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THE PEACH.

THE KANSAS PEACH.

THE LUSCIOUS, MELTING, JUICY MASS OF ANGEL FOOD.

None too good for Kansas palates, but too good to be made into brandy.
How can one of the grandest fruits God gave to man be put to so ignoble use as
a body, brain and soul destroyer?—SECRETARY

HOW TO GROW YOUR TREES.
HOW TO PLANT AND CARE FOR THEM.
HOW TO FIGHT ITS ENEMIES.
HOW TO GATHER, PACK, AND MARKET.
HOW TO ENJOY IT IN THE HOME



COMPILED BY THE
KANSAS STATE HORTICULTURAL SOCIETY,
WILLIAM H. BARNES, SECRETARY,
State Capitol, Topeka, Kan.

1899.

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A Typical Peach Orchard in its Third Year.—“Peaches Pay.”



“Peaches Don't Pay.”

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THE PEACH.

DEFINITIONS AND LEGEND OF ITS ORIGIN.

Standard Dictionary: A well-known, high-flavored, juicy fruit, containing one or two seeds in a hard, almond-like endocarp or stone; also, the tree which bears it.

Century Dictionary: (1) The fleshy, drupaceous fruit of the tree *Prunus persica*. (2) A garden and orchard tree, *Prunus* or *Amygdalus persica*. The peach is a rather weak, irregular tree, fifteen or twenty feet high, with shining, lanceolate leaves, and pink flowers appearing before the leaves. The roundish or elliptical fruit is two or three inches in diameter, and covered with down; when ripe, the color is whitish or yellow, beautifully blushed with red; its fruit is subacid, luscious, and wholesome. The peach is closely allied to the almond, from which Darwin inclines to derive it. Its local origin has commonly been ascribed to Persia, but the investigations of De Candolle point to China. It is now widely cultivated in warm, temperate climates, most successfully in China and the United States, as in Delaware, on the shores of the Chesapeake bay and Lake Michigan, and in California. The canning of peaches is now a large local industry; large quantities are also dried, and some are made into peach brandy. The seed often takes the place of bitter almonds as a source of oil, etc. Peach leaves and flowers are laxative and anthelmintic. The varieties of the peach are numberless, a general distinction being between clingstones and freestones, and again between the white and yellow fleshed. The flat peach, or peento, is a fancy Chinese variety, having the fruit so compressed that only the skin covers the end of the stone. Another Chinese variety, the crooked peach, has the fruit long and bent, and remarkably sweet. In ornamental use there is a weeping peach; and various dwarf and double-flowered varieties, called flowering peaches, have been produced, with pure white or variously, often very brilliantly, colored flowers.

Legend of its Origin: The Japanese, who claim to have first discovered or utilized the peach, have a quaint legend as to the fruit. A pious old couple, stricken with years and poverty, subsisted by begging. One day on the highway the old woman found a beautiful ripe peach. Although almost famished, she did not selfishly eat the luscious fruit alone, but took it home to divide with her husband. As

the knife cut into it the peach opened, and an infant sprang forth, who told the astonished beggars that he was the god Shin To, and had accidently fallen from the orchard of the Japanese heaven while at play with some other gods and goddesses. For extricating him from the peach Shin To gave the Japs its seed to plant, and told them its product would make them wealthy. This is the origin of the peach, according to the Japs.

Kansas is the home of 4,058,762 bearing and 1,966,881 not yet bearing peach trees (see map), and by the 1890 census stood sixth on the list of peach-producing states, with 1,798,781 bushels reported, being 100,000 bushels more than California. Peach trees grow so quickly, and produce so abundantly when healthy and the season is appropriate, that they become necessarily subject to many "ups and downs." Growers go into ecstasies over a big crop of luscious, melting, beautiful peaches, and—if circumstances prevent the crop the second year—many neglect the trees, and allow weeds and vermin to destroy them. No tree fruit brings such pleasing returns so cheaply as the peach. Even when neglected it often repays its owner with most appetizing returns. Young trees usually produce the best fruit, and as they grow readily in almost all parts of our state, and adapt themselves to their environment, we should plant a few every spring, and as the older ones become unsightly cut them out; they make good fire-wood. In this connection, I would describe the method of Frank Barker, of Saline county.

Mr. Barker discovered a peach—a persistent seedling: it is yellow, good size, sprightly, and of good quality, coming the same from seed. He says: "I prepare my ground as for wheat, marking it off in squares of ten feet each way; at each crossing of the marks I drop three of the peach pits, and cover them. I cultivate them until six or eight inches high, when I pull out all but one of the little plants at each crossing, filling vacancies by transplanting the surplus. The second year I often have peaches, and thereafter I have an abundance."

If on each farm such a plat of one or two acres was planted each year, our western citizens could have fruit and fire-wood, to their great profit.

THIS MAP SHOWS THE NUMBER OF PEACH TREES IN 1898 IN EACH COUNTY.

174 Cheyenne.	149 Rawlins.	2,797 Decatur.	8,822 Norton.	15,996 Phillips.	72,618 Smith.	141,001 Jewell.	68,105 Republle	51,285 Washington.	58,779 Marshall.	40,643 Nemaha.	29,914 Brown.	38,448 Doniphan 46,960		
352	551	13,225	34,657	27,861	18,359	122,543	46,392	58,677	64,429	49,352				
96 Sherman.	623 Thomas.	657 Meridan.	3,253 Graham.	16,506 Rooks.	26,132 Osborne.	42,229 Mitchell.	46,491 Cloud.	45,718 Clay.	36,019 Riley.	37,598 Pottawatomie.	36,225 Jackson.	29,482 Atchison.	22,652	
879	1,495	1,850	7,761	32,594	64,935	44,721	46,228	28,513	14,495	22,872	26,165	58,030 Jefferson.	29,482 Atchison. 22,652	
160 Wallace.	1,225 Logan.	1,077 Gove.	2,865 Trego.	5,307 Ellis.	6,425 Russell.	28,187 Lincoln.	17,079	39,188 Ottawa.	17,079	17,026 Geary.	38,958 Wabauasee	56,951 Shawnee.	25,025 Leavenworth.	25,942 Wyandotte.
226	1,132	2,935	8,195	4,151	9,074	21,297	21,297	47,590 Saline.	18,767	6,447	15,873	28,847	54,190 Douglas.	33,434 Johnson.
58 Greeley.	922 Wichita.	1,779 Scott.	1,297 Lane.	3,574 Ness.	2,709 Rush.	34,676 Barton.	18,689	47,590 Saline.	18,767	31,464 Morris.	75,115 Lyon.	62,136 Osage.	51,190 Douglas.	33,434 Johnson.
1,329	1,193	1,783	3,954	11,970	6,379	25,419	59,799 Rice.	46,228 McPherson.	15,327	65,095 Marion.	32,102 Chase.	17,628	51,190 Douglas.	33,434 Johnson.
					4,641 Pawnee.	68,397 Stafford.	17,828	15,327	15,327	12,106	18,365	56,381 Coffey.	23,931 Anderson.	39,773 Lion.
1,943 Hamilton.	5,303 Kearny.	5,005 Finney.	7,580	2,657 Hodgeman.	6,905	10,853	200,740 Reno.	73,675 Harvey.	14,239	65,095 Marion.	32,102 Chase.	18,365	23,931 Anderson.	39,773 Lion.
2,782	2,558		5,137 Gray.	22,178 Ford.	12,001	24,148	61,319	14,239	136,676 Sedgwick.	164,554 Butler.	61,047 Greenwood.	30,030 Woodson.	29,827 Allen.	27,530 Bourbon.
1,892 Stanton.	2,077 Grant.	797 Haskell.	2,876	22,127	33,330 Kiowa.	18,648	117,014 Kingman.	18,832	30,479	17,988	12,468	8,825 Wilson.	35,822 Neosho.	35,039 Crowford.
3,297	524	1,105			13,648		18,832				69,094 Elk.	8,872	10,276	6,491
2,025 Morton.	1,614 Stevens.	3,424 Seward.	11,544 Meade.	5,550 Clark.	13,682 Comanche.	55,235 Barber.	45,850 Harper.	152,785 Sumner.	178,398 Cowley.	178,398 Cowley.	45,546 Chautauqua.	43,881 Montgomery.	33,955 Labette.	48,796 Cherokee.
810	5,125	2,823	88,969	2,727	5,719	11,508	18,963	37,047	21,416	21,416	4,983	9,538	10,000	8,444

The upper figures are in bearing; the lower are not yet bearing. Total bearing, 1,058,762; not bearing, 1,066,881; total, 2,125,643.

THE PEACH IN KANSAS.

WITH the Kansas settlers came the peach. Peach pits were saved at the old Eastern home and brought in pockets and in baggage. I know one gentleman who was accosted on the train while coming to Kansas by the train-boy with fruit: in the lot were three immense peaches; asking the price, the old gentleman was astounded to be told twenty-five cents, but he gave it—twenty-five cents for three peaches—solely to obtain the pits, and felt proud of his purchase. Such pits were religiously planted and tended. Their product surely must have been unsatisfactory, but they bore peaches.

In the following pages the experiences and conclusions of Kansas peach growers have been given, and we find that the peach produces fruit on all kinds of soil and on any angle, aspect, or slope. Sandy soil, of which we have a preponderance, seems the favorite. Budded trees are usually planted after a growth of one season from bud; that is, a two-year root and a one-year top. See chapter on budding. The general way seems to be to trim to a stick, cutting the stick to a length of from six to thirty inches, some leaving it whole. Distance differs from ten (or even eight) feet to thirty-two feet apart; some planting between young apple trees, others deprecating such practice. In such planting the peach trees should be cut out in seven or eight years; some say they will die of old age by that time; but if a man is a wise cultivator the peach trees will then be in their prime, and it takes "a deal of pluck" to cut down a peach tree with the taste of its luscious fruit still clinging to the mouth.

Those who have tried it favor "heading in" bearing trees—that is, cutting back from one-third to one-half of the past year's growth. This tends to keep the tree in bounds, making it stockier, so that it is not so liable to be torn to pieces by the winds or weight of fruit. Thinning on the trees should be practiced more. See article on thinning. I have heard of 9000 young peaches being picked from a single tree, and as those left grew larger and heavier, many more had to be taken off to save the limbs from breaking. Many peach trees would live longer and be far more profitable if thinning the fruit was practiced. Peach trees should undoubtedly be cultivated, and, where closely planted, nothing should be grown among them after two or three years.

One of the best crops (for the tree) is vines—melons, pumpkins, squashes, or cucumbers. Live stock running among the trees is harm-

ful; the tops should be low; and the branches are brittle, and animals can and will do much damage; yet shoats or pigs will eat the wormy fruit, and during the ripening period might be allowed to pick up such as fall. Picking and packing vary, and will have a chapter by themselves.

Owing to want of courage and determination on the part of many of our husbandmen, the demand for good peaches (culls and indifferent ones, too) makes a market for them necessary in the orchard over a large area. During the late '70s peaches were shipped in car lots from our state; but of late years, owing to the increased population and prosperity of our cities, the peach crop is mostly utilized within the state. In the western part of the state peach pits are planted in great quantities to grow for windbreaks; and as they—without cultivation or care—produce more fruit than the settler needs, and much of it of surprisingly fine quality, therefore there is little inducement for him to try the choice budded varieties: for such localities we would recommend the choicest of the persistent varieties, costing only a little trouble to obtain, but yielding under the same treatment a choicer fruit. Dean's Orange, Barker's Rareripe, Heath Cling, Salway and many others will give great satisfaction and grade up the western seedlings.

The severe winter of 1898 and 1899, beginning suddenly with a snow-storm in October, with peaches still on the trees, and passing through the extremely low temperature of February, 1899, caused immense loss and destruction to the peach interests. But as it cleaned up many worthless varieties, and the same cause affected the peach in all our neighboring states—in some more disastrously than in ours—therefore, if wise we will plant largely of choice varieties known to do well—barring such extreme weather—in our state, and we will soon be reaping our reward.

VARIETIES RECOMMENDED.

The following varieties are recommended for all purposes by the Kansas State Horticultural Society. This list is the result of a ballot taken December 11, 1896:

	<i>Votes.</i>		<i>Votes.</i>
Elberta	17	Troth's	4
Old Mixon Free	14	Hale's Early	4
Salway	13	York Early	3
Smock	11	Reeve's Favorite	3
Champion	10	Old Mixon Cling	3
Alexander	9	Foster	3
Stump the World	9	Crawford's Early	3
Crosby	9	Ward's Late	3
Heath Cling	7	Mountain Rose	2
Family Favorite	5	Amsden	2

	<i>Votes.</i>		<i>Votes.</i>
Crawford's Late.....	2	Indian.....	1
Wonderful.....	2	White Rose.....	1
Waterloo.....	1	Cooper's Late.....	1
Beatrice.....	1	Snow.....	1
Honest John.....	1	Governor Garland.....	1
Governor Briggs.....	1	Hill's Chili.....	1
Chair's Choice.....	1	Early Rivers.....	1
Lemon Cling.....	1	Democrat.....	1

OTHER RECOMMENDATIONS.

List of J. C. Evans, ex-president of Missouri State Horticultural Society, of Olden, Mo., fruit farm, south Missouri: Elberta, Picquet's Late, Salway, and Bonanza.

N. F. Murray, Oregon, Mo., president of Missouri State Horticultural Society: For north Missouri—Champion, Elberta, Crosby, and Heath Cling.

Prof. J. C. Witten, horticulturist at state agricultural college, Columbia, Mo.: For central Missouri—Elberta, Family Favorite, Champion, and Mountain Rose.

Mr. Beekman: Southwest Missouri—Old Mixon Cling, Heath, Elberta, and Bonanza.

Mr. A. Nelson, Lebanon, Mo.: Old Mixon Cling, Salway, and Elberta: would plant ten per cent. clingstones.

HOW TO GROW YOUR OWN PEACH TREES.

Having procured the pits, either by saving them from the kitchen, picking them up from under your own or neighbors' trees, or by purchasing them from others, take them out on the garden and spread them out on the earth from one to three inches deep and cover them over with four to six inches of fresh pulverized earth free from trash. If the quantity is small they may be mixed with earth and placed in a box, can, or keg—which must have openings in the bottom to allow water to pass through—and the box, can or keg then buried out anywhere that water will not stand on it.

As soon as land can be worked in the spring, prepare—by plowing and harrowing or spading and raking—a plat of ground; mark off rows north and south, three or four inches deep; open up your seed bed and you will find most of the pits opened, many of the kernels lying loose, some with sprouts starting. Handle them carefully, and drop one in a place about four or six inches apart, in the furrows made as above; in a few days the little seedlings will appear and should be cared for as any garden crop, cultivating with hoe and rake. If you have many, make the rows three and one-half feet apart and cultivate with a five-toothed cultivator and hoe until after the 4th of July; then if the bark will "slip"—peel easily—they may be budded.

Be sure to get buds of the variety you want—true to name; these buds are of the present season's growth and should be sufficiently matured for use. Cut the new twigs containing the buds, discarding the "tips and butts," using only the healthy, strong middle buds; cut the leaves off, leaving the petiole or leaf stalk with the buds. See fig. 1*a*. Now, beginning at the south end of a row of the seedling trees—which should be from two and one-half to four feet high—get on your knees, with your back to the south and the row on your left; allow the top of the young tree to rest back of your left shoulder, and with your left hand grasp it near the ground, and, bending it toward the south, hold it there while with the knife in the right hand you make an incision through the bark across the tree about two and one-half or three inches from the earth (see fig. 1*c*), and another from its center downward, from one to one and one-half inches. See fig. 1*c*. The bent position of the tree will cause the corners of the bark to open slightly; with the reverse end of the knife-handle—some use a goosequill or a piece of ivory or bone—press the bark gently from the wood (see fig. 1*d*), and having cut a bud from the twig (see fig. 1*b*) insert it under the bark in such a way that the bud itself projects from the perpendicular cut in the bark of the young tree; push the bud and shield of bark well down in the slit (see fig. 1*e*), and then, with bass mat, yarn, or tow string, proceed to wrap above and below the bud. I like to wrap above first, then crossing behind wrap and tie below the bud, being always careful not to injure it. The tie does not need to cover all the cut parts: it is simply to hold them for the healing which nature brings. No wax or covering of any kind is used. You are now ready for the next tree.

After three, four or five days examine your work, and if necessary cut the tie, as such young trees are often so thrifty that the string will check growth in three or four days. Where much budding is done boys go ahead to clean the lower part of the tree of sprouts, leaves, trash, or dirt: then after the budders follow the tiers. Have your ties cut beforehand: the most convenient length is about seven inches. Be careful to discriminate between leaf and blossom buds; leaf-buds are more pointed and are what you want, as they contain the germ of a sprout, a tree. Blossom buds are plumper and more blunt, and rounded on the end, and will produce only blossoms—on the parent tree they would probably set fruit.

Plainly label your trees with name of bud variety, with stakes at end of row, and cultivate until August, being careful not to injure the bud.

The following spring cut the seedling top off about three or four inches above the inserted bud; and it is a good thing to tie the sprout,



FIG. 1.

From *Canadian Horticulturist*.

FIG. 2.

as it grows, to the stub, to keep winds from breaking it out. This inserted bud will soon grow and form a new tree, and the variety will invariably be exactly like the parent from which the bud was taken. These young trees with budded tops are ready the next spring to be set in the orchard.

SOME PEACH NOTES.

By HUGH N. STARNES, in Bulletin No. 42 of the Georgia Experiment Station; Part I, "Peach Culture."

So important, of late years, has the peach industry become, that information of any kind bearing either directly or indirectly on the subject is of interest to a very large portion of our citizens. Therefore, we present a few notes on the behavior, during the past season, of the standard varieties common in this section. As an introduction, we insert a short clipping on the culture of the peach, using largely for this purpose a condensation of a very practical and concise, yet comprehensive essay, by Mr. G. H. Miller, of Rome, Ga., originally published as a press bulletin by the Georgia experiment station.

Mr. Miller's directions will be supplemented by a few miscellaneous notes on points not sufficiently elaborated by him.

I—LOCATION.

A most important factor in the problem of successful peach culture is to know how to select a location for an orchard, so as to secure the greatest immunity from the effects of the late frosts. While it is hard to determine the best location without special observation for each

locality, yet it may be laid down as a rule of pretty general application that the crest adjacent to a valley is a desirable location for a peach orchard, and if these valleys have streams running through them, thus securing an outlet, so much the better. This rule appears to hold good without the general elevation of the valley above sea-level. Ascend a high elevation some frosty morning and you will reach a point where the frost will be succeeded by dew, and as you ascend still higher the dew itself will disappear; or, as you descend from the warm air of the elevation into the adjacent valley, you will find yourself plunging into a lake of cold air.

There is such a thing as frost drainage. Frost runs down hill—so to speak—very much like water, and the buds in the valley will often be killed when those on the elevation escape.

Cotton, for instance, is often uninjured on elevations for weeks after it is killed in the adjacent valleys. I will not invade the domain of meteorology in attempting to explain this phenomenon further than to state that the heat that is absorbed by the earth from the sun during the day passes by radiation on cloudless nights into the atmosphere, and, owing to the difference in specific gravity, the warmer air rises and the colder air sinks, and this envelope of warm air in the early morning, when the temperature is lowest, usually stands at an elevation of 200 feet and upwards above the adjacent valleys, thus affording protection from frosts in such favored locations.

As an auxiliary condition in producing the above results, I might mention that the radiation of heat from the soil of valleys is usually much more rapid than that of uplands. We might refer to the fact that clouds check the formation of dew and frost by obstructing radiation, or restore by counter-radiation some of the heat lost.

It is possible to accomplish the same end by a dense cloud of smoke; winds also prevent the formation of dew and frost, by constantly changing the strata of air in contact with the earth. The protection afforded by steep mountains or hills to the strips of land at their base is somewhat analogous to that given by clouds, to which I have referred.

II — SOIL.

The soil for a peach orchard should, if possible, have a good clay subsoil, naturally well drained, and be rich enough to produce a fair crop of wheat or corn, or not less than half a bale of cotton to the acre.

Some people appear to think that if they have an old field that is so exhausted it will not produce profitable farm crops any longer, and is washed into gullies, there is the place to plant an orchard. No greater mistake can be made. If you are not willing to devote good land to the orchard our advice would be to let the business alone. In

the region of country for which I am writing (the Piedmont belt), we find that the so-called red lands as well as the gray and those that are composed of sandy loam with a clay subsoil all produce first-class peaches.

III—PREPARATION.

The entire surface should be plowed deeply before planting: then check each way with a plow, planting where the furrows cross each other. Dig the holes sufficiently large to admit the roots without cramping. In locations where the subsoil is poor it is advisable to dig a hole, say three feet in diameter and eighteen inches deep, and then fill up with good surface soil, leaving the excavation that is to receive the tree of such a depth that the tree, when planted, will be about the same depth, or a little deeper, than it grew in the nursery. The proper distance apart for planting is from sixteen to twenty feet each way. In orchards with sloping or uneven surface we generally recommend locating the rows as near a horizontal line as practicable, about eighteen feet apart, and the trees in the rows sixteen feet apart.

IV—VARIETIES.

The selection of varieties for the commercial orchard is a point that is vital to its success, and in making this selection there are a number of considerations that demand our attention. While I do not condemn new varieties, yet it is wisdom on the part of the commercial grower to "touch them lightly" until he has tested them himself, or they have been tested by others in soils and locations similar to his own. Then there is the matter of hardiness in fruit, and consequently greater certainty in producing regular and paying crops. For while a variety may be beautiful in appearance and first-class in flavor, it may, on account of its unproductiveness, be unworthy of a place in the commercial orchard. The grower should also study the markets that he wishes to supply, that he may learn what style of peaches is most in demand in these markets. He should also study the production of other peach centers with which he may be brought in competition. For instance, if some other favored locality sends, at a certain season, large quantities of some leading, first-class variety to market, it would not be wise to endeavor to compete with them at the same season with any variety in the smallest degree inferior to what they are sending in such large quantities to the market.

The commercial grower should therefore confine his list to a few varieties. If the fruit is being grown for a home market, then, of course, a greater range would be admissible. . . . A good reason for planting only a few varieties is that this will enable the grower to have his fruit carried to the market at less expense. Having large quantities to ripen at once, he can ship by car-loads. The difference

in cost between this method and by express affords quite a profit in itself. If I were planting an orchard of only 5000 trees, and had no one at the same shipping point to unite with in making shipments, I would plant only one variety. The planter who selects varieties that are not suited to his location, or will not meet the wants or whims of his market, makes a mistake fatal to his financial success. The commercial grower should buy his trees direct from reliable nurserymen, whose trees can be relied upon as being true to label, propagated from healthy, vigorous stock, and given careful and thorough cultivation. Avoid trees from sections where the yellows, rosette, or any disease capable of being transmitted, prevails. Do not accept trees of more than one year from the bud as a gift. [!!!] For my own planting in orchards, I do not want a tree over three to four feet in height, and after a large experience with June buds, I am convinced they give as good results and as quick returns as any other tree that can be planted. June buds, however, should not be dug before December, as they make a late growth, and the wood is not properly matured sooner.

V—TIME FOR PLANTING IN GEORGIA.

A tree planted in November or December will by the ensuing spring have formed sufficient new roots to give it firm hold in the ground, and will grow off rapidly when active vegetation begins. Trees can be transplanted as late as March, and in some seasons until the first of April. All trees should, however, be procured not later than December, and, if not ready to plant then, should be heeled in: that is, the roots should be placed in a trench, allowing room to get fine soil into all the interstices between the roots, and then cover somewhat deeply with mellow soil. From this trench the trees can be taken, a few at a time, as needed for planting. While in the trench the cut roots will become calloused and ready to start with vigor when planted. While handling trees that are out of the soil, it should always be kept in mind that the absorptive power of the roots is very much weakened by exposure to the drying influence of sun and wind; hence the necessity of keeping the roots protected from every drying influence. After the young tree has been properly prepared it should be placed in the hole with the roots in their natural position; then fine rich soil should be firmly packed among the roots, so that every part of each root may be in close contact with soil. Do not forget to pack firmly.

VI—PRUNING.

The work of pruning begins before the tree is planted; first, all broken and bruised roots should be cut back to sound, healthy wood, with a sloping cut on the under side of the root, always using a sharp knife. If there are any side branches they should all be cut off,

leaving a single straight stem, cut off at the height of one foot to eighteen inches from the ground. There are many good reasons for having our orchards branched this low. When the trunks are shaded they are less liable to disease. With no long trunk for leverage they are less liable to be blown over by storms. When trained with low heads, pruning, thinning and picking can be done for a tithe of the expense involved where the workmen must use ladders to enable them to reach the high and widely extended top.

The planter should aim to have four or five well-developed buds on the upper part of the trunk when planted, as the new branches grow from such buds more readily and vigorously than from those near the base of branches that have been cut off. Three or four of the branches that grow out the first season will be needed for the framework of the future tree.

By rubbing off as soon as started all superfluous shoots the grower can, to some extent, economize growth, but if not rubbed off they can be cut out at the first pruning after the tree has attained a year's growth.

During the latter part of winter, before the trees start into growth, all shoots not needed for the permanent head of the tree should be cut out, and those left (which should have attained a length of three to five feet) should be cut back to two feet or two and one-half feet.

It has been customary to cut back even shorter than this, say to one foot or eighteen inches, but the tendency of such very close pruning the first year is to have the tree too dense, its leading branches too close together. Each of these main branches will the second year throw out leaders, each of which will make a growth of four to six feet. At the second annual pruning the first aim should be to establish a broad, low, open-headed tree. This can be accomplished by first thinning out all crowding inside branches, and shortening in all others from one-half to three-fourths of the year's growth, doing the closest cutting in the central top.

The third year's pruning should be on the same general plan, having the same object in view, to establish a well-formed tree best suited to produce the greatest quantity of fruit in the highest perfection. Pruning must be kept up year after year, but as the trees grow older less severe cutting will be required. The aim should be to avoid long, bare branches that only bear fruit at the extremities and, as a consequence, break down the trees.

No specific set rules can be given for pruning, but every one who would prune intelligently must study the characteristics of growth and fruitage of the trees upon which he would use his knife.

Pruning may be done at any time during winter, but we prefer to have it done after the buds begin to swell in early spring. If done

earlier it tends to hasten the development of the buds left, thus increasing the liability to injury from frost, and if buds have been injured before trimming you can then trim to retain as many live buds as possible.

VII—THINNING.

This operation is necessary to success, but one that puts the nerve of the inexperienced grower to a severe test. This work can be partially accomplished by pruning as we have intimated, and some seasons the late frost will do the work even more thoroughly than we may desire.

It is not unusual in a good season for a four-year-old tree to set 800 to 1000 peaches, which if left on the tree would measure two bushels when ripe, and be worth perhaps fifty cents per bushel; but if all down to 300 were pulled off, these, when ripe, would also measure two bushels, but be worth two dollars or more per bushel; and while the small peaches could only be shipped at a loss, the larger ones would yield a handsome profit.

A large per cent. of the edible part of a peach is composed of water; hence it is the formation of the seed that exhausts the vitality of the tree. The perfecting of the seeds of such an immense number of peaches will frequently exhaust the vitality of the tree, so that it cannot produce another good crop for years, and this is one reason why peach trees allowed to overbear are usually short-lived. Peaches should always be thinned before the seed begins to harden, while you can still run a pin through them without meeting any obstruction from the seed. If any show marks of having been stung, or are in any way faulty, they should be taken off and destroyed.

We should leave the peaches as equally distributed as possible, from four to six inches apart, all over the tree. The cost of thinning should not be considered, as if they were left on they must be picked when ripe, and it certainly will cost less to take them off while small, to say nothing of the vastly increased value of those that are left to fully develop.

Remember that overbearing is the "besetting sin" of the peach tree, and that thinning *must* be done if you would grow the finest fruit. If we were asked to give the approximate number of peaches that should be allowed to mature on a tree, we would say, for a three-year-old tree, about 150; for a four-year-old, 250; for a five-year-old, 400; but seldom over 600 for a tree of any age.

VIII—CULTIVATION.

It is just as reasonable to expect a good crop of cotton or corn [as peaches] without the same care. During the first two or three years some low hoed crop, such as cotton, peas, or melons, may be grown

in the orchard, but they should not be planted too near the trees, and the space around the young trees should not be neglected, but should be kept clear of weeds and grass and the surface mellow.

The cultivation of young orchards should be suspended about the 1st to 15th of August each year, in order that the young wood may mature before winter. Cultivation should be kept up in the orchard as long as it lives. It should commence in the spring, as soon as the blossoms open, when the orchard should be carefully plowed, being careful not to plow so deep as to injure the roots.

For subsequent cultivation, on lands not too rough or stony, the Acme or Cutaway harrow may be used, thus saving much time and expense. It will, however, usually be necessary to use a one-horse cultivator directly in the row and next to the trees.

We need scarcely caution the orchardist that great care should be exercised in the work of cultivating not to break the branches or in any way mutilate the trees. Cultivation should be kept up as often as necessary to maintain the surface in good condition until in August. It is a good plan to sow peas in drills in the orchard, say early in July. Give them one or two good cultivations, then allow them to cover the ground, in this way both protecting and enriching the soil.

IX — FERTILIZING.

Of the three essential constituents of plant food—nitrogen, phosphoric acid, and potash—nitrogen is of the greatest value in promoting growth and forming wood. This fact indicates that manures or fertilizers rich in nitrogen should be used during the first years of growth in the young orchard.

Of this class of fertilizers, we might mention well-decomposed barnyard or stable manure and cottonseed-meal, which should be applied early in the season, to be turned under at the first spring plowing.

When planting no manure should ever be put in direct contact with the roots, but in some soils a few handfuls of fine bone may be mixed in the soil about the roots. When the peach tree comes into bearing, phosphoric acid and potash are necessary to the proper development of size, beauty and flavor of the peach. These elements can be supplied by fine ground bone and muriate of potash, or hardwood ashes, ashes of cottonseed hulls, etc. Many orchards become unprofitable because they are not properly fertilized. One great reason for the failure of so many orchards is because they are starved. After the trees come into bearing, they have to perform the double function of developing wood growth and perfecting the fruit, and the failure to perform either of these functions properly is evidence that the soil must be enriched or the orchard will no longer be profitable.

The rootlets that absorb the plant food necessary to the growth of

the tree and the perfection of its fruit are found away from its base; hence the fertilizer should always be applied broadcast over the entire orchard. The practice of piling up manure around the base of the tree is about as sensible as it would be to apply a poultice of bread and milk on a man's stomach to alleviate hunger.

X—MISCELLANEOUS POINTS.

Distance.—The matter of distance probably demands a little more attention than Mr. Miller has given in his directions. It is certainly one of the most perplexing problems confronting the peach grower. While the standard distance for this section is 20 x 20, there can be no question but that this is a waste of ground, and consequently a reduction of the profits in a "crop year." Peach trees are short-lived at best; their wood is brittle and easily broken, and when they become so large as to require a distance of 20 x 20 feet to prevent interference with each other, the probability is the orchard will be found, from other causes, to be no longer profitable, consisting, as it doubtless will, of a lot of one-sided, malformed, gangling trees—most of them infested, also, with fungous diseases or scale insects.

Therefore a lesser distance is advisable. What this distance should be depends on many factors which each grower must reconcile for himself. For instance, Mr. S. H. Rumph, of Marshallville, the originator of the Elberta, and one of our "peach kings," believes in extremely close planting (15 x 15, or 16 x 16 at most), and claims to make much larger profits, all things considered, at this distance, than where more space is given. Yet many of his immediate neighbors, themselves successful growers and practical men, are equally positive in advocating greater distance, claiming that it will pay in the "long run" by reason of the increased longevity of the trees. To this the answer comes readily that it is easier to establish a new (and thrifty) orchard than to care for an old (and decrepit) one.

As a general rule, for commercial planting, it is certain that 18 x 18 will not be found too close, and even 17 x 17, especially on thin land, will probably be found amply sufficient. Many growers plant 18 x 16; but on level land, for several reasons, square checks are preferable; for terraced lands, however, 18 x 16 will be found quite convenient.

Where a crop "hits" within three or four years after planting, 18 x 10 will be found to realize a maximum profit. After four years every other tree must of course be cut out, and the orchard thus reduced to a permanent distance of 18 x 20. If even one full crop can be secured before this is done, it is evident that the yield (and presumably the profit) will thus be doubled. It is true that in this method there is apparently an element of "gambling," but then so there is in fruit-growing generally, where it's "hit or miss" all

through. Still, in view of the doubled profits, should a crop be realized in three years or so, the slight extra cost (as inexpensive as standard peach trees now are) is well worth taking—*on good land*. On poor land this method will not do, as the fruit would be undersized.

Of course, when the trees begin to crowd each other in the row the alternate trees must come out, whether a crop has been secured or not; but this seldom proves to be the case, and one good crop, at least, is usually obtained before the trees have to be thinned out.

XI—BUDDING.

While every experienced grower is of course thoroughly familiar with this operation, we have found at the station that so many inquirers wish to be informed of all the details attending it, that it may not be out of place to insert here a few simple directions. This method of propagating the peach has altogether superseded grafting.

Budding may be done at two seasons—in the early summer, or in the early fall or late summer. When done early in the season it is always with the intention of forcing immediate growth, thus producing what are known commercially as “June budded” trees. When done in August or September the bud remains dormant through the following winter and does not commence growth until the next season. Of late years June buds have been growing steadily in favor with the fruit-growing public—as it becomes more and more convinced that small trees, of any variety of fruit, are always preferable to large ones for planting. While budding in either instance must be done with wood of the current season’s growth, such wood is quite often immature in the early summer, and consequently many June buds fail to live in the hands of inexperienced operators. This has probably been the cause of the slow progress June budding has made in the past with the public. In either case the operation is the same, excepting that in June-budded trees, after buds have “taken,” the top growth of the stock is cut off in order to stimulate the growth of the bud.

The process itself is a simple one. A twig of the present year’s growth, having leaf-buds well developed, is cut to a convenient length—from six to twelve inches, according to circumstances—and the leaves trimmed off, leaving only a short portion of the stem or petiole by which the bud is to be handled. Budding sticks should never be cut until the day they are to be used. In preparing the bud, the knife should be inserted under the bark about a quarter of an inch below the bud, turning the blade nearly flat with the stock, and a clean, upward cut made just under the bark to a point about a quarter of an inch beyond the upper portion of the bud. This leaves a small, oval disk attached to the budding stick by the bark at the upper end.

Each bud intended to be used should be loosened up in this way before commencing operations. A horizontal cut just above the bud, when ready for insertion, separates it from the budding stick. The most common form of incision in the stock is that known as the T cut. The laterals of the young stock are usually cut off for a few inches from the ground, and about two inches from the surface a horizontal cut some three-eighths of an inch long is made with the budding-knife, followed by a vertical cut half an inch long, leaving an incision in the form of a T. The corners of the bark along the vertical cut are then loosened (generally with the edge of the budding-knife, sometimes with its handle), the bud inserted, and pressed down with the back of the budding-knife until the square upper end slips in under the horizontal cut. The bud is then tied in place with raffia, baste, or some other convenient binding material, and the process is complete. (See figs. 1 and 2.)

Some budders, instead of tying the raffia, make an angular incision in the stock a half an inch above the bud and force the end of the raffia into this cut. This is somewhat more expeditious than tying, and holds as tightly; but it is apt to cause a flow of sap, producing a gummy mass which sometimes proves injurious to the bud. A method of winter budding, which may prove valuable in our latitude, has been practiced by Prof. R. H. Price, of the Texas experiment station, with great success. Its importance consists in the fact that it enables the operator to do this work at a season when he is not so pressed for time as during the summer. Professor Price describes his operation as follows:

"The method as used at the station here consists in cutting a slip of bark, with some wood attached, down the tree about one inch, leaving it attached at the lower end. About half this slip is then cut off, leaving the other half still attached to the tree. Cut off the bud, leaving some wood also attached to it to prevent injury, and then carefully place it between the slip and tree so that it will fit nicely and the cambium of the bud and tree come in contact. Tie tightly with some good material, such as raffia. In five or six days the bud will be found to have knit firmly. Treat them as though budded in the usual way." (See fig. 3.)

Professor Price has employed this process in the month of January without the loss of a single bud. He ascribes its first use in this country to Professor Ness, of the Texas station, but admits that he has since discovered that it is a modification of a method practiced years ago in Europe. Should it prove as successful in Georgia as in Texas, it will be of decided value to our nurserymen.



FIG. 3.

From *Canadian Horticulturist*.

XII—MARKETING.

Under this head the importance of careful selection cannot be too strongly stressed. It should never be forgotten that the poorest peach in a crate sells the crate, and hence, on gathering, they should be severely culled and only perfect peaches shipped. It should be also remembered that the neater and more tempting the carrier is made in which any fruit is transported the more readily the shipment will sell. Fortunately the Georgia public seems to appreciate this fact, and, of the many different packages now in use for shipping peaches throughout this country, that known as the "Florida" crate in the Northern markets, and to Georgia shippers (see fig. 4.) as the "six-basket carrier," now appears to be the general favorite. The carriers usually hold about two layers of peaches. These should be arranged in parallel rows and with great care, so that when the top is taken off the contents will show up symmetrically and temptingly. It will always be found a wise plan, after a crop appears to be assured, to lay in an ample supply of crates. Our fruit-growers will all remember the straits to which many of them were put during the last

season [1898] through failing to provide an adequate supply of carriers to handle their crop, and how much loss was sustained by shipping in California crates and other unsatisfactory packages which their exigencies forced them to use.

Probably the most important factor in marketing is the selection of the market. Frequently, when large shipping centers are glutted on account of the tendency of the average grower to ship to the biggest markets, very satisfactory returns may be obtained by selecting smaller and more obscure points. During the handling of the enormous crop of the past season [1898] profitable returns were frequently obtained from such minor markets as Lincoln, Neb., Duluth, Minn., Springfield, Ill., etc., when shipments the same day to New York, Chicago or Cincinnati barely paid freight.

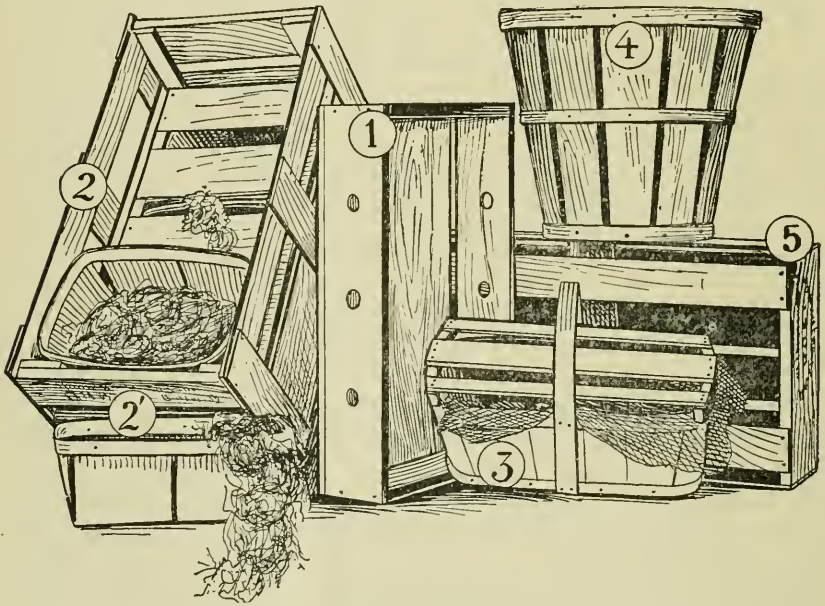


FIG. 4. TYPES OF PEACH CARRIERS.

1, California; 2, Georgia; 3, Michigan; 4, Delaware; 5, North Carolina.
(*Farmers' Bulletin 33, United States Department of Agriculture.*)

Another important question is in the selection of varieties. At present the bulk of the Georgia crop is of course Elberta. Finding the market this year glutted with this variety, and that Emma, coming in immediately after, brought good prices, there will doubtless be an enormous acreage in the next year or two planted in Emma; and this must necessarily result, in a short time, in as bad a glut during the Emma shipping season as now occurs with Elberta. Therefore the careful grower should seek, in addition to these two standard varieties

to have one or two other desirable peaches which may be marketed both before and after them. In this way he will not run the risk of sending his entire crop to a glutted market.

XIII—PREMATURE BLOOMING.

Probably the chief factor operating to cause the total loss of our peach crops in the seasons when they make a total failure is the affection of the fruit by late frosts. Consequently it is always desirable to have the trees to bloom as late in the season as possible. Many methods have been sought by which this end could be attained. "Smudging" as a preventive process is well known, and has been attended with great success, but probably the most effective means has been found to be *whitewashing*. It is well known that the two colors which absorb heat most readily are black and purple, and that white has been found to be the best reflector. Owing to the fact that the bearing twigs of the peach are nearly always of a dark purple color, it has been found that they very readily absorb the heat rays of the sun in the late winter or early spring, and that such absorption causes the fruit-buds to swell prematurely, thereby exposing them to great danger in case of late frost. If, however, the purple color was replaced by a white surface, the sun's rays would necessarily be more or less reflected, and careful experiments with the thermometer made at the Missouri station during the past few years have proved that a considerable variation in temperature is observable between whitewashed and unwhitewashed peach twigs. This subject has been thoroughly investigated at the Missouri station, and it has been found that a coat of whitewash applied to the trees in early winter by means of a spray pump, and renewed as often as washing rains or other removing agencies render it necessary, has proved absolutely effective in retarding the development of the fruit-buds, while untreated trees bloomed from a week to ten days sooner, and were, in several instances, injured by late frosts through which the whitewashed trees passed unharmed. Consequently this method of treatment can be quite confidently recommended.

XIV—THE STRINGFELLOW THEORY OF ROOT PRUNING.

Mr. H. M. Stringfellow, of Galveston, Tex., has of late years advanced a theory which promises to overthrow all accepted methods of tree planting, and will, doubtless, should it be proved practical, produce a complete horticultural revolution in this particular. He holds that, instead of endeavoring to retain and maintain intact the original root system of a transplanted tree, it should be severely pruned—cut back, in fact, to practically no roots at all, or at most mere stubs of roots, thereby reducing the tree to the state or condition of a cutting—the top being shortened proportionately to maintain a relative bal-

ance. Mr. Stringfellow claims that the new root system resulting from this treatment would be a strong, vigorous, perpendicular growth of lusty, large-diametered roots, heading straight down for the moist depths of the subsoil, instead of a network of fine, capillary surface rootlets matted horizontally within a few inches of the ground. These roots, penetrating deeply, would safely anchor the tree, and in a year's time produce a growth above ground to which trees started by the old method of planting would not be comparable.

He claims, also, that wherever his system is adopted it will no longer be found necessary to excavate holes three feet in diameter for orchard planting, but that a mere dibble hole, or a crack made by sinking a spade in the soil, will prove amply sufficient for tree setting, and that in this way one of the costliest features of orchard planting would be removed. In addition, by the removal of most of the roots of the tree, the danger of spreading all kinds of fungus and insect pests, such as nematode root-gall, root-knot, scales, etc., would be reduced to a minimum, while the process would also permit of the use for planting of two- and even three-year-old trees, which instead of being thrown away could be thereby utilized as profitably as one-year-old trees.

Realizing the importance of this theory, the Georgia experiment station instituted careful tests in order to determine how far it could be relied upon in this section and in this climate. The results of these experiments are given in detail in bulletin No. 40. It is only necessary here to state that after three years' tests the station is satisfied that peach trees pruned by the Stringfellow method, even when all the roots were removed, will live and flourish in this section in stiff clay soil and under adverse weather conditions. This statement may also be extended to cover apples and pears. That all trees so treated will thrive equally well in all localities we are by no means prepared (as yet) to admit. Continued and more extended experimentation must be relied upon to decide this matter. Nor can the station recommend unreservedly the employment of the Stringfellow theory and practice by fruit-growers. We think, however, that it is highly probable that the experience of every one who tests the matter for himself in Georgia will be found similar to that of the station, and we certainly earnestly recommend every fruit-grower who can do so to test the matter for himself on a larger or smaller scale, according to his means, as the matter is of such vital importance as to warrant a great deal of pains in forcing it to a conclusion.

DISCUSSION ON PEACHES

By the Missouri State Horticultural Society, at its summer meeting, in June, 1898.

W. A. GARDNER: In pruning, Professor Stringfellow [of Texas] advises the cutting off of lateral roots, and I have found it a success. The reason is that it is better to have roots start in the soil where they are to grow, and thus accord with the nature of the soil. The surface roots which furnish food should be near sunlight and air, also in condition to obtain food from the soil. The trees bear after three years. Devote three years to shaping; cut the center out to have an open tree. Keep the buds in the right direction and let the branches grow out so as to let sunlight in. I did no pruning back after the third year, and for three years now have had beautiful peaches. Where the wood was thoroughly seasoned [?] I had the best buds and they withstood frost the best. There should be system in pruning. Clean out dead branches; prune when there are no peaches on; do not cut back far; have the lower part eighteen inches from the ground and cut off three to four feet of the growth. This gives many branches from the old wood which are fruit producing. Cutting indiscriminately makes a brush heap instead of a tree. On new wood the fruit is not so good color or vigor. To cut every year produces the effect of a young tree which drops its fruit. Do not prune until after frost. In cutting back one-third you cut off the best bearing part. Keep the roots bare and exposed on all sides where they grow into the ground. The borer goes into these. A wash of lime, wood ashes and kerosene will keep off the borer. Now, about gathering, packing, and marketing. Use one half bushel baskets lined with excelsior, so as not to bruise when dropped in. The California box is a good package and the commission man says it is better not to wrap the peach. [?] Elbertas stood two weeks in hot Chicago weather. Pack in four- or six-basket carriers. It is very bad to send poor peaches to market. When the crop from Olden glutted the market, poor peaches brought five cents a box, while those wrapped brought \$1.25 per box. Fancy peaches pay even on a glutted market, and are always in demand, while the poor peach keeps the market down. Those who packed poorly thought they were cheated because they didn't get as much as those who sent in good shape. Peaches properly graded and packed give satisfaction.

J. T. SNODGRASS: One great trouble is irregular packing. It should be uniform and the fruit of uniform grade. Commission men sell on the track, after representing to their markets what they have. The six-basket carrier is the favorite.

PRESIDENT MURRAY: One fault with all fruits is the packing.

L. ERB: For packing peaches, the six-basket and four-basket carrier, the California box and the one-third-bushel box are best. There is a new six-basket carrier which holds less but is better and lighter. I do not like the California box; it holds too little. The favorite in New Orleans is the one-third-bushel box. Common fruit in baskets, good quality in one-third-bushel boxes, and the best in the California box or six-basket carrier, is, to my mind, the best arrangement. The consumers want small packages and the above meet the demands of all classes. Small growers should learn to have fruit uniform. In marketing, send small quantities by express, but where there is enough for a car the refrigerator is much the better.

MR. LANG (of Memphis): Use the refrigerator car. We load a great many, but, no matter how good the car is, the results cannot be good unless we pack and handle properly. We should have several ice stations on the route. Open the doors before icing, as this lets out the foul air. Have them open for from one-half to two hours, no matter how hot the day is, as the car may be musty. Ice, then close one side and the drip box, to drive out the warm air, and it will be cooled enough in fifteen minutes. In loading leave a space of fifteen inches between the fruit and the top of the car. Fruit begins to degenerate as soon as gathered, and gas forms at the top; therefore this space makes ventilation; if it is not so the fruit molds. The boxes should be set end against end, and a space left between the piles. Seven or eight cases will reach across the car, leaving two inches between the crates, so the refrigerated air circulates through the fruit. The peach keeps the best of any fruit, but it also shows any imperfection quicker. Mushy peaches are worthless to the consumer. Fruit must look attractive on the market, and uniform—not good and knotty together. The peach takes less ice; but put in all the ice you can, because the fruit and the box are warm. Fruit will carry from here [Kansas City] to Buffalo or Philadelphia with one re-icing. Chill your car and the fruit first, and you will have no trouble. Vegetables generate heat; so the box must stay filled with ice. This means icing every 300 miles, and even then it is hard to keep peas from wilting and turning yellow. Do not re-ice as heavily for peaches as you do for other things; one and one-half tons are enough to keep the fruit from getting too cold. A California car takes a ton more than a Kansas City car. To unload a car gradually and hold it for a day or so is better than to put all on the market at once. Fruit sent by express needs no ice-car, and keeps in a cool place until after the glut is over. Sometimes cars are reshipped to avoid a glut, and this cannot be done unless a refrigerator car is used. Fruit getting too

cold does no harm if the commission man handles it properly; but fruit will spoil at a violent change, even if it has been only chilled. The condition depends on the icing of the car, on the stacking of the boxes, and on the handling at the end of the journey.

MR. ANDERSON (Memphis, Tenn.): For packages of peaches, the best specimens in Michigan are put in one-third-bushel boxes; the others into one-half and one-bushel baskets. In Georgia they use the six-basket carrier: in Kentucky, the half-bushel basket; and in Missouri all these are used and another wanted. Growers should find what they want and not change so often. All of these are good. The one-fifth-bushel package is not suitable for long distances. The six-basket carrier holds nearly a bushel, but we have a new package of six baskets holding the same as the four-basket size. Bushel boxes are good for customers; made with handles they are better for loading peaches into the wagons than baskets. The price is seven cents apiece; bushel baskets are twelve cents.

F. HOLSINGER, (Kansas): I choose small trees and get all roots and tops. I took two and one-half and three feet culls from southern nurseries, cultivated for two years, and thinned 300 peaches off one tree three feet high. I have had five crops continuously in Kansas City.

J. C. EVANS: Every market has its choice [preferred] package. One-third-bushel box is best [preferred] in Kansas City, but I deem it poor taste. Chicago takes anything; Boston wants the twenty-pound box and the finest of peaches in it. It would be well to educate people to expect low grades in one-third bushel, and the best in twenty pound boxes.

MR. GARDNER: Interior towns prefer one-fifth-bushel baskets. The one-third-bushel box is not known in Iowa.

COLONEL EVANS: The one-fifth is good for short distances, filled with sound but ripe ones.

L. A. GOODMAN: Three packages [styles] are enough. First, fancy; second, fair; and third, for lower grades.

L. ERB: The third grade should be in bushel boxes, second in one-third-bushel boxes, and first in six- or four-basket carriers. [??]

H. E. MOSELEY: Gathering is an important factor. Fruit cannot get on the market right unless correctly gathered. The best arrangement for packages is six basket, California or one-third-bushel box, and one-fifth-bushel basket. Put the ripe ones in one-fifth; the next grade—selected by the superintendent at packing table—goes into the third-bushel box; and the next grade, greener and of two sizes, goes into carriers. Culls go into half-bushel baskets. Pack near the trees; put up shade in the orchard. Gather by hand and have tables within

a few rods of the outer row. Pack securely. A half-bushel basket will hold four tiers and will bruise if hauled. The basket for gathering is the half bushel; renail [tacking around the rim and the handle]; pack in excelsior, and sacking for lining, making a pad three-quarters of an inch thick, and thus avoid bruising.

PRESIDENT MURRAY: Nearly every variety requires a different time for the pickings.

MR. MOSELEY: A Family Favorite tree is stripped in two pickings, three-fourths on the first time. Salway, picked every other day, takes fourteen days. Elberta requires three pickings; the second takes one-half of them.

A LIST OF PREFERRED VARIETIES.

In answer for the call for lists of best varieties for market, the following were given:

F. H. SPEAKMAN (Newton county): Elberta, Heath Cling, Family Favorite, Mixon Cling.

W. A. GARDNER (West Plains): Family Favorite, Elberta, Salway, Mt. Rose, Bonanza.

T. W. WADE (Greene county): Heath Cling.

H. S. WAYMAN (Mercer county): Elberta, Champion.

LOUIS ERB (Cedar Gap): Mt. Rose, Elberta, Salway, Heath Cling, Bonanza, Picquet's Late.

H. E. MOSELEY (Olden): Reeve's Favorite, Family Favorite, Elberta, Picquet's Late, Salway.

F. C. WHITTEN (Columbia): Family Favorite, Elberta, Salway.

C. H. DUTCHER (Johnson county): Elberta, Champion, Heath Cling.

G. T. TIPPIN (Springfield): Champion, Mt. Rose, Elberta, Picquet's Late, Chinese Cling, Henrietta.

N. F. MURRAY (Holt county): Champion, Elberta, Family Favorite, Mixon Free, Heath Cling.

F. HOLSINGER (Rosedale, Kan.): Rivers, Champion, Crawford, Elberta, Crosby, Mt. Rose, Family Favorite, Reeve's Favorite, Salway, Mixon Free.

A. NELSON (Laclede county): Elberta, Early Crawford, Salway, Champion, Family Favorite, Old Mixon Free and Cling.

W. H. LOOMIS (Wright county): Elberta, Salway.

J. C. EVANS (Howell county): Mt. Rose, Reeve's Favorite, Family Favorite, Elberta, Picquet's Late, Salway, Bonanza.

G. L. SESSEN (West Plains): Mt. Rose, Family Favorite, Elberta, Salway, Bonanza.

J. E. THOMPSON (Johnson): Heath Cling, Stump the World, Elberta.

On a vote of varieties, Elberta received 36, Salway 21, Family Favorite 13, Old Mixon Free 4, Reeve's Favorite 5, Champion 6.

G. L. SESSEN: Matthews Beauty has not been fruited in Missouri, but is reported as prolific as Elberta and ten days later, and it carries well.

J. E. THOMPSON: June buds on Triumph trees two years old are full of peaches.

WILL IT PAY TO PLANT PEACHES, AND WHAT VARIETIES ?

Read by A. CHANDLER, of Argentine, Kan., before the Missouri Valley Horticultural Society, at Edwardsville, on October 21, 1899.

To a superficial observer this question might seem easily answered. Many questions present themselves that are not readily disposed of, especially from a commercial standpoint.

The consideration of the main questions will embrace: (1) Climate; (2) soil and location; (3) varieties; (4) market and its capacity to consume. Now, as to climate, certain types of the peach succeed in the far South, namely, the peento and its seedling. Such type belongs only to the orange belt. The Spanish race of the peach is found in the sandy soil of the Gulf region. Some attempts have been made to introduce the Persian race far south, but failure was the result. The peach, like people, thrives best in its own climate.

The North China race has given us some conspicuous object-lessons, the most notable and most worthy of which is the Elberta. The territory of the Persian peach has been extended far to the north. Many of our hardiest and most popular varieties have been propagated from this race. Peaches of all these different types are grown in their home belts. All are subject to variations, being governed by different soils and other local conditions. These types have in many cases been modified by cross pollination, so that it is not easy to determine to which race they belong. In the United States the successful peach district lies between the thirty-fourth and thirty-ninth parallels of north latitude, though the peach industry has been extended far north of this limit, subject to the ever-varying vicissitudes of climate.

One notable peach district is the Ontario, adjacent to Niagara Falls. Another is the state of Michigan, or rather the western side of it; nearer to the lake and sandy soil are the leading features of adaptability.

Now, as to soil. Locally speaking, our own country possesses many requisites for successful fruit-growing. One thing to avoid on the prairies of Kansas, and even the loess formation of the Missouri river, is too rich a soil, or else no fruit; a superabundance of fire-wood will be your only recompense. I learn that in some counties of western Kansas the peach is successfully competing with the forest-tree as a windbreak, so rapidly does it grow; a growth of eleven feet in one year has come under my observation. Let us be particular about soil and location. Take the highest points possible, upland clay or sandy loam; no bottom land or wet land is desirable. It is especially

desirable to take a north slope, even if you must buy your neighbor's farm to get it. Evidences are not wanting of failure where all these conditions have not been complied with.

The direct cause of failure this present year was the too frigid character of the climate, likely to prevail five years out of ten. Notwithstanding last winter's extreme cold, seventy per cent. of the peach trees are living, many having made a fine growth. A few conspicuous varieties may be named; Early Rivers, Elberta and Old Mixon stood the winter best. Later, Smock, Picquet's Late, Salway, Heath and Wilken's Cling are desirable varieties. For further information of particular varieties for varying latitudes, see Catalogue of Fruits No. 6, Department of Agriculture. This was compiled by the American Pomological Society, and is reliable.

It is generally conceded the market nearest home is best; this, though, is often limited in demand. As the markets of great cities do not come to us we must go to them, devising means and methods of transportation as the occasion demands. At any rate, it is supposed that the up-to-date fruit-grower will be equal to any emergency. This fact I have noticed, that the Western people have never had an over-supply of first-class peaches, and, with new markets to supply, no one fruit will be in better demand for some years to come.

GROWING GOOD PEACHES.

The *American Garden* reports Mr. Hall's address before the Massachusetts Horticultural Society, as follows:

"The difference in preparation of lands for peach orchards is the difference in business methods, that being superior which is most thorough, practical, and intelligent. The land cannot be plowed too much, and harrowing and cross-harrowing are less harmful than sensible.

"The trees should be planted early in spring; fall planting is apt to be disastrous, because the tender roots will not then bear transplanting from nurseries to open soil. While sixteen feet each way is now accepted as a proper distance, the theory of planting trees thirteen feet apart is justified by the fact that peach trees are mighty uncertain and may not fill out. Medium-sized trees, three or four feet high, are best to plant, and they should be one year old. In fact, no nursery ever delivered a two-year-old tree, though it may claim that it does.

"It is not essential that a tree have many fibrous roots; most of them are dead anyway at planting, and a modest number will serve, provided they are cut off smoothly. Fine earth should pack the roots,

and the only thing having any business in the orchard after that is a horse, a harrow, and a plow. The practice of mixing crops by planting alternate rows of corn and expecting to get a peach orchard of any vigor is extreme folly. At the first year's growth cut off all but a few top sprouts, and the next year cut off the interfering side spurs. Twice can these be removed, yet the tree will yield well.

"Do the pruning and shaping in the first two years. In pruning for fruit, the question is, "How are your buds?" If they are nearly all killed wait until spring, and when the buds are swelled prune. Trim for peaches then. Don't trim for form; you may have one of the worst looking orchards in the country, but you will get more peaches.

"As to winter bud killing, seventy-five per cent. of your peach buds may blight, but if the remaining twenty-five per cent. are evenly distributed among the trees you need not worry. It is a popular fallacy that when it is announced that fifty per cent. of the buds have been killed the peach crop for the following season is doomed. It is time enough to thin your fruit after it has set in the spring. Large, fine fruit can be raised only when there are a moderate number of peaches on each tree.

"It takes from ten to twelve days to gather peaches which have come to maturity. Don't use a machine in sorting them. Hire bright, intelligent women; they are better than men as a rule. And remember always that there is more profit in selling fifty or sixty peaches to the half-bushel at two dollars than one hundred to the half bushel for fifty cents. There may be less nutriment and more water in the large fruits, but the people like them and will have them. As to the profit in peach growing, it depends on the individual.

PEACH GROWING IN NEW JERSEY.

By ALVA T. JORDAN, in Agricultural Experiment Station Bulletin No. 133.

SOILS FOR PEACHES.

Downing, in his work on "Fruits and Fruit-trees of America," page 582, states that "the very best soil for the peach is a deep, rich, sandy loam, next to this a strong mellow loam, then a light, thin, sandy soil, and the poorest a heavy, compact clay." Thomas, in the "American Fruit Culturist," (20th ed.,) page 410, says "even a compact clay may be made suitable for the peach by regular and thorough underdraining and mellow cultivation." Our first commercial orchards were planted upon light, sandy soils. This fact led many of the early planters to believe this class of soils the best for this fruit. Later experience, however, has shown that the stronger gravelly and

loamy soils have given the best results, producing trees that are more vigorous and fruitful and longer-lived. This experience has been the one chief cause of the gradual movement of the peach center from the southern to the northern section of the state. Our reports show that approximately three-fourths of the orchards are located upon the stronger rather than the lighter soils of the state. In some cases thrifty, vigorous orchards are found upon soils the disintegration of which was so imperfect—that is, so stony and rocky—that the use of picks was necessary in the setting of trees.

INJURY TO BUDS.

Injury to buds, and consequent failure of crop, results quite as often from winter-killing as from late spring frosts. A warm spell in winter starts the sap moving and causes the buds to swell: this, if followed by a lower temperature, is liable to cause considerable injury. Northern and northwestern slopes will reduce to a minimum danger of such injury, as far as location is concerned, while management of the orchard may exert a greater influence even than location. Very early cultivation may force an early growth that late frosts destroy, or late cultivation may cause a too late growth that does not fully ripen before winter. Heavy dressings of nitrogenous manures of the wrong kind, or applied too late, may also result in injury, due to the imperfect ripening of the wood. About forty per cent. of our growers report annual injury to buds.

In selecting a soil, its situation must be considered, as well as its physical qualities. Low situations are to be avoided, since cold air, like cold water, will seek the lowest places. Southern and southeastern slopes are likewise to be avoided wherever possible, since they favor an early spring growth just in season to be nipped by the late frosts. Other things being equal, a northern or northwestern exposure is the best.

THE PURCHASE AND SETTING OF TREES.

A good beginning is half the battle. Very few growers bud their own trees—they are generally purchased from local nurserymen. A popular idea demands the use of “natural pits” for propagation. Many nurserymen claim to use pits from this source, but the abundance of the supply has been questioned. Downing and Thomas, in their works, do not mention natural pits; they do, however, lay much stress upon the selection of pits from healthy, vigorous orchards and trees. Pits from diseased trees are believed to be a fertile source of infection in a young orchard. Before setting, all trees should be carefully examined for root-gall, scale insects, etc. Prune before taking to the field; remove all injured or bruised roots and burn the prunings.

The usual distance for setting is sixteen feet each way. On the stronger soils, eighteen and even twenty feet is occasionally used.

The quincunx method is also reported, which requires about half as many more trees for the same area as when set square. An apple orchard is frequently started with the peach, the latter having passed its usefulness when the apple comes into bearing. In this case every other tree in every other row is an apple.

The age of trees generally used is one year from bud, though about thirty per cent. of the growers prefer two-year-old trees, and a few those still older. Sod land is almost always preferred [this is in New Jersey], though an occasional grower crops with corn a year previous to setting the orchard. Spring setting is quite generally practiced, though approximately one sixth set in the fall and report excellent results. Care should be taken, when setting, to have the roots well spread, and to fill all air spaces, also to thoroughly firm the soil with the feet. This point is very important: it not only holds the tree in place, but prevents the drying out of the soil about the roots.

PRUNING AND THINNING.

These operations exercise a great influence on the life of the tree and the size and color of the fruit. The low-forked, vase form is an excellent method of training, the foundation of which is laid at setting. All side shoots are cut back, and the trunk cut to about two and one-half feet, from which point the main branches are started to form the tree head. The idea prevails that this form of tree prevents close cultivation, though experience has proven that the low heads, with obliquely rising branches, are easier to work among than the high-headed trees with their horizontal, drooping branches. The advantages of the low fork are the ease of pruning, picking, and thinning, while its spreading habit freely admits the sun to color the fruit; and the disadvantages of the high-topped tree are that it is generally more dense, hence shading the fruit: besides, it exposes more of the trunk to the hot sun, and is more liable to be injured by high winds.

The *time* of pruning is not so important a matter, since it may be performed in any month in the year: authorities, however, generally agree that late winter or early spring, before the buds swell, is best. One point to remember in pruning is that the fruit is borne on wood of the previous season's growth, and hence a vigorous annual growth should be provided for this purpose, which is readily accomplished by an annual shortening in process, the cutting back of a quarter or a third of the growth of each year.

Thinning is not practiced to the extent that it deserves; for while direct experiments are wanting, the fact remains that the removal of a third or half of the number on the tree, as occasion demands, greatly

increases the size and quality of the remaining fruits, and that as much and more prime fruit is obtained, with far less culls, than if left unthinned. Thinning is secured in two ways: either by hand-picking of all the small and imperfect fruit, and sufficient of the remainder to leave none closer than three or four inches (this is best done after what is called "the June drop" occurs), or annually cutting off with pruning shears at regular time of trimming from a quarter to a half, as required, of each year's growth. The first method is the better.

LIFE OF AN ORCHARD.

The length of life of an orchard is naturally variable, depending upon the grower, the soil, and climatic conditions. The average life for the state is approximately ten years, with a range of from six to over twenty years. The older orchards are largely the result of judicious and systematic culture and feeding. As previously stated, the use of fertilizers or manures will prolong the profitable bearing period of an orchard.

With ordinary care and with no attention to fertilization, three good crops are, on the average, all that can be obtained from an orchard, while with good care and judicious fertilization from eight to ten crops may be secured. The failures in the latter case, which must be expected, are due almost entirely to conditions over which the grower has no control.

PICKING AND MARKETING.

Only experience can determine the best degree of ripeness to pick for shipment. If picked a little too soon it is too green, and if too late it quickly becomes soft, and on arrival at market is bruised and unsalable at remunerative prices. A request of the commission man for information as to the condition of fruit on arrival will soon teach the beginner the best time to pick. The handling should be reduced to a minimum, and be done carefully, in order to avoid bruising the fruit.

Sorting is an operation which requires strict attention. Grade carefully; keep the inferior specimens at home, and put nothing but No. 1 fruit in the No. 1 basket; one inferior fruit in the basket is sufficient to cut it in price. The kind of basket or package used also has a considerable influence on the selling price. The majority of our growers use the standard one-half-bushel basket, though a few are using a carrier holding eight four-quart baskets, and report better returns by so doing.

To the large grower a knowledge of the different markets is indispensable, since often when prices are low in the large, near-by markets, because they are oversupplied, there is a scarcity in the interior towns, high prices prevail, and direct shipments to these result in good re-

turns. A large proportion of the fruit is sold on commission, and it is important to select a good firm and stick to it, since regular customers whose stock is good always receive the best treatment. Peach exchanges have been established in several districts, and have given satisfaction to growers.

RETURNS.

The great difficulty in obtaining information upon this side of the peach industry is the almost entire lack of accurately kept records on the part of the growers. In the author's experience with several hundreds of growers, not over a dozen knew exactly whether peach growing was profitable or not; a very few keep accurate records of the labor of picking, sorting, hauling to depot, carting, the cost of fertilizers and their application, and all other items chargeable to the crop. The following is one of this class kindly furnished the station:

RECORD KEEPING OF A PROFITABLE ORCHARD.

This orchard, located in Somerset county, New Jersey, includes twenty-five acres, and for practical purposes may be considered typical. From the detailed statement of receipts and expenses for the years 1892, 1893 and 1894 are obtained the following average annual receipts and expenses:

Gross receipts (commission deducted).....		\$2,230 68
<i>Expenses.</i>		
Baskets.....	\$209 42	
Team work, cultivating (\$4 per day).....	91 88	
Trimming, grubbing, and removing brush.....	84 44	
Picking and sorting.....	266 50	
Carting to depot.....	61 13	
Interest and taxes (six per cent.).....	150 00	
Commercial fertilizers, including carting and application...	184 50	
Lime, including application.....	20 27	
		1,068 14
Total net returns from twenty-five acres, annually.....		\$1,162 54
Average net return per acre, annually.....		46 50

It is to be noted that the labor and team work have been charged at the highest prices, and that the items have been entered in every case; that is, in addition to the average annual net return of \$46.50 per acre, the grower received the highest ruling rate of wages for men and teams, besides interest on his investment at the rate of six per cent.

SUMMARY.

In New Jersey, soils of a gravelly or a slaty nature, or even sandy, are naturally well adapted for the peach, though the sandy soils require that fertilization shall begin earlier in the life of the orchard.

Injury to buds is caused quite as often by winter-killing as by late

spring frosts ; low situations should be avoided. Good management of the orchard, as indicated, exercises a favorable influence on hardiness of buds.

The trees when set should be free from root-gall and scale insects.

In New Jersey, Crawford's Late, Mountain Rose, Old Mixon, Stump and Reeve's Favorite are the five most popular of the older varieties. Of the newer varieties, Elberta, Globe and Susquehanna are favorite sorts.

A shallow plowing early in May, followed by frequent cultivations until the last of July, is the practice of the best growers.

The best time to prune is late winter or early spring, before the buds swell.

Thinning is a desirable practice, resulting in larger, better-flavored and higher-colored fruit.

Good returns for the labor expended and money invested in peach growing may be confidently expected if the above points are carefully observed.

PEACHES IN WESTERN NEW YORK.

Extracts from Bulletin No. 74 of the Cornell Experiment Station, by PROF. L. H. BAILEY.

LOCATIONS AND SOILS FOR PEACHES.

Many peach orchards are planted upon land that is wholly unsuited to them, such as heavy clay, or low lands which have very imperfect drainage of both water and air. The ideal peach soil is a deep sand. Upon such lands the tree makes a hard growth, the wood matures early, the tree bears young, and the fruit is highly colored and flavored. The regions which have become most famous as peach-growing centers are those of a sandy formation, as the lands of many parts of the South, of Delaware and New Jersey, and of the "peach belt" on the eastern shore of Lake Michigan. Some of the best peach orchards which I know are upon lands which were once thought to be worthless.

Warm, sandy lands abound along the Ontario shore, and it is upon them that the peach orchards of that region are giving the best returns. Yet peaches will thrive upon heavier lands, even upon clay ; but they are rarely so productive upon heavy lands unless they are severely headed in. Upon such lands the trees run strongly to wood, and they often split down from the weight of foliage alone, when disturbed by wind. . . . In interior localities—away from the lakes—it is generally only upon elevated land that peaches thrive. These are lands which are naturally well drained, and they escape the late spring frosts which are frequently so disastrous to peach buds

in lower places. It is sometimes said that in these interior places trees should not be set upon southern exposures, for in such places the buds are likely to start too early in spring. This is no doubt good advice; but it should be understood that it may not apply to lands within the influence of bodies of water of considerable size.

CULTIVATION AND FERTILIZING OF THE PEACH ORCHARD.

Having selected his land, the peach grower must look with the greatest care to the cultivation and fertilizing of his orchard. Peach orchards should never be cropped after the third year; and if they are planted upon sandy lands, which are best adapted to them, and particularly if set less than twenty feet apart, they should never be cropped from the time they are set. The only reasonable treatment for the land in a peach orchard is very frequent stirring of the surface soil from May until August, and thereafter, perhaps, a green crop, which shall be plowed under the next spring. Never under any circumstances seed down a peach orchard; never sow it to grain. Lack of tillage is ruinous, and I am astonished that farmers do not see this fact when bewailing the unprofitableness of their sod-bound, drouth-sick and borer-cursed orchards. If there is any fruit which should never be neglected it is the peach, and this is why careless men do not succeed with it and why so many of the orchards produce only debts and exasperation.

But here comes a difficulty; it is easy to produce an overgrowth upon strong lands. The trees grow to a great size during the first few years, their tops are full of heavy leaves, and the foliage holds very late in the fall. These trees generally bear tardily, and, in some cases they are never very productive of fruit. They run to wood. The winds tear them to pieces. The first trouble lies in the land; it is too strong for the peach. The second trouble may be the too frequent use of barn manures or other nitrogenous fertilizers, or too late cultivation in the fall. In 1889 I set several varieties of peaches in the university gardens, upon soil which had been well manured in previous years, and the land has since been used for garden vegetables, which have been well and sometimes even excessively manured with stable manure. The trees have now passed their sixth summer, but not one of them has borne two dozen peaches. Yet they are models of thrift, and their large, heavy leaves are as green this middle of October as they were in June. Some of them have been entirely ruined by storms, and now the lustiest one of the lot has got the yellows!

I believe that the key-note to the proper fertilizing of peach orchards is potash and phosphoric acid, and not nitrogen. Ashes, muriate of potash, bone fertilizers—these are some of the money-makers

for peach trees. Tillage with green manure crops at the end of the season can be relied upon to furnish the nitrogen in most instances. . . . We have been taught all along that nitrogen lies at the foundation of successful agriculture, and this is true; but its greatest benefits, when it is applied artificially, are to be expected upon the annual crops of the farm and garden. It can also be applied advantageously in some cases to newly set fruit plantations. I do not wish to disparage the use of nitrogen, for even in bearing orchards a direct application may sometimes be necessary; but I desire to state what I believe to be a fundamental consideration in orchard culture, that nitrogen can easily be used to excess, and that it can generally be obtained by means of tillage and green manure, and also that potash and phosphoric acid need to be annually applied to orchards of bearing age.

PRUNING PEACH TREES.

The methods of pruning peach trees are the occasion of much discussion among pomologists. The differences of opinion turn chiefly about three practices—short trunks with rapidly ascending branches, high trunks with more horizontal branches, and shortening in or heading back the annual growth. Each of these three methods of handling or training peach trees has ardent advocates and pronounced opponents. It is probable that each method has distinct merits in particular cases. I believe that the nature and fertility of the soil are the dominating factors in these opposing methods. A system of pruning which fits the slow growth and hard wood of sandy soils may not be adapted to the rapid growth and heavier tops of trees on strong soils.

There is much to be said, fairly, for the high-topped trees. They are more easy to till, and it is quite as easy to pick their fruit; and there is less tendency to make long and sprawling branches as a result of careless pruning. On rich lands it is perhaps the better method. And here is the chief reason for heading back in this climate—the necessity of checking the growth and keeping the tree within bounds when it is growing in a strong soil. Whether one shall head in his trees or not, therefore, must depend entirely on circumstances. In sandy peach lands it is generally unnecessary, but it may be a good practice when trees make an over-exuberant growth. This heading in is usually done in the winter, from a third to half the annual growth being removed. It is sometimes done also in the summer, but it is very doubtful if this is a wise practice. The summer trimming is usually made in June, by clipping off an inch or two of the ends of the tender shoots by means of a sickle or sword.

Heading in the branches always makes a thick-topped tree. The

Michigan growers usually give much attention to cutting out the small unprofitable wood from the center of the tree. This labor may be greatly increased if heading in is practiced. Many orchards of this state have suffered much during the last two years from twig-blight in these central shoots.

THINNING THE FRUIT.

There is almost universal neglect in thinning the fruit in this state. Every peach grower knows that good fruit cannot be grown upon overloaded trees; and yet he refuses to thin, and forthwith blames the market! It should be a rule that no two peaches should stand closer together than five inches of one another. No work of the orchard pays better than thinning the fruit, either in the price which the remaining produce brings in the market or in the vital energy which is saved to the tree. Peach trees which are regularly thinned should bear every year, barring injuries from winter or spring frosts. Growers seem to forget that this fruit must all be picked sooner or later, and that the work is more easily done in June or July than in September. The thinning should be delayed until the fruit is the size of the end of one's thumb, for by this time the "June drop" has occurred, and the peaches can readily be seen and handled.

MARKETING THE FRUIT.

But if growers are negligent in thinning the fruit, they are too often positively careless in marketing it. Even in this year of low prices, fancily or nicely packed fruit has brought good prices, wholly independent of its quality. The handsome boxes of California peaches, containing sixty wrapped fruits, have sold from two to four dollars, and yet they are generally very inferior in quality when they reach our markets. Alongside these peaches, shipped several thousand miles, our [New York] peaches have sold from twenty-five to seventy-five cents a half bushel. There are several faults with our handling peaches. The packages are too large. The fruit is not graded and selected; in fact, it is not well grown. There are often no wooden covers on the baskets, and, as a consequence, that part of the package which should look the best is usually the most jammed and crushed. In observing the markets this summer, I found that quite half the packages were not full when they reached the salesman, and the peaches comprising the two or three top layers had chased each other around the basket until they were scarcely recognizable. The peaches had evidently been dumped into the basket and they settled as soon as placed upon the cars. Our method of handling peaches is the very best advertisement of the handsome Pacific coast fruit. In that fruit every individual peach is sound and perfect; in Eastern fruit the peaches often run through the package and are sold in the liquid [?] state.

VARIETIES.

Amongst varieties, the Melocoton family is still the most prominent in western New York. The old Red-cheek Melocoton, from which the family sprung—or, at least, varieties under that name—is occasionally seen and recommended, but it is doubtful if the original form of it is now known. This important family of peaches is known by a firm, yellow flesh, free stone, red-splashed cheek, and a prominent tip-like projection at the apex. Its chief representatives nowadays are the Early and Late Crawfords. Some orchards are composed almost entirely of these varieties, although there are several somewhat differing forms or strains under each name. I am inclined to think that the Crawfords are planted too exclusively, and that the time has come for the freer introduction of other sorts. Amongst recent varieties of this type, the Brigdon or Garfield receives most praise in western New York, although Foster and Chair's Choice are popular wherever known. Although the white-fleshed peaches as a class are superior in quality to the yellow fleshed, yet consumers demand the yellow varieties almost exclusively. I have solicited lists of the very best market peaches from well-posted men in various parts of western New York, and they are detailed below:

H. S. ANDERSON, Union Springs, Cayuga county: Alexander, Mountain Rose, Early and Late Crawford, Old Mixon Free. To these might be added Wheatland, Wager, Foster, and Salway.

S. D. WILLARD, Geneva, Ontario county: Horton's Rivers, Hynes's Surprise, Yellow St. John, Brigdon or Garfield, Red-cheek Melocoton, Stevens's Rareripe, Willet, Salway. Elberta promises well.

E. SMITH & SONS, Geneva: Atlanta, Yellow St. John, Early Crawford, Brigdon, Potter (new), Lamont (new), Late Crawford, Stevens's Rareripe, Wager.

T. C. MAXWELL & BROS., Geneva: Crosby, Hill's Chili, Elberta, Brigdon or Garfield, Stevens's Rareripe, Red-cheek Melocoton, and probably a few Early and Late Crawford.

GEO. G. ATWOOD, Geneva: Alexander for first early, Early Rivers, Brigdon, Stevens's Rareripe.

C. W. STUART & Co., Newark, Wayne county: Foster, Brigdon, Wheatland, Hill's Chili, Longhurst, Stevens's Rareripe, Wager, Early Rivers, Early York, Early and Late Crawford, Elberta, Hynes's Surprise, Mountain Rose.

C. H. PERKINS, Newark: Early Michigan, Hale, Early and Late Crawford, Foster, Michigan Chili, Barnard, Wheatland.

GEO. C. SNOW, Penn Yan, Yates county: Early Rivers, Wager, Yellow Alberge, Hill's Chili, Salway.

JOHN F. WHITE, Mt. Morris, Livingstone county: Elberta, Foster, Early and Late Crawford, Brigdon, Wheatland—all yellow. Mountain Rose, Stump, Old Mixon Free, for white.

DEWANE BOGUE, Medina, Orleans county: Lolo, Alexander, Early Rivers, Honest John, Early and Late Crawfords, Foster, Hill's Chili, Old Mixon Free, Morris White, Smock.

JULIUS HARRIS, Ridgeway, Orleans county: Early and Late Crawfords have been the most profitable varieties with me.

H. H. BICKFORD, Johnson's Creek, Niagara county: I should plant chiefly Early and Late Crawfords. Smock is too late for this locality.

W. T. MANN, Barkers, Niagara county: Early and Late Crawfords, Foster, Reeve's Favorite. Among white varieties I should choose Mountain Rose, Stump, Old Mixon Free, Ward's Late White. Elberta is promising.

F. M. BRADLEY, Lake Road, Niagara county: Early Crawford is our only peach which can be classed as first for market. Yellow St. John is good. Elberta is promising, but is much subject to curl-leaf.

E. M. MOODY, Lockport, Niagara county: Early Rivers, Mountain Rose, Early and Late Crawfords, Smock, Salway.

PETER S. TOWER, Youngstown, Niagara county: Early and Late Crawfords, Reeve's Favorite, Globe, Smock, Old Mixon Free.

HENRY LUTTS, Youngstown: Early Rivers, Hynes's Surprise, Yellow St. John, Early Crawford, Old Mixon Free, Reeve's Favorite, Wheatland, Chair's Choice, Late Crawford, Globe, Beers Smock, Gary's Hold On, Billyer's Late, Salway.

SOILS AND PLANTING.

As peach-tree roots have less power of penetrating hard soil than most other trees, therefore the best soil should be warm, sandy, well drained, and in a location where good air will freely circulate.

Seeds may be planted right where the tree is wanted, in which case do not plant less than three seeds or pits in one spot. If these are persistent—such as come again true from seed—and the young trees robust, two may be pulled up when six or eight inches high, or cut down still later, allowing only one to grow. This (or all three) may be budded at the proper time, and the strongest one chosen to remain. Trees from seed, grown in a nursery and budded, may be set out the following spring, but great risk is run of some injury occurring to the bud, in which case much of the labor is lost. It is better to wait or obtain trees one year from the bud. You are then sure of your variety, and your tree has a good start. If you are transplanting seedlings, they may be successfully set at either one or two years of age. I do not advise fall planting.

In setting, the tree can hardly be too severely pruned. Our best growers trim the roots considerably and then cut off all side branches from the top, and cut the stalk down to sixteen, eighteen, twenty or twenty-four inches. When such an orchard is planted it looks just like stakes driven to show where to plant. Such treatment causes a new, thrifty top to form low down, which is the only proper way to grow serviceable peach trees in Kansas. Each year thereafter cut back about one-third the new growth. How long this should continue is a question; but I would advise it until it becomes too great a task. Young trees are said to be better and have more stamina if not left in nursery rows all winter. Thinning on the trees is abso-

lutely necessary if you want the best of fruit. It can only be properly done by hand, and as the peaches must at some time be hand-picked, there is a gain in time and labor by doing it while they are small; say from the time they are as large as beans to the size of robin's eggs. When done, the remaining peaches should be about four inches apart; even then many branches will break.

Peaches are heavy, and get heavier every day, and, if a storm wets the fruit and the foliage, the limbs will droop, and a sharp wind will cause them to break. A few props with forked tops may be kept handy, and they will often be found useful in saving a limb and fruit at a time when you cannot spare a moment to go to the timber for them. You cannot have too many such props at hand.

The nearer market peaches are grown the more profitable they are, as the bruising of cartage is avoided, as are also delays; twenty-four hours often makes many dollars difference in the results. Early peaches are generally poor peaches; they are unfit for canning, preserving, or drying; they have only earliness to recommend them, and they must compete with blackberries, early apples, and melons.

The curculio troubles them far the most, and consumers soon tire of their insipidity. Still, American impatience demands fruits and vegetables ahead of their season, and often despises the better article when it becomes plentiful. As the lady who put fine apples and potatoes in her cellar in the autumn, and told her maid to always use the specked and decaying ones first, found that she lived the entire winter on specked and decaying apples and potatoes, so Betsy Bullion, who demands the earliest fruits and berries that come to market and despises them when Johnny Coalhauler and Maggie Scrubbart can have plenty, will find that she is always living upon the poorest fruits and vegetables in the market.

Mr. Roland Morrill, of Benton Harbor, Mich., is one of our most careful and successful peach growers, and gives his orchard constant and careful attention. His success is phenomenal. In 1899, when peaches were generally scarce and many trees dead from extreme cold, Mr. Morrill grew bushels of extraordinary peaches, four to four and one-half inches in diameter, and his sales were often for more than seven dollars per bushel net. I examined the original sales account.

Following we give an interview from the *Western Fruit-grower*, of St. Joseph, Mo., written by R. M. Kellogg, of Three Rivers, Mich.:

BIG PEACHES AND BERRIES.

When Roland Morrill speaks on matters pertaining to farming or fruit-growing, everybody in Michigan gives the closest attention. The agricultural college has officially declared him a "Master in Horticulture," and for the past six years he has been president of the

Michigan State Horticultural Society. As an institute lecturer he is without a peer in the state. Possessed of a fund of practical information, he is able to stand on the platform and pointedly answer or give an intelligent opinion of any question which may come up, and so it is not strange that lecture engagements come to him thick and fast at a large per diem.

Mr. Morrill began life as a poor boy, and, while now scarcely passed the meridian of life, he has amassed what most of us would regard as a comfortable fortune, but the day will never come when he will be an idler. He finds too much pleasure in his berry fields.

He has some 400 acres of the best land, in the great lake-shore fruit belt. There are about 100 acres in peaches, only half of which are now in bearing. The raspberry fields usually average from forty to sixty acres: blackberries about forty acres, and some ten acres of currants and a vast amount of other fruits. He is famous as a grower of Little Gem melons, usually having about sixty acres of them.

His reputation gives everything appearing in market under his well-known trade-mark a special value, and he never strikes a glutted market or receives returns of dull sales. It has been a common thing in other years for returns from his commission house to show double the price of what other fruits of the same varieties sold for.

Yesterday, while at the Michigan state fair—by the way, one of the largest exhibits the state has had for many years—I ran square against Mr. Morrill, and at once determined to give him a vigorous pumping for the benefit of the readers of the *Western Fruit-grower*, and so I locked arms with him and started him toward the magnificent fruit exhibit, which I knew would warm him up so he would unbosom himself freely. I finally got him cornered and fired questions at him as follows:

“What was the amount of your peach sales this year?”

“Oh, something over 12,000 bushels from the old orchard (about fifty acres).”

“I understand you received over seven dollars a bushel for a large quantity of this fruit.”

Here Mr. Morrill shied off. He said he did not like to answer that question, because so many people did not understand his method of marketing or quality of fruit and were not willing to accept such statements. Fortunately I had seen the original returns from his commission house, in which large sales had been effected at that price, and when asked if there were not other sales as good, he timidly admitted there were, and would not deny that the cash sales for the orchard exceed \$35,000.

“Where did you find a market which would take this fruit at such fancy prices?”

"Oh, in Boston and at my old stamping-ground on South Water street, Chicago."

"What commission house do you consign to?"

"To the same one which has received all my products for more than twenty years. I have never changed. I sell car-loads to parties who come to my farm at an advanced price."

"What was your small-fruit crop this year, and how about prices?"

"I had a very large crop, and it paid me good profits."

I said: "Now, Mr. Morrill, here is a remarkable condition of things. Here you are in the midst of the greatest peach and fruit belt in the world, extending almost 300 miles along the lake and well back in the interior (Mr. Morrill is about seven miles from the lake). There are probably not a half-dozen who had a paying crop, and you seem to be the only one with so large an acreage having such fancy prices for everything. I should like to know how far you attribute this success to the physical condition of your trees and the method of propagating and caring for them."

"It has everything to do with it."

"How were these trees propagated, and who did it?"

"I have in my orchard many trees which bear better fruit than others. Indeed, on some of these trees there are certain limbs which bear better fruit than others. I propagated these trees as far as possible myself, taking all my buds from these better trees. Of course, I have had to buy new varieties. I have full faith in the individuality of trees and plants, as much as the stock I breed. There are great variations in trees and plants, and in propagating through buds and stimulating them by high tillage and restriction they develop better characteristics; and when we find them we must breed from them. I have practiced this for many years. While it is difficult to furnish absolute proof, yet I cannot account for such crops as I have grown for half a lifetime, without a failure, on any other hypothesis."

"Then, Mr. Morrill, you believe that trees under neglect overbear and decline in vitality, and easily fall a victim to fungi, insects, and unfavorable climatic conditions, and that trees or plants propagated from them share in this weakness?"

"Well, I should think my work proved I believed in it absolutely. I would not think of taking buds from an unfruitful tree."

"What is your method of pruning?"

"We prune every year in March, removing any weak limbs and cutting off about half of last year's growth, operating on each individual limb and cutting out in such a way that every leaf shall have full sunshine."

"Then you believe that excessive bloom is a factor in potency of pollen and the development of fruit?"

"There is no question about it. I am very particular about this. It is hard to restore a devitalized tree or plant. Their vigor is the source of profits. They must be able to respond to generous tillage or this work is lost."

"How about thinning the fruit? I understand you picked off and threw away several thousand bushels of this fruit in a year when anything in the shape of peach crop would sell at big prices. It must have taken a good deal of nerve to do this."

"Well, no; it does not require any nerve. It is the source of my profits. It is true that, in addition to extreme pruning on many trees, we picked off even three or four peaches where one was left, but I could not afford to devitalize my trees and lower the standard of excellence in my fruit for any price. I shall have an enormous crop next year, just as I have had for the past twenty years. Such treatment reduces a big crop to a practical certainty."

"Do you propagate and prune all your small fruits in the same way?"

"Most assuredly. It gives me the same results and produces the same returns in the cash account."

"What about manuring?"

"We feed heavily on potash in the form of wood ashes, which I buy by car-loads, and liberally on phosphoric acid in the form of ground bone, and very sparingly of nitrogen, relying on very thorough tillage to secure the proper wood growth."

"What about your method of cultivation?"

"We use the gang-plow first, early in the spring, and then the Breed weeder every four or five days; always after every rain. Of course, we never allow a weed to establish itself."

"Then you believe in shallow cultivation?"

"Yes; we go just deep enough to maintain a loose earth mulch to admit air to the roots and conserve moisture. I can always rely on 'horse-leg' irrigation."

"How late do you continue this cultivation?"

"It depends on the season and the amount of fruit on the trees. If well loaded we continue a little later, but if heavy rains come we sow oats about the middle of August, as a cover crop to hold snow and protect the roots during the winter and add surface humus to the soil in the spring."

"Why do you sow oats? why not use rye?"

"Because you have nothing alive and green in the spring to get rid of. Rye pumps the water out early, and we do not want this done; besides, it lodges around the trees and is hard to get rid of. I have tried everything suggested and find oats by far the best."

“Do you sow oats in the berry bushes?”

“Certainly; and for the same reason.”

“What about leaf curl and other fungous diseases?”

“That is entirely controlled by thorough spraying. We spray with copper sulphate in March to destroy the spores in the buds which produce the leaf-curl fungus, and later with Bordeaux mixture. Good fruit cannot be produced without strong, healthy foliage, and spraying is the only remedy; but we must begin in time and do it thoroughly.”

Mr. Morrill always works to a well-considered plan and a definite object in view. If everybody would adopt his methods and put such magnificent fruit on the market, the consumption would be so large we should not hear of a glutted market, and high prices would always prevail. I ate one of these big four-and-a-half-inch-in-diameter peaches sent to the Philadelphia meeting of the American Pomological Society. I shall always remember that peach as the most delicious thing I ever tasted.

SOME NOTES ON VARIETIES OF PEACHES.

From the *Southern Florist and Gardener*.

ELBERTA.

Frequent inquiries are made as to the best varieties of peaches for the South. It has been our custom to place special emphasis on four varieties, namely, Elberta, Sneed, Greensboro, and Triumph. These sorts are most highly spoken of in the *Practical Farmer*, of Philadelphia, the horticultural department of which is edited by that eminent horticulturist, Joseph Meehan. He says concerning the Elberta: “The present season has seen our city markets well supplied with splendid fruit of this variety. Those who saw and tasted the fruit will be skeptical no longer. It is a splendid sort. The fruit spoken of came from Georgia, and was in our Philadelphia market during the latter part of July. In both quality and size it is much superior to any we have been accustomed to seeing so early in the season.”

SNEED.

Mr. J. Van Lindley, president of the North Carolina Horticultural Society, writes the following about the other varieties named above: The Sneed commenced ripening first, and is a peach of fine quality, ripening on the tree to perfection, and is generally well colored with bright crimson. It is most valuable for home orchards and local markets, and is all right for markets which can be reached the morning after gathering, but too tender for distant markets and long hauls. It commences to ripen about ten days ahead of the old Alexander, and

is about through before that variety commences; so there is nothing in its way.

GREENSBORO.

The Greensboro ripened immediately following the Sneed, and with the Alexander; is larger than that variety, and far superior in every way except color. However, its bright, delicate crimson next the sun makes it show up beautifully on tree and in basket, and it sold well in New York markets this season. It is a semi-cling, and will part from the seed when overripe. On account of its large size and quality it has come to stay, and completely takes the place of the Alexander.

TRIUMPH.

The Triumph commenced about a week later than the Greensboro, coming on when that variety and the Alexander are two-thirds gone. It is of good size, averaging considerably larger than the Alexander, of high color and most excellent quality. It ripens well to the seed and is a semi-cling. Fully ripe ones will part clean from the seed. It being a yellow peach, ripening when it does, and extremely hardy in every respect, makes it a most valuable market peach for distant markets, coming in at a season when we needed such a peach, and filling up a little gap that is very important to commercial peach growers. My test with the above varieties was with 2000 trees each, one and two years old in orchard, or two and three years old from bud, which, I think, is a fair test. All together, these three varieties, though comparatively new, give fruit of good qualities for nearly a month with not a break, where heretofore we only had the Alexander and its class of inferior quality for ten days.

A GREAT SOUTHERN PEACH ORCHARD.

From the Southern Florist and Gardener.

One of the most extensive fruit plantations located in the South is that at Southern Pines, N. C. The peach orchard, containing over 500 acres, was established in 1891. Mr. J. Van Lindley, president of the North Carolina Horticultural Society, was prime mover in the enterprise. He first recognized the adaptability of this great sand belt for the production of certain classes of fruits, and, interesting a number of gentlemen in the possibilities of this section, succeeded in organizing a stock company.

The lands, which are located in Moore county, are composed of a very high percentage of white sand, which affords thorough aeration in the soil. Of course, they are of low fertility, and annual applica-

tions of fertilizers are necessary to secure full crops. but the looseness of the soil is of decided advantage in securing a fine root system. and this is doubtless the chief merit of the lands for peaches.

Mr. T. L. Brown writes a history of the plantation for the *Rural New-yorker*. All the land was cleared in 1891, burning pine timber, which covered the entire area. The trees were also set this year. 1892 was spent in freeing the land from pine roots and other rubbish. A few peaches were harvested in 1893, but not in sufficient quantity to ship. Acid phosphate was applied and cow-peas grown during this year. The cold wave in March, 1894, which destroyed all the fruits, was most discouraging; all the stockholders were ready to give up the enterprise at once except Mr. Van Lindley. The 1895 crop yielded the company a net income of over \$8000. The curculio greatly injured the 1896 crop, so that the output was inferior. Prospects were fine for 1897, but a hail-storm played havoc, although the Alexanders alone brought in enough money to pay all the expenses of the year. Referring to the disaster, Mr. Van Lindley said: "It was a terrible visitation." The storm literally swept every peach from the heavily loaded trees. At this writing, the latter part of June, 1898, every indication points to a tremendous crop, which, if no hail-storm comes, will mean a tremendous income for the company. The very best care is given the orchard, and Mr. Van Lindley, although over sixty years of age, gives his personal attention to the great work, and inspects every tree of the great plantation.

The following varieties are most largely used: Sneed, Alexander, Husted's, Lady Ingold, Wheatland. Early Crawford. The peaches are shipped in refrigerator cars to northern markets.

ALMONDS ON PEACH TREES.

From the *California Fruit Grower*.

Question.—Kindly inform me through your journal whether or no almonds can be budded on peaches successfully, and oblige—W. D. HOUSTON.

Answer.—Almonds have been budded on peach roots quite extensively by nurserymen in California. Many of the older almond orchards are on peach roots. Leonard Coates, of Napa, is of the opinion that the almond on an almond root does best in very deep, warm soils, but in all other soils the peach root is as good or better.

PEACH TREES IN APPLE ORCHARD.

From the *Western Fruit-grower*, of St. Joseph, Mo.

Peach trees planted in an apple orchard may pay both as a wind-break and in the fruit. Plant a peach tree between each two apple trees in the rows running north and south or [in rows] exposed to greatest winds. Peach trees set in rows between apple-tree rows to be in midst of four apple trees would make cultivation inconvenient and will not answer as well for windbreaks. Ten years ago I planted an orchard as above described. Now, visitors walking through the orchard will remark, "I never saw apple trees so straight." One could not tell by the trees north from south, while trees in almost all orchards lean to the northeast. Two years ago I commenced cutting out peach and plum trees to give room for the vigorous-growing varieties of apples, such as Minkler, Little Red Romanite, and Ben Davis. With the more slow-growing apple trees I will let the peach trees grow another season, and some of the plum trees for curculio catchers.

The plum tree will answer the same purpose the peach tree does: it is also a rapid grower and short-lived. It has about passed its usefulness by the time the apple trees need the room. It will also endure much pruning.

Peach trees will not poison apple trees, but they will be so much larger than the apple trees and shade them so much that the slovenly orchardist may call them poison. Peach trees should be headed low. One-third of the growth should be cut off each season, which is the proper way to prune. If I were to plant another orchard, in every sixth or seventh row I would plant plums as described above for the peach tree.

 THINNING PEACHES.

From *Montana Fruit Grower*.

A New Jersey peach grower, at the recent state horticultural convention, said in regard to thinning peaches: This portion of the work of peach culture should receive more attention from the orchard tender. If too great a number of peaches are left to ripen, one of two results must surely follow: either the fruit will be undersized and often so inferior in quality and insipid in flavor as to render it worthless for market, or else the tree will, from overwork, become exhausted and finally blight and die. The most perfect way of thinning is to pick them off by hand, leaving the fruits from four to six inches apart; but, where help is scarce and economy is the object, I have seen poles or

long clubs used in removing the surplus fruit [a bad plan]. There must be, however, some rule adopted to determine the quantity of fruit we wish to remain to ripen. This the individual grower must determine for himself. When he fully realizes that a peach tree can successfully ripen only a given number of pounds of fruit—the amount varying according to age, size and condition of the tree—he will possess knowledge necessary for correct thinning. He must bear in mind that the profits of a peach orchard depend almost solely upon two features—the size and the color of the fruit.

The following may prove to be of some value in determining the amount of fruit that should be left to ripen upon the tree: Number of peaches 300, diameter $2\frac{1}{2}$ inches, baskets 4, weight 100 pounds; number of peaches 500, diameter $2\frac{1}{4}$ inches, baskets 4, weight 100 pounds; number of peaches 720, diameter 2 inches, baskets 4, weight 100 pounds.

[Accuracy in grading will in the end enhance the value of the crop. Small or large peaches should be graded to a uniform size, but the small fruit will not ordinarily pay shipping expenses and had better be disposed of at home.—SEC.]

THINNING ON TREES.—Peaches are said to repay the labor of thinning whenever the crop is full, and the practice of thinning is advocated; but it may be remarked that few men thin in a thorough way. It is one of the many things that pays, according to the testimony of practical men, and yet is not done in any general and effective way. Professor Butz's rule is to thin after the June drop, leaving three or four inches between fruits, excepting where there are only two on a twig.—*Garden and Farm*.

CURIOUS PEACH FRUITING.

The Californian says many peach trees have fruited this year in a peculiar manner. In some varieties each blossom has produced two peaches, and on some trees it is not uncommon to find even more. On one place at Bakersfield, Cal., there may be seen five perfect peaches that came from one bud. An effort will be made to preserve the cluster, and if it matures the result will be a curiosity in the fruit line.

THE PEACH ORCHARD.

Notes from Bulletin No. 11 of the Alabama Experiment Station.

In March thirty-six varieties of budded peaches were planted upon a sandy ridge, which produced the previous year only 136 pounds of seed cotton per acre without manure. By the side of these twenty-two seedling trees, grown from selected seed out of choice seedling peaches, were planted. Next to these one row was planted with seed from which a dozen healthy trees were grown and left where they sprang up. The object in view was to compare the productiveness, hardiness and longevity of transplanted budded trees, transplanted seedlings, and seedlings not transplanted, and at the same time to secure a record of the habits, peculiarities and merits of the varieties of budded fruit. All of the trees were well grown, one year's growth from the bud. These were planted, after having the roots examined to see that they were free from borers, in well-prepared soil, liberally manured in the drill with compost and kainit. The trees were all cut back to two or three feet when transplanted, and have been pruned each spring since, by the classes in the school of agriculture. The objects had in view in pruning have been: (*a*) To train each tree to shade its own body to prevent sun-scald. (*b*) To distribute the growth of limbs uniformly around and above the body, to secure symmetry, and to have the weight of fruit uniformly distributed around the point of support. (*c*) To strengthen the limbs by shortening back to enable them to sustain a crop of fruit. (*d*) To reduce the quantity of fruit by a judicious shortening of the shoots bearing the fruit-buds. (*e*) To so direct the growth that the crop of fruit could be gathered by a man standing upon the ground.

All of these objects have been attained in nearly every specimen.

Notwithstanding the immense crop of fruit borne last summer, the trees were neither broken nor rendered ill-shapen, while trees not pruned were often stripped of all their branches.

THE BORER.

In October each year the earth is removed from the collar of the tree until the large roots are exposed; a careful search for borers is then made, and the tree left thus exposed until the following March, when another search is made for borers and the earth raised around the bodies of the trees a few inches above the general surface. When the earth is removed the collar is scraped free of soil and gum and the knife freely used to find and destroy the borers. Any not found at that time may be readily detected a few days later by the brown cast-

ings at the entrance to their dens. A second examination should always be made in five or six days after removing the earth. The borer works just under the bark, and may therefore be readily destroyed with a pocket-knife. If not removed, they eventually destroy the trees by girdling them just below the surface of the soil. Thousands of peach and plum trees are thus destroyed, without a suspicion on the part of their owners of the cause of death.

DO SEEDLINGS BEAR WHEN BUDDED TREES FAIL?

The affirmative of this question is frequently asserted with the confidence of positive knowledge. In 1887 and 1888 the peach crop on the station was practically a failure because of late frosts. Several varieties of the budded trees bore from one-third to one-half crop each year, while there were none on the seedling trees.

In 1889 all bore full crops, but the seedling fruit was so far inferior to the budded varieties that no one would eat the seedlings. Again, the seedlings all ripened within a month, while the budded fruit of different varieties supplied excellent ripe fruit from the 6th of June to October 15. A census of the trees now living shows that we have lost two and eight-tenths per cent. of the budded trees, twenty-three per cent. of the transplanted seedlings, and none of the seedlings left to grow where the seed germinated.

But little notice is taken of the death of a scrub cow, but the death of a petted Jersey attracts much attention. Hundreds of seedlings die without attracting attention because of their inferior fruit and the fact that they cost nothing. Greater regrets are felt at the loss of a budded tree for the opposite reason. Both are short-lived if neglected or mistreated. The lives of both are prolonged by proper care and attention.

TIME OF FLOWERING AND SIZE OF THE FLOWERS.

A record of the date and duration of blossoming of each variety has been kept for two seasons and notes made upon the size of the flowers, for the purpose of inquiring what relation, if any, either bore to fruitfulness or power of resisting or escaping frost. During the unfavorable seasons of 1887 and 1888 the only varieties which bore fruit were either late bloomers or those which had very large petals.

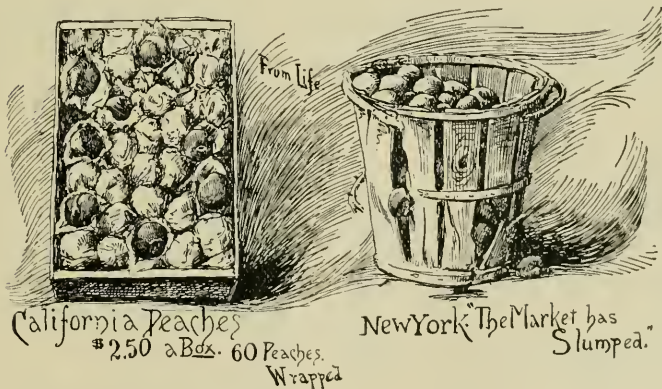
A very general impression prevails that early varieties blossom late and late varieties early. This is not true, and there is no uniform relation between the date of flowering and season of ripening.

NEATER PACKAGES FOR FRUIT.

From the Proceedings of the American Pomological Society.

There is a needed tendency toward smaller and neater packages for fruits. In addition to getting nearer the wants of the consumer, the fruits are not subject to the injury they are exposed to in large packages, where the ripe are crushed by the greener ones. A light, attractive package helps to no small extent in the sale of the contents. The cost of the packages is no longer a big expense. The decline has kept pace with the decline in values of fruit, and new and improved machinery insures still lower prices for many of the packages necessary.

Conceding that the grower has done his duty so far in raising, picking and packing the fruit, the next step is the best market, and last, but not least, the firm selected to ship to. The alluring and neatly worded circulars have led many shippers astray. Big figures, too, often prove a bait that many cannot resist. Every big market has plenty of firms who are entirely satisfied with their legitimate commissions, to whom the grower can ship without assuming any risk. Beware of the big, windy circulars that promise everything and the firms that send them out.



WRAPPING FRUITS AND VEGETABLES.

At the recent meeting of the Michigan fruit-growers, H. E. Van Deman said: "There is nothing very mysterious about the success of the California fruit-growers. In the first place, they take pains to produce high-grade fruit: then they fix it up in the nicest packages they can devise, and wrap every pear, every peach, every fruit (except cherries) in tissue paper, some even having their brand printed on the tissue paper. And this fruit they send here, and with it capture the fancy market. The way to beat California is to beat her at her own game. If it pays them to buy tissue paper and wrap their fruits, it will pay you. Fruit which is wrapped is of better quality: the wrapping retains the flavor. Why do the Florida people wrap their oranges? They wrap oranges with skins as thick as sole leather because it retains the aroma. With a pear, the longer that fragrance escapes the poorer it is. The peach, pear or plum that is wrapped is better than if not wrapped."

SOILS OF THE PEACH BELT OF MICHIGAN.

From Bulletin No. 90 of the Michigan Experiment Station.

The conditions that determine the successful cultivation of the peach in our state are climatic to a large extent. Yet the peach thrives best and produces fruit of finest quality on light, porous soils which are found in abundance along the eastern shore of Lake Michigan. Yet fruit of good quality is produced on some of the heavy clay lands found in this belt.

Soil from Van Buren county:

Timber: Hemlock.	
Sand and silicates.....%	87.23
Alumina	2.87
Oxide of iron	1.52
Lime .....	.51
Magnesia .....	.46
Potash .....	.83
Soda .....	.34
Sulphuric acid .....	.20
Phosphoric acid.....	.13
Organic matter containing .07 nitrogen.....)	3.41
Water	2.23
Capillary capacity for water, 44.70.	

Soil from Lake county:

Timber: Maple, elm, hemlock, bass- wood.	
Sand and silicates.....%	87.32
Alumina	3.22
Oxide of iron	2.10
Lime.....	.62
Magnesia .....	.28
Potash .....	.90
Soda .....	.63
Sulphuric acid.....	.10
Phosphoric acid .....	.23
Organic matter containing) .12 nitrogen.....)	3.78
Water .....	.55
Capillary capacity for water, 45.55.	

Soil from Mason county:

Timber: Hemlock intermixed with hardwood.	
Sand and silicates.....%	92.43
Alumina.....	2.99
Oxide of iron.....	1.23
Lime.....	.66
Magnesia.....	.12
Potash.....	.65
Soda.....	.23
Sulphuric acid.....	.10
Phosphoric acid.....	.22
Organic matter containing .03 nitrogen.....	.87
Water.....	.27
Capillary capacity for water, 32.40.	

Soil from Osceola county:

Timber: Hardwood mixed with pine and hemlock.	
Sand and silicates.....%	83.80
Alumina.....	5.10
Oxide of iron.....	3.24
Lime.....	.80
Magnesia.....	.64
Potash.....	1.19
Soda.....	.52
Sulphuric acid.....	.12
Phosphoric acid.....	.29
Organic matter containing .07 nitrogen.....	3.06
Water.....	1.24
Capillary capacity for water, 45.80.	

Hardwood land, Mecosta county:

Timber: Beech, maple, basswood.	
Sand and silicates.....%	76.00
Alumina.....	10.00
Oxide of iron.....	3.41
Lime.....	1.14
Magnesia.....	.49
Potash.....	1.80
Soda.....	1.16
Sulphuric acid.....	.24
Phosphoric acid.....	.33
Organic matter containing .10 nitrogen.....	3.18
Water.....	1.90
Capillary capacity for water, 43.80.	

Sandy loam from Mason county:

Timber: Hardwood mixed with hemlock.	
Sand and silicates.....%	75.27
Alumina.....	6.93
Oxide of iron.....	6.10
Lime.....	1.00
Magnesia.....	.89
Potash.....	2.10
Soda.....	.90
Sulphuric acid.....	.27
Phosphoric acid.....	.30
Organic matter containing .09 nitrogen.....	3.30
Water.....	2.92
Capillary capacity for water, 42.85.	

Pine land from Mecosta county:

Timber: Heavy pine forest.	
Sand and silicates.....%	75.54
Alumina.....	10.62
Oxide of iron.....	3.80
Lime.....	.94
Magnesia.....	.48
Potash.....	1.96
Soda.....	1.25
Sulphuric acid.....	.26
Phosphoric acid.....	.44
Organic matter containing .12 nitrogen.....	2.97
Water.....	1.44
Capillary capacity for water, 45.40.	

Hardwood land, Wexford county:

Timber: Maple, rock-elm, basswood, beech, and a little hemlock.	
Sand and silicates.....%	86.74
Alumina.....	4.32
Oxide of iron.....	2.10
Lime.....	.65
Magnesia.....	.24
Potash.....	.83
Soda.....	.34
Sulphuric acid.....	.14
Phosphoric acid.....	.15
Organic matter containing .11 nitrogen.....	3.26
Water.....	.86
Capillary capacity for water, 44.	

Soil from Missaukee county:

Timber: Beech, maple, elm, and some pine.	
Sand and silicates..... %	69.39
Alumina.....	8.35
Oxide of iron.....	5.80
Lime.....	1.15
Magnesia.....	.98
Potash.....	1.95
Soda.....	1.15
Sulphuric acid.....	.25
Phosphoric acid....	.28
Organic matter containing .11 nitrogen.....	4.73
Water.....	5.38
Capillary capacity for water, 39.10.	

MISCELLANEOUS NOTES.

JAPAN BLOOD PEACH.

A correspondent of the *Fruit Growers' Journal*, in speaking of the Japan blood peach, says: "The tree is of a rather stocky, dwarfish growth; which is all the better, for the branches shade the trunk and prevent the sun from burning the bark and thus damaging the tender wood. The tree comes into bearing the second year after planting, and matures its fruit about one week earlier than Alexander or any of the early June varieties; and the specimens were not only good-sized but ripe fully to the seed, and of almost as fine flavor as George the Fourth or other freestones that we have in August. I am free to say that the introduction of this peach, considering all its good points, was the most remarkable occurrence in peach culture, so far as my experience has gone, in a quarter of a century. Ripening the 1st of June; a decided freestone: of good quality; blooms late; and is not in danger of spring frosts."

VITALITY OF TREES.

Maturing an immense crop reduces the vitality so that the tree is unable to ripen a crop of fruit-buds the succeeding season; so that there is only one crop in two years: or else the tree or vine by annual overbearing is unable to make a healthy growth of new wood, so it dwindles and soon dies.

THINNING.

Thinning cannot be done with a brush, or by thrashing off the fruit, because the fruit that remains will be more or less bruised by the thrashing, and the finest specimens are more likely to be removed than the smaller.

EXPRESS ON INFERIOR FRUIT.

The express and freight charges on fruit of inferior size and quality are just as much as on the finest that can be produced; so the difference between a profit and loss is the difference between inferior, ordinary fruit and that of fancy size and top quality.

VOLUNTEER TREES.

Wherever there were peaches last season there no doubt will be found seedlings coming up, which can be taken up carefully, and set in rows three feet apart, and six inches apart in the row, to let grow until August or September, says Judge Miller in *Rural World*, when they can be budded. If of a select good variety, they might soon be planted to bear without budding.

TO GET EARLY PEACHES.

J. H. Hale, the peach grower, gets ripe peaches two weeks earlier by the following method: In the middle of the growing season put a strong wire around a large arm of a tree and twist it fairly tight. This checks the flow of sap and causes fruit-buds to form early and in great number. The fruit on the branches of this arm will ripen two weeks earlier than that on the untreated branches and will be much more highly colored. But this part of the tree will be so weakened by the treatment that it should be cut away after fruiting that new shoots may come and take its place. Thus one large arm or limb of a tree may be forced each year.

TEN PEACH COMMANDMENTS.

Mr. J. H. Hale, of Connecticut, lays down the following, and says: "On these ten commandments hang most of the law and all of the profits":

1. High, dry, sandy or sandy loam soil.
2. Careful selection of varieties most hardy in fruit-bud.
3. Vigorous, healthy seedling stocks budded from bearing trees of undoubted purity and health.
4. Trees given entire possession of the land from the start.
5. Thorough culture from the opening of spring till the new growth is well along.
6. Liberal annual manuring, broadcast, with commercial manures rich in potash and phosphoric acid and lacking in nitrogen.
7. Low heading and close annual pruning for the first five years.
8. Keep out most borers with some suitable wash, and dig out all others.
9. Search for traces of yellows every week of the growing season, and at first sign pull up and burn every infested tree.
10. Thin the fruit so that there shall never be what is termed a full crop.

ENEMIES AND DISEASES OF THE PEACH.

THE PEACH-TREE BORER.

(*Sannina exitiosa* Say.)

From Bulletin No. 77 of the Kansas State Agricultural College Experiment Station, by Prof. E. E. FAVILLE, of the Entomological Department.

One of the most widely distributed insects attacking peach trees in Kansas is the peach borer. See figs. 6, 9, and 10. Notwithstanding the havoc noted each year, scarcely anything of its attacks, life-history or appearance is known by the majority of horticulturists of this state. Too often peach trees planted and left to grow suddenly weaken and die, seemingly from some unknown cause. Thus the planting of peach trees is little encouraged on the average farm. If the method of destruction of the borer were better understood, its attacks could be more easily stopped.

The damage done to the tree consists in extreme cases in the entire girdling of the tree. In slight attacks mere excavations are made in the bark and layers of the bark. Where girdling is prolonged, the infested part begins in time to decay. The eggs are deposited on the bark of the tree, ordinarily near the surface of the ground. The eggs are of a yellowish color, oval shaped, somewhat flattened, and average about one-fiftieth of an inch in length. The earliest record of the appearance of the adult at the Kansas station is June 16. From about this time until fall eggs are deposited on the bark at the base of the tree, fastened by a gummy substance which is secreted by the female. As soon as the larvæ hatch they work their way downward toward the roots. They do not perforate the bark at first, but as they increase in size they gradually enlarge their channels laterally and inwardly.

When first hatched the larvæ are very small, but by winter some individuals attain a length of one and one-third inches. They are of a whitish color, slightly tinged with yellow: body soft and cylindrical, slightly tapering from first three segments: head horny like, brown, with strong jaws; segment next to head semi-chitinous. Fine hairs are arranged sparsely over the body, more noticeable at tip of abdomen. In studying badly infested trees at and near the college grounds during the past season, a number of important and practical observations were made. Whole trees, with roots attached, were removed in certain instances and studied. See fig. 12. Upon examination of the infested trees various stages of the larvæ were found, varying in length from one-fourth of an inch to one and one-fourth inches. This varia-

tion in larvæ may be found particularly in fall and spring. This fact often leads to the belief that the life-history consumes more than one year; although there may seem to be several broods, there is but one year employed in completing the life cycle. This difference in size is easily accounted for by the fact that eggs are deposited from about the middle of June to September.

By a study of the workings of the pest, the large larvæ appear to form long channels or broad, deep cavities filled with large quantities of gum and worm castings. A number of channels measured showed a measurement of one and one-fourth inches wide by two and one-eighth inches long. The larger larvæ are found beneath the bark, feeding on the cambium and interior portion of the bark. Seven inches below the ground large larvæ were detected which had eaten one-fifth around roots having circumference of eight inches. Several small roots next to it were dead, undoubtedly due to action of the borer. A number of trees and roots were beginning to decay, showing serious effects of the insect. See fig. 12. In a number of instances the work of the larvæ upon the roots seems more destructive than upon the trunk. They not only cut the bark and cambium but burrow grooves into the woody tissue. The larvæ pass the winter in different positions, as observed by careful examinations during the winter months. In a badly infested tree the liber of the bark was perforated with short channels, evidently the work of small larvæ.

Larvæ were found feeding upon rotten wood, four or five inches from growing tissue, though evidently not there by accident. These larvæ were in large channels about one-fourth of an inch deep. The number of larvæ is dependent upon the care that is exercised in the protection of the tree. In one orchard inspected, trees were detected containing over fifty larvæ. The number in other trees varied, depending upon the severity of the attack. About the middle of June the larvæ have nearly all attained full size. They then spin for themselves follicles of silk, with gum and excrement intermixed. The

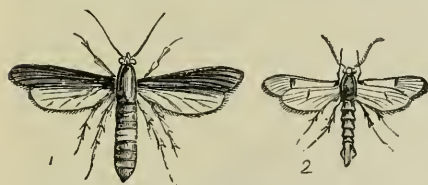


FIG. 6. Adults.

pupæ (see fig. 8) are about an inch in length, brown in color, ovate, with obtusely rounded ends. They are attached to the trunk of the tree at the base just above the ground. The pupal state lasts about a month. There is a great difference in the sexes of the adults (see figs. 6, 9, and 10), the female being much larger and more robust than the male, from which she is easily distinguished by a broad, transverse, orange-yellow band on abdomen. Both have almost transparent wings and are of a steel-blue color.

REMEDIES.

As the presence of the larvæ is clearly indicated by the exudation of gum, one of the first remedies to suggest itself is to search for the larvæ and remove them. The depth to which the larvæ channel and the manner of their work makes the operation almost speculative, so that there is great danger of serious injury to the trees in digging for the insect, making the method almost impracticable. The best method that can be employed in combating this insect is by preventing the adult from depositing its eggs. Mounding the tree is often employed to meet this end; hilling the trees to the height of about a foot in April before the adults emerge—thus preventing them from depositing their eggs. This mound should be left on until fall; the object, as in all mechanical protections, being so to protect the trunk that the adult cannot deposit its eggs nor the larvæ emerge. Bands of tarred paper may be used by wrapping to a height of two feet, tying at top. These should be renewed each year. Fine wire netting which is more lasting may be employed. It should extend two or three inches below the surface of the ground. Applications of certain washes are made during the spring and summer months which are obnoxious to the moths, and keep them from depositing their eggs. One of the most common used is an alkaline wash, consisting of soft soap and washing soda made to the consistency of paint, to which enough crude carbolic acid is added to give the mixture a strong odor. Apply the wash with a stiff brush at various times during the season.

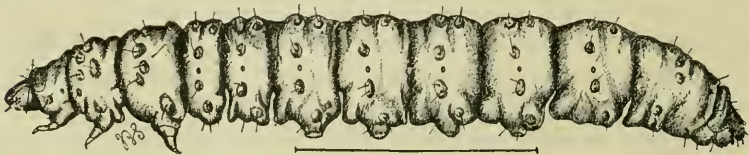


FIG. 7. The Peach Borer, enlarged. From Bulletin No. 128 of the New Jersey Experiment Station.

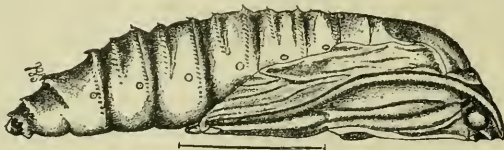


FIG. 8. Pupa of Peach Borer. From Bulletin No. 128 of the New Jersey Experiment Station.



FIGS. 9 and 10. Parents of the Peach Borer, *Sanninoidea exitiosa*. Upper figure male, lower female. From Bulletin No. 128 of the New Jersey Experiment Station.

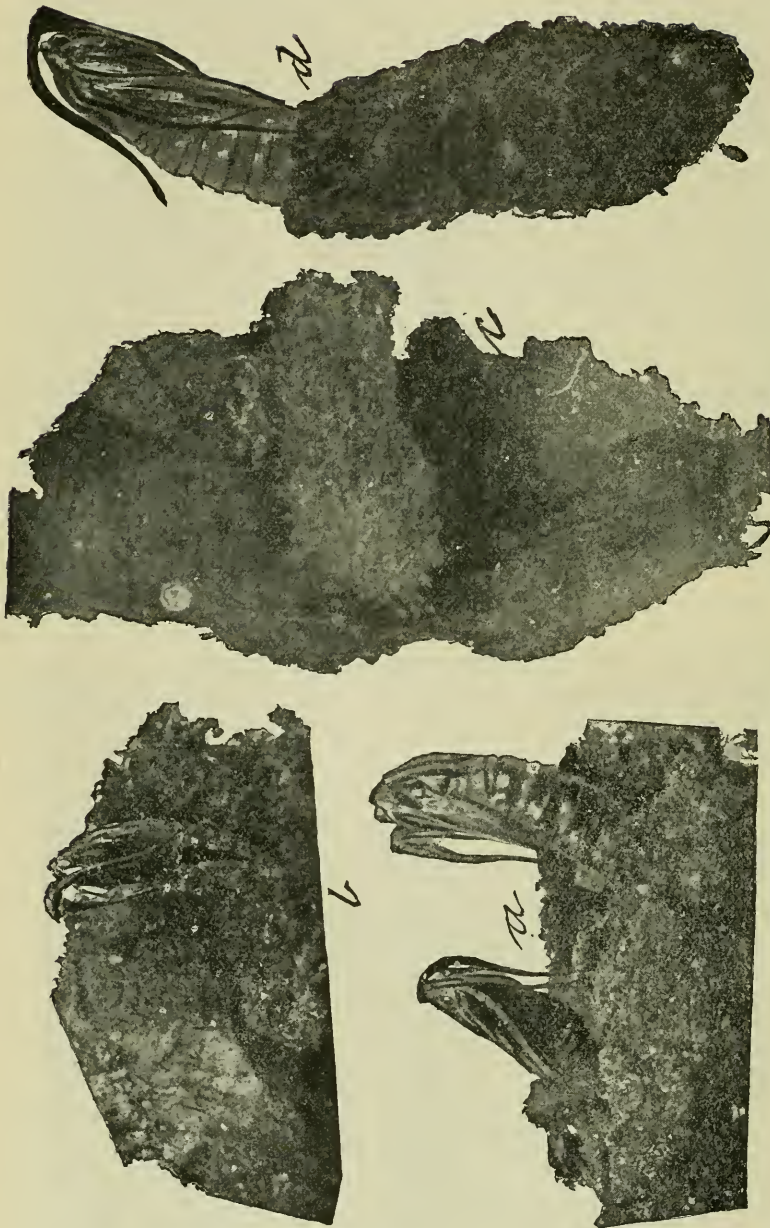


FIG. 11. Cocoons and pupae of Peach Borer: *a*, *b*, pupa skins projecting from bark after moths have emerged; *c*, an empty cocoon fastened to inner side of bark; *d*, cocoon, showing empty pupa case projecting from it. From Bulletin No. 125 of the New Jersey Experiment Station.

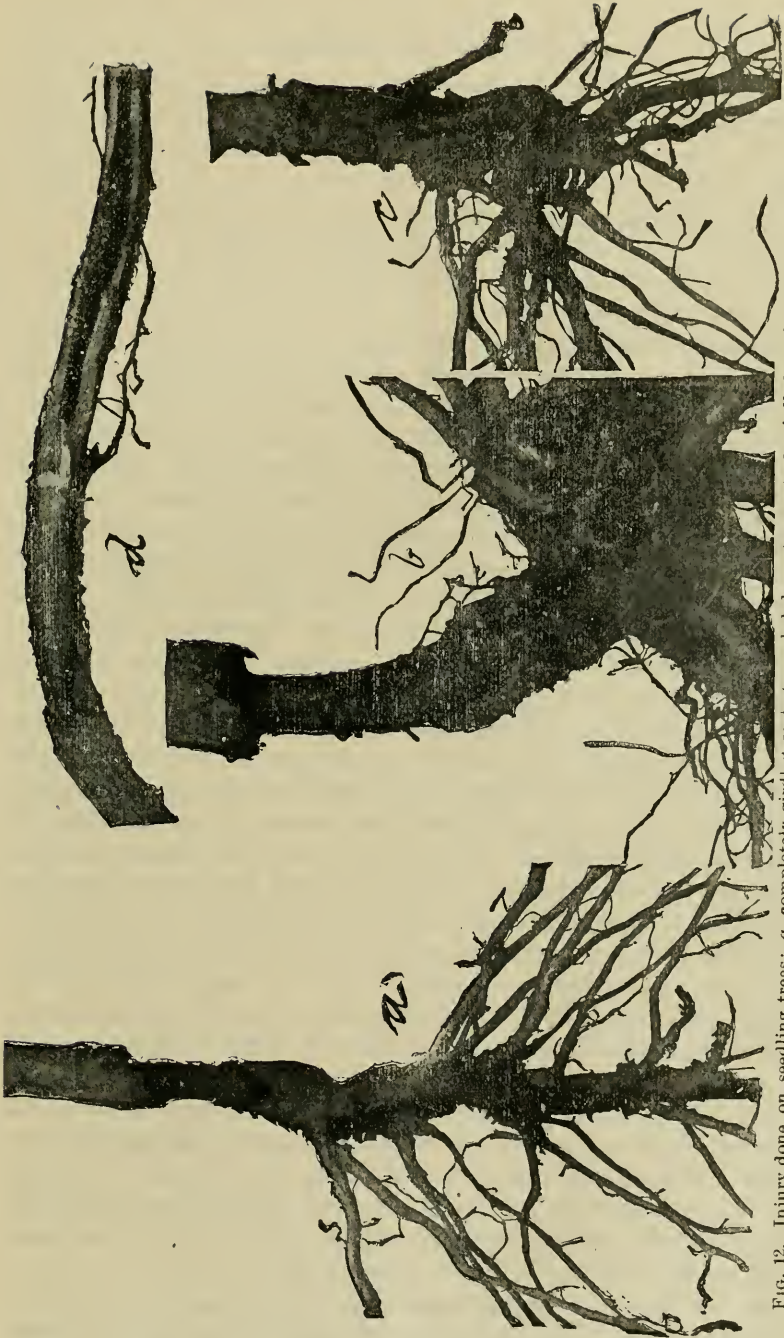


FIG. 12. Injury done on seedling trees: *a*, completely girdled and chained down tap-root; *b*, girdled to the root mass; *c*, repairing injury after borer left; *d*, burrow in center of a trunk. From Bulletin No. 128 of the New Jersey Experiment Station.

PEACH-TREE BORER.

By FRANK HOLSINGER, of Wyandotte county, in the *Western Fruit-grower*.

The peach-tree borer is a very common pest throughout the country wherever the peach is grown. It is a native American, and doubtless subsisted in the wild plums, which were widely scattered. It is claimed by some that it attacks the cherry, but I have as yet to be convinced that the cherry is ever infested by them.

The presence of the peach borer is discernible by the exudation of a glutinous, gummy substance at or near the root of the tree. To the orchardist no introduction of this enemy is needed. Yet it is no uncommon thing to meet orchardists who, while recognizing the importance of the pest and knowing its habits, are unfamiliar with the parent insect. See figs. 6, 9, and 10. The parent is a moth, yet is frequently mistaken for a wasp, which it strongly resembles. In the male this similarity is more strongly developed than in the female. In color the moth is a deep blue. In the male the wings are transparent; in the female, the hind wings only. The female is much the larger when her wings are expanded, being fully one and one-half inches across.

In this latitude they appear about May 1. They deposit their eggs in the bark at a few inches below the surface of the ground. The egg is very small: color, yellowish brown. After a short period of incubation they are hatched, the worm entering the bark of the tree to the sap-wood, where it feeds until fall. This is the time the greatest damage is usually done, as not infrequently the tree is entirely girdled and dies. How to get rid of them is therefore an important factor.

The remedies are legion—quack nostrums are abundant: but a little common sense injected into a little work will give you the greatest satisfaction. About May 1 take a hoe and mound the ground about your trees four to six inches in height. This will induce the moth to deposit her eggs high up in the tree. You should maintain this mound. If the winds and rains displace it, go over your trees and replace the ground about the trunk. You should see that the weeds are kept down. About the 10th or middle of September you should, with the hoe, remove the ground, leveling it. You will be surprised at the result. Many exudations of gummy matter, carrying numerous larvæ, will part from the tree. Wherever this substance is found scrape the tree and that tree will be beyond the power of the moths' influence for at least that year. It is quickly done. An active hand can effectively care for 500 to 1000 trees per day.

I have rarely lost a tree, although following this custom for more than fifteen years. It does sometimes happen that some larvæ escape observation at first, but by having the tree scraped you can at a glance

see any that remain, by having four to six inches of the body of the tree exposed. It is rarely they pass below the surface if thus treated. Where loose cultivation is had the insect soon passes to the roots, and it is much more difficult to clean the tree. I think this the best and simplest method yet devised to reduce this pest to the minimum.

CEMENT AND SKIM-MILK FOR BORERS.

From Bulletin No. 128 of the New Jersey Experiment Station.

During the winter of 1896-'97 it was suggested that a coating of hydraulic cement mixed with skim-milk formed an excellent protection against borer attack, with no danger to the trees. The suggestion seemed practical, and I tried the material on the college farm, and had it tried on peach trees near New Brunswick, at Cologne, and at Parry, N. J., and at St. Catharine's, Ontario, Canada. The applications on the college farm were made on May 3, two quarts of skim-milk being used, and cement added to make a body paint. This was applied to wild cherry, from the sapling of last year's growth to a tree three inches in diameter. The test was to determine the lasting qualities and whether it was injurious; hence the application reached from the surface of the soil to the branching or, in the case of saplings, to the very tip of the growing plant. A complete coat was put on in all cases, and it set almost immediately. It began to rain when the application was completed, and during the night a heavy rain fell. All through the early summer there were frequent heavy rains, so that the test was a severe one. May 6 another series of trees and shoots was painted with the hydraulic cement mixed with water to the same consistency as in the case of the skim-milk, the application covering the same variety of plants. June 15 the coating where mixed with water was decidedly imperfect. Where mixed with milk it was entirely intact. October 4 found the coating where milk was used to be yet entirely intact, the covering as perfect as when first put on. The material was brittle, however, and broke or crumpled readily.

As to injurious effects, it was impossible to detect any on even the youngest shoots. The bark was dirty: otherwise entirely healthy beneath the cement coating in all cases. For lasting qualities it leaves nothing to be desired. As there is nothing to penetrate or soak into the tree, the only possible injury could have been from the inclosing jacket of cement or from excluding air. But the coating does not seem to be air-tight, and is somewhat elastic, perhaps from the presence of casein; so there is no reason to expect injury. The water-mixed cement was broken in every direction, the coating imperfect in

every case, and almost entirely gone in some. The material was now reduced to a powder, easily rubbed off, and which looked as if the next good rain would remove it completely. Several trees were coated with the milk and cement at Parry, early in the season, one of which was under observation up to September 25. This was a small plum tree badly infested by scale, and standing alone near a road in weeds and grass. The coating of cement was still in excellent condition September 25, except where it had been broken by the growth of the scales beneath it. The shoots were still green and healthy but hardly vigorous, which is not surprising when the surroundings of the plant are taken into consideration.

The application on Mr. White's place was made in early June, and the coating, when examined late in September, was yet practically intact. Only the milk-and-cement mixture was used here.

The experiments at St. Catharine's, Ontario, were made by Mr. M. Burrell, on peach trees, and both milk and water mixtures were applied June 16. August 9 the skim-milk and cement was found "as good as when put on," while the cement and water was only "fairly good." September 21 the milk mixture was "in good shape," while the water mixture was "largely off."

Applications made May 26 to May 28 to peach trees by Mr. Henry Pfeiffer, Cologne, Atlantic county, New Jersey, were still in perfect condition in October, and had been effective in keeping out borers.

It is a fair conclusion from these experiments, made in a very wet season, that a mixture of cement and skim-milk applied to tree trunks forms a continuous coating that will remain in good condition during an entire summer. As a mechanical coating it leaves nothing to be desired, and no appearance of injury from its use has been observed. It is impenetrable to young insect larvæ, and a surface so covered would not be readily selected by an adult for oviposition.

The coating is sufficiently elastic to admit of moderate growth, but quite brittle enough to break readily from the efforts of any insect attempting to come out from beneath the bark. It would not, therefore, prevent the exit of borers that were already working in the tree, but would keep out any young larvæ that attempted to get in.

It is probable that this cement, added to some of the soap washes in use by fruit-growers, will add to their [the soap washes'] lasting qualities.

The simple water mixture is so far inferior to that made with milk that its use is not recommended.

In all cases the cement should be broken up with a stiff brush when the danger season is over. On young trees it should not be put on until necessary, nor kept longer than required, that the bark may develop normally. On old trees it makes little difference.

THE PEACH TWIG-BORER.

(*Anarsia lineatella* Zell.)

From Farmers' Bulletin No. 80 of the United States Department of Agriculture.

This insect is of European origin, but has been known to occur in the United States since 1860. It has been very injurious at times to peach trees in the peach-growing sections of the East; notably in Maryland; Delaware, and Virginia, also in New Jersey and New York, and more recently in West Virginia. In California and Oregon, and elsewhere on the Pacific slope, its injuries have taken a wider range, including damage to the apricot, almond, nectarine, prune, pear, and perhaps other fruit-trees, in addition to the peach.

In California it is listed as one of the three or four worst insect pests. In Washington as many as 100 larvæ, or instances of damage to as many twigs, have been counted on a single tree. In Oregon this insect is stated to be next to the peach-tree borer in the amount of damage it occasions, particularly in the Willamette valley. In western Colorado it is very destructive to peach, plum, apricot, and almond.

The injury occasioned by this insect is limited almost exclusively to the work of hibernating larvæ during the latter part of April and first of May, when they bore into the shoots of new leaves, killing the growing terminals and preventing the development of the branch, although sometimes a whorl of living leaves may remain at the base. Much of the new growth of the tree is often killed, in many instances the branches remaining with scarcely a bud or shoot which has not been thus destroyed. This necessarily results in greatly checking the vigor and fruiting capacity of the tree, and causes an irregular and knotty growth.

The summer broods of larvæ feed beneath the bark or in the fruit stems, occasionally, when nearly full grown, boring into the fruit; but such damage is not ordinarily noticed and is slight as compared with the injury occasioned by the first or hibernating brood of larvæ.

RECENT STUDIES OF THE INSECT.

Up to comparatively recent years the knowledge of this insect has been practically confined to its injury to peach twigs, either in terminals before the trees leaf out in the spring, a rare form of attack, or in the young shoots—the usual and destructive habit—and later and more rarely in the ripening fruit.

The peach twig-borer is apparently an old world species, and probably a very ancient enemy of the peach, with little doubt coming with this fruit from western Asia. It was described in Europe in

1839, and in this country in 1860. As an important injurious insect in this country, attention was first drawn to it about 1872 by Mr. Glover, a former entomologist of the department, and also by Mr. Saunders, of Ottawa, the report of Mr. Glover being the first published. On the Pacific slope record was made of injury by it to various stone fruits by Mr. Coquillett, and later similar damage was reported from Vancouver. We have also the results of the investigations by Mr. Ehrhorn in California, and the recently published account by Mr. Cordley relative to the insect as affecting peaches and prunes in Oregon. That this twig-borer is very destructive to the peach, plum, apricot and almond in western Colorado is shown by recent accounts, and damage from it has also been lately reported in West Virginia. In addition to the more important published accounts, injury from the twig-borer has been often recognized and reported by various observers in recent years. The records of this department show the presence of twig-borer in at least twelve states, and give it a range which indicates it is practically as wide-spread in this country as is the culture of its principal food plant.

If not already cosmopolitan in distribution, the peach twig-borer is rapidly becoming so, and will probably follow the peach and other stone fruits wherever they are cultivated, especially as its peculiar hibernating habit greatly facilitates its distribution with nursery stock.

LIFE-HISTORY AND HABITS.

According to Mr. Ehrhorn, they appear in the fall as very small larvæ, living and working in the spongy bark, chiefly at the crotches of the branches of the peach, and he surmises that they are from eggs deposited in these situations. Here the larvæ are supposed to grow slowly until the new growth appears in the spring, when they leave their cells in the bark and enter the new shoots. It is stated, also, that frequently the larvæ are nearly full-grown when they attack the young growth. A later brood is said to attack the fruit near the stems. The occurrence of the larvæ during the winter in the situations described is also thought to explain the fact frequently noted that the under and inside twigs, being the more accessible, suffer the most, while the exterior and topmost branches escape.

Later studies confirm, in the main, Mr. Ehrhorn's conclusions as to the habits of the larvæ. That the larvæ make any essential growth in the winter, however, is probably a wrong inference, as will be shown later, and the nearly full-grown larvæ referred to were doubtless individuals that were wandering from one point to another, and had merely reached nearly full growth before they were observed.

Both in the orchards of California and by means of the abundant

material received at this office, we have been enabled to make a careful study of the hibernating galleries or chambers of the young larvæ. These occur not only in the crotches of the smaller and sometimes quite large branches, but many of the larvæ utilize the roughened bark at any point. They burrow into the bark for a short distance, penetrating little more than the upper superficial layer, and form slightly elongated chambers (fig. 13, *c*), which are lined with white silk and the opening afterwards closed. The location of the larvæ may be readily recognized by the little masses of projecting excrement or comminuted bark at the entrances to the burrows. Fig. 13, *a, b*. The size of the burrow and the fact of its being lined with silk preclude the idea that the larva feeds in the fall or during hibernation, except, perhaps, in the mere operation of excavating the chamber.

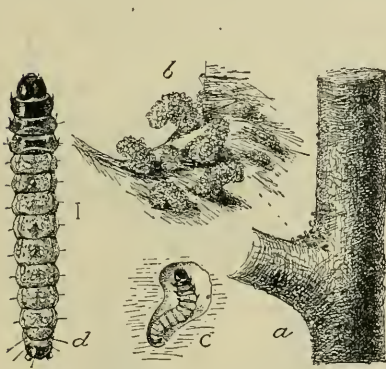


FIG. 13.—*Anarsia lineatella*: *a*, twig of peach, showing in crotch minute masses of chewed bark above larval chambers; *b*, latter much enlarged; *c*, a larval cell, with contained larva, much enlarged; *d*, dorsal view of young larva more enlarged (original).

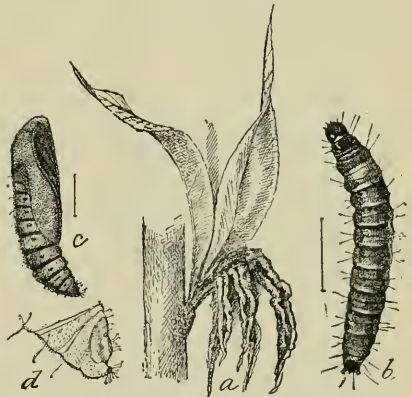


FIG. 14.—*Anarsia lineatella*: *a*, new shoot of peach withering from attack of larva; *b*, larva enlarged; *c*, pupa enlarged; *d*, tip of pupa more enlarged (original).

The young larva, as taken from the burrow, is not above two millimeters long, and is of a general yellow color, with the head and cervical and anal plates dark brown, almost black. Fig. 13, *d*.

While in their winter quarters the larvæ are subject to the attacks of predaceous mites, and many of them are destroyed by this means, as will be later noted. They are also occasionally parasitized by a chalcidid fly.

Early in April the larvæ begin to abandon their hibernating quarters and attack the new leaf shoots, but some individuals were found in the crotches by Mr. Ehrhorn as late as April 21. The damage becomes noticeable, as a rule, at the time the shoots are from one-half inch to two inches in length, or, more properly speaking, [when] mere clusters of newly expanded leaves.

Glover's account of their working downward in the old twigs from

the terminal buds before the starting of the leaves in April apparently cannot be questioned, but seems not to be the normal course, as shown by the observations since made.

In our experience, the larvæ begin to migrate only after the new foliage has begun to put out, and they [then] attack the new shoots at any point, generally, however, from one-half inch to an inch from the apex, either near or in the crotch formed by the leaf petiole and the stem. The longest burrow observed was one and one-half inches and the shortest one-fourth inch. Sometimes the burrow extends about one-eighth inch above the entrance, and occasionally the larvæ simply eat into the shoot as far as the pith and then go elsewhere. The larvæ are seemingly restless and not easily satisfied, and are continually moving from one shoot to another, and are most active travelers. In this way a single larva may destroy or injure several shoots before reaching maturity, thus greatly increasing the damage.

When working in the succulent new growth the larva bores rapidly, sufficiently so at least to excavate a burrow two-thirds of its length in an hour. The length of time spent by the hibernated larva in coming to full growth in the green shoots is comparatively short, not exceeding ten to fifteen days. In California, and also in the District of Columbia, the larvæ begin transformation to pupæ in the latter part of April, and the moths of the first brood emerge throughout May. In Colorado, Mr. Gillette has bred the moths the 1st of June and also toward the end of July. In Oregon, Mr. Cordley secured his first pupa on May 8, and his first moth on May 17.

The adult larva tapers strongly toward either end, and attains a length of three-eighths to half an inch, or slightly more when in motion. It is of a dull, reddish-brown color, the reddish color predominating before maturity and the latter after maturity, and the head and the cervical and anal shields are dark brown or almost black. The space between the segments, and especially between the second and third thoracic segments, is noticeably light colored. The hairs are long, and spring singly from minute tubercles. Other details of structural features are shown in the illustration. Fig. 14, *b*. In confinement, the larva on reaching full growth spins a scanty web—in no sense a close cocoon—in the leaves and rubbish about the trees or on the trees in the dried and shriveled leaves of the injured shoots, or it attaches itself exposed on the twigs or bark. After thus securing itself the larva immediately pupates, becoming a brown, rather robust, chrysalis. Fig. 14, *c*, *d*. In midsummer these transformations are very quickly accomplished. A larva, for example, which webbed up June 29 pupated July 1, and the adult emerged July 8.

Mr. Ehrhorn states that it is very difficult to find the pupæ in or-

chards, as the larvæ hide in all sorts of places, as in crotches of the branches, between dried leaves, and about small peaches likely to drop off.

The chrysalis stage lasts from seven to ten days, and the moths of the first brood begin to appear early in May and continue to emerge throughout this month and into June, in the latitude of Washington. The adult moth is less than a quarter of an inch in length, expanding a little more than half an inch, and is of a beautiful dark green color, with darker spots on the fore wings, as indicated in the illustration. Fig. 15. It is a handsome insect, and has a peculiar way of resting with its palpi (feelers) bent back over its head and its antennæ laid closely down on the wings.

The actions of the moths out of doors have been recently described by Mr. Cordley. During the daytime they remain perfectly still on the bark of the tree, and with the fore part of the body slightly raised

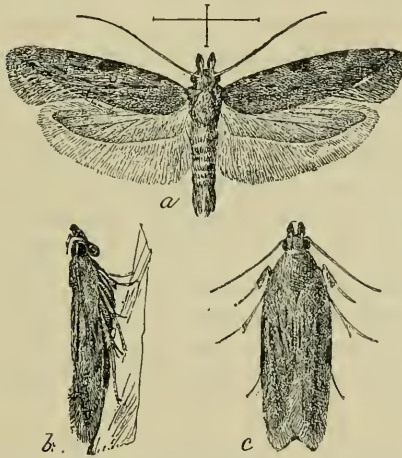


FIG. 15.—*Anarsia lineatella*: a, moth with spread wings; b and c, same with wings closed, illustrating position normally assumed—all much enlarged (original).

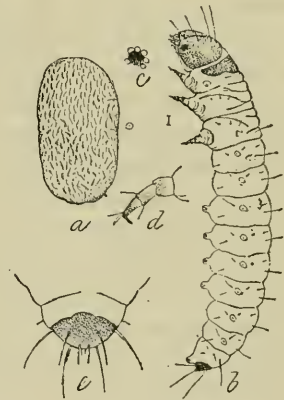


FIG. 16.—*Anarsia lineatella*: a, egg; b, young larva; c, eye; d, thoracic leg of larva; e, anal segment, from above—all greatly enlarged (original).

and the labial palpi (feelers) held rigidly upright before the face. They so closely resemble small, rough projections of the bark that it is almost impossible to distinguish them. When disturbed they dart rapidly about for an instant and then as suddenly alight in a new position.

The egg-laying habits of this insect previous to 1897 having been merely a matter of conjecture, special effort was made to get the facts concerning this feature of the life-history. A number of moths reared in the insectary were confined about May 10 with peach twigs eight to ten inches in length, of this year's growth. On May 28 it was

found that many eggs had been deposited on these peach twigs, an egg having been placed apparently just above the base of the petiole of nearly every leaf. When examined, most of the eggs had hatched and the larvæ had entered the twigs at or near the crotch formed by the leaf and twig, the point of entrance being indicated by a little mass of brown excrement. The egg had evidently been placed in the protection formed by the two little spurs at the base of the petiole.

In one instance nine eggs were deposited around the base of a single leaf, six of them close together under one of the bracts at the base of the petiole, and three in the depression or scar left by the second bract, which had dropped.

The recently deposited eggs are white in color and iridescent, but before hatching become distinctly orange. They measure about four-tenths of a millimeter in length by two tenths of a millimeter in breadth, are somewhat ovoid, and are lightly attached lengthwise to the twig by a glue-like material. Under a high power they are seen to be coarsely and rather regularly reticulated, as shown in the illustration. Fig. 16, *a*.

In confinement the moths live about ten days, and most of the egg laying is in the first half of this period. The habits above described are those of caged moths, but it is reasonable to suppose that in a state of nature the eggs are deposited in much the same way, and this is rendered almost certain by the great regularity noted in the manner of their deposition. In but one or two instances were the eggs placed in other situations—one being placed on the upper surface of a leaf close to the midrib, and two together placed in a groove at the side of the base of the leaf. From eggs deposited later than those first mentioned, viz., about June 3, larvæ appeared June 15, indicating a period of about twelve days between the laying of the egg and the hatching.

The newly hatched eggs measure about one millimeter in length and are of a very pale yellow color, with the head and the cervical and anal plates black and the thoracic legs dusky. When first noted they had excavated channels somewhat longer than themselves and about twice as broad in the twigs, the entrance being marked by a small mass of excrement. By June 3 most of the older larvæ had abandoned their original burrows and were constructing new ones in similar situations on fresh branches of the peach, with which they were from time to time supplied. They continued to construct new burrows every few days until they were full grown. On June 23, of the few remaining individuals of this lot of larvæ, one had already pupated in a folded leaf and the other two were fully grown and about ready to transform, which they both did before the end of the month. About the end of June some peaches were received from Mr. Ehrhorn, said to be in-

fested with the second brood of larvæ. Some of the peaches had been bored into a little way near the stem by what was evidently, from the size and nature of the burrow, nearly full-grown larvæ of the second brood. One of these was found, and also one pupa. On further examination, however, it was found that the larvæ of what is undoubtedly the third brood (the second of the summer broods) were present in numbers, not in the fruit, but in the short stems of the fruit, which at this season are green and somewhat succulent. In these stems they had made their little chambers not unlike those in the twigs described above, or those in the crotches in the fall, except that they were for feeding purposes and not lined with silk, as are the latter. Others were also found at the base of the leaf stalks, just as we had been finding them in our breeding-cages.

We were unable to carry our breeding-cage material farther than this point at Washington, D. C., and Mr. Ehrhorn was unable to furnish additional supplies, but he writes that he found minute larvæ in the crotches of the trees as early as August 21. It would seem from this last and very important observation that some, at least, of the fourth brood of larvæ, if not all of them, go into winter quarters, and at a period much earlier than would have been supposed. These facts go a long way toward clearing up the life-history of this insect, and indicate a much more uniform habit in the different broods than has been hitherto supposed. The old idea that this insect is double brooded, the first brood living in the wings of the second brood, affecting the ripening fruit, must be abandoned. At the time of the appearance of the first brood of moths, during the month of May, the fruit of the peach is of considerable size, especially by the end of the month, but is green, hard, and densely hairy, and is probably rarely if ever chosen by the parent moths as a nidus [repository] for their eggs.

The normal location of the eggs, and the point at which larval development begins, is indicated by the foregoing notes, and there is no reason to doubt but that at all seasons of the year larvæ develop in the new growth, entering normally at the axils of the leaves or in the stems of the green fruit. In these situations the eggs are placed, and the young larvæ construct their little oval chambers, which they abandon from time to time to make new ones, rarely doing enough damage in the later broods at any one point to be noticeable. As they attain larger size they travel more, and often bore into the fruit near the stem, where the greater exudation of gum and more serious character of the injury draw attention to them. In the case of the burrows in the twigs, the more abundant new growth and more mature condition of the wood render the injury much less noticeable, nor are

the results of the attacks so marked as in the injury to the new growth in April.

Our records for the first summer brood indicate a period of about six weeks as necessary for its complete development. The time necessary in the warmer months for the later broods is probably even less, and it is evident that there are certainly three broods of larvæ annually, if not four. One of the important points remaining to be cleared up in regard to this insect is whether the larvæ found in the crotches of the branches in late summer and fall come from eggs placed in these situations or are migrants from some other parts of the plant. Mr. Ehrhorn's supposition that the eggs were placed by the moth where the larval chambers are afterwards found are borne out by the small size of the larvæ, which are not much larger than when newly hatched. The comparatively large size of the egg and its striking appearance, and the lack of any attempt at concealment of it, should enable one, where the insect is abundant, to clear up this uncertain feature without difficulty.

NATURAL PARASITES.

That the larvæ of the peach twig-borer are attacked by parasites during the hibernating period has already been alluded to, and, in fact, of the material received from Mr. Ehrhorn, nearly all had been destroyed by a minute predaceous mite, *Pediculoides ventricosus*. Fig. 17. In most instances nothing remained of the larvæ except the empty heads. Two minute hymenoptera, or four-winged fly parasites, have also been reared from the larvæ. The first of these was obtained by Professor Comstock, who, in his studies of the peach twig-borer, reared a parasite from it which he did not name, but which was later described by Dr. L. O. Howard as *Copidosoma variegatum*. The second fly parasite of *Anarsia* was obtained from the material in tree crotches submitted by Mr. Ehrhorn, and proves to be *Oxymorpha livida* Ashmead, a wide-spread species, quite variable in point of size. Of these parasites, in California the greatest benefit is derived from the mite, which, as we have already stated, frequently causes the death of from seventy-five to ninety-five per cent. of the young larvæ.

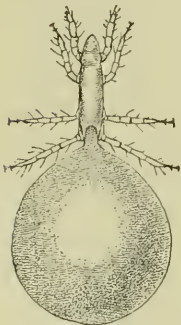


FIG. 17. *Pediculoides ventricosus*—much enlarged (original).

REMEDIES AND PREVENTIVES.

The common method of procedure against this insect, and the one hitherto generally suggested, is to clip off and burn the withering infested tips in the spring as soon as the injury is noted. The forego-

ing life-history emphasizes the fact that it is necessary to do this very promptly, for the larvæ remain in these situations a very short time, and early in May will have abandoned their burrows in the young shoots, to transform, often elsewhere, although sometimes pupating in the withered leaves. The presence of dying terminals does not always indicate that a larva is necessarily present, since in many instances it will have wandered to some other point. With large orchards this step would be a very tedious one, and, with trees of any size, often impracticable.

The knowledge of the hibernating habits of this insect indicates a more effective method of control. This consists in spraying the trees during December or January, or any time after the foliage has fallen, with kerosene emulsion, resin wash, or some similar oily preparation which will penetrate the burrows and destroy the young larvæ. Mr. Ehrhorn found the kerosene treatment very satisfactory, as practiced in California in the winter of 1897-'98, the little excremental pellets of the larvæ absorbing the oily mixture and leading it directly to the insect in its hibernating cell. For California, Mr. Ehrhorn recommends that the application of the mixture should be begun in December.

Kerosene emulsion has one advantage over other oily preparations, such as the resin wash, in that it is more penetrating and will be more certain of reaching the larvæ. Where the emulsion is to be prepared by hand, it is better to make it in rather small quantities at a time, in order to secure a perfect combination of oil and soap. The proportions usually taken are as follows: Kerosene, two gallons; whale-oil soap, half a pound; water, one gallon. The soap, first finely divided, is dissolved in the water by boiling and immediately added boiling hot, away from the fire, to the kerosene. The whole mixture is then agitated violently while hot by being pumped back upon itself by a force-pump and direct-discharge nozzle, throwing a strong stream, preferably one-eighth inch in diameter. After from three to five minutes' pumping the emulsion should be perfect, and the mixture will have increased from one-third to one-half in bulk and assumed the consistency of cream. Well made, the emulsion will keep indefinitely, and should be diluted only as wanted for use. The proper dilution for the above formula is about twenty gallons of spraying mixture.

When hard water is employed in the making of the emulsion or in diluting afterwards, it is necessary to use about twenty-five per cent. more soap, or preferably the water may be broken with lye, or rain-water may be used.

In the use of kerosene or other oily washes on plants, the applica-

tion should be merely sufficient to wet the plant without causing the liquid to run down the trunk and collect about the crown. Usually at this situation there is a cavity caused by the swaying of the plant in the wind, and the accumulation of the insecticide at this point may result in death or injury of the plant. It is even advisable to mound up the trees before spraying or to see that the earth is firmly packed about the base. Care should also be taken in refilling the tank to see that no free oil is allowed to accumulate in the residue left at the bottom.

In line with the use of kerosene emulsion may be suggested the use of pure kerosene mechanically combined with water in the act of spraying, as is now effected by a style of pump specially made for the purpose. A twenty to twenty-five per cent. solution of the kerosene can be used without danger to the plant in its dormant condition, but it is necessary to watch the apparatus employed for this work very carefully to see that the proportion of oil to the water does not change, and on the whole it is much safer and more satisfactory to use the kerosene emulsion, the strength of which may be known definitely in advance and is not subject to variation.

SPRING OR FALL TREATMENT WITH ARSENICALS.

The possibility of destroying the larvæ of the peach twig-borer by spraying the plants with arsenicals, either in the fall or spring, has also been suggested; but such treatment demands the greatest caution on account of the extreme sensitiveness of the foliage of the trees ordinarily attacked by this insect to scalding when sprayed with these poisons.

The fall treatment is directed against the last brood of larvæ, and to be effective the poison should reach the parts of the plant where the eggs are most apt to be placed, presumably the crotches of the branches. Many of the larvæ might thus be poisoned while eating through the bark preliminary to the construction of their winter retreats. To effect anything of value by this course the poison must be applied early—that is, before the eggs are deposited—and the feasibility of the treatment will depend somewhat on the condition of the trees and the damage that might result from scalding of the foliage in late summer.

As a spring treatment, the arsenical spray should be applied to the trees at the moment the leaf-buds begin unfolding, so that the first meal taken by the wintered-over larvæ will be a poisonous one. The difficulty with this method is that already given—namely, the extreme sensitiveness of the foliage of the peach and allied fruits to damage by scalding with arsenical sprays—and if this method is followed the poison should not be used in much greater amount than one pound

of the arsenical to 400 gallons of water, previously mixing the poison up with an equal weight of lime in a small amount of water.

The experience in California with the arsenicals, as reported by Mr. Ehrhorn, has not been satisfactory. It has been found very difficult in actual practice to use them without danger to the plants. The winter treatment with kerosene emulsion, first described, is therefore especially and strongly advised.

HEADING OFF THE PEACH BORER.

When borers once get into a peach tree there is nothing to do but to cut them out. No application can be made to the outside of a tree to kill the borers inside of it.

The proper way is to keep them out from the beginning. No young trees should be set out until they have been examined for borers, and no tree injured by them should be put in.

The trees should be wrapped with a double thickness of newspaper when set out, so that at least fifteen inches of the trunk above ground is covered, and this wrapping should remain until the middle of September. When the wrappings are taken off, the trees should be closely examined, and if any borers have made their way in above the papers they should be cut out.

Thereafter the trees should be annually protected by paper wrappings, put on not later than the first week in June, and preferably before the 1st of that month; this protection to continue each year to the middle of September.

Hydraulic cement mixed with skim-milk is equally effective, and may be preferable on young trees. It is sufficiently lasting, and cheap, and any borers attempting to enter above it are at once seen, since there is nothing to shelter them.

In tying on papers do not use too strong or stiff a twine. Peach trees grow rapidly and may become girdled, unless the twine is somewhat yielding and breaks under a moderate strain. A little retying may be required in August on young, rapidly growing trees.

Such are the results of elaborate inquiry and tests at the New Jersey experiment station, as summarized by Prof. John B. Smith in bulletin No. 128.

NEW PEACH-TREE DISEASE.

In the Michigan *Fruit-grower*, Mr. Gardner Avery has the following article regarding a new peach-tree disease, which has appeared in some of the orchards of Michigan :

I saw in a recent issue, in the report of the Lowell horticultural meeting, that S. E. Tucker exhibited some new growth of peach trees that had dead spots in the bark.

I have never seen anything in your paper or any other that treated on this subject. I know something of this disease, and I feel that it is a subject which ought to be discussed, and that thoroughly, too. I know nothing of this disease scientifically, but experimentally, I am sorry to say, I know more than I wish I did about it.

It is worse than the yellows and the San Jose scale combined, for it spreads faster and leaves none unaffected. We are taking out a block of 1500 trees, nine years old this spring, that are nearly dead at this writing. The disease commenced the second year after setting, in Barnard variety, which has been affected more severely than the other varieties, with the Chilis as a close second. The Smock seems to be mostly proof against the disease.

I have tried to find the name, cause, and remedy, but have made a failure thus far. Mr. Morrill thought the cause was climatic, and I see that Mr. Tucker has also been inclined to think it was climatic, but changes his mind since we have had no severe weather the last winter. Mr. Sneathen is inclined to think that it is a fungous disease, and he says that others think it is caused by barn-yard manure. Now, my trees are ruined, and I have never applied barn-yard manure to nearly all of my orchard, and those that had manure applied to them are no different from the rest. In this belt of peach country there are a few orchards that are not affected, but they are isolated ones.

This proves two things: First, that the disease spreads from tree to tree; second, that it is not caused by rigorous weather, or they would all be alike, under like conditions; whereas some of the orchards on the lowest ground have escaped, while orchards on the higher sites are nearly dead. Generally, those on clay are worse than those on sand, but when it gets in they all go sooner or later.

Dry weather is a healer while wet weather is a deadener to the trees. I am inclined to think that we would not have gotten very much from our trees that we are taking out if it had not been for the drought three years since; this kept the disease in check, so that we harvested a good crop.

All of the above points to a fungus as the cause; and we have had

our coats off laboring with it as a fungous disease. We have kept all the dead wood trimmed out, and sprayed them early with sulphate of copper and later with Bordeaux mixture, with no perceptible difference. We had a first-class apparatus for applying these remedies, and applied them with the hope of curing the disease; but, as I said, we are taking them out now, and have become a little discouraged with another block, located some distance away, that is four years old and affected with these little brown spots in the bark that Mr. Tucker speaks of.

I think that all of these orchards, which are similarly affected, will give evidence in the future of worse symptoms than dead spots in the new growth, unless there is a remedy found.

BLACK SPOT ON PEACHES.

This fungus is quite common over the state, mostly affecting late varieties, more especially on seedling fruit. It first appears as black, sooty-like spots of varying size, generally on one side of the specimen, often covering one entire side of it.

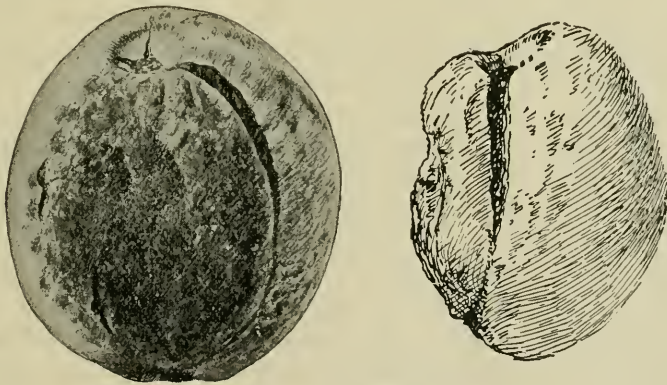


FIG. 18. Black spot of peach (Hill's Chili).

The side becomes dwarfed, the skin becomes hard, and shrinks and cracks open sometimes to the stone, and the flesh on the affected side is useless, and the whole fruit valueless for market and of little value for family use. Bordeaux mixture is the only thing known that will hold it in check. The formula is four pounds of sulphate of copper and six pounds of lime, diluted with at least fifty gallons of water, and applied with any of the spray pumps.

THE CURCULIO.

From a Texas Experiment Station Bulletin.

While we have had very fair success in spraying plums for the curculio with the arsenical compound, our success in spraying peaches does not encourage us to recommend it. As before stated, the peach is very susceptible to injury from the use of these poisons, and the quantity used must be very small, probably one pound to 200 gallons of water, and then some lime must be mixed with it. We prefer the jarring method for the peach. If the insects are jarred down into sheets early in the morning they do not fly readily, and may easily be caught and killed. The trees can be jarred for something less than five cents per tree. When the wormy fruit falls to the ground it is a good idea to turn hogs in to eat it up, which greatly prevents the insect next year.

GENERAL DIRECTIONS FOR SPRAYING PEACH TREES FOR PEACH ROT.

From a Bulletin of the Delaware College Agricultural Experiment Station.

For the treatment of peach trees, the following brief directions are given:

1. During the winter or very early in the spring remove from the trees and gather and burn all mummified fruit.
2. Very early in the spring it will be well to spray the trees thoroughly with a solution of copper sulphate (bluestone), one pound of bluestone to twenty-five gallons of water.
3. When the fruit-buds begin to swell, spray either with the acetate of copper solution or the Bordeaux mixture.
4. Just before the fruit-buds open, repeat the latter.
5. When bloom begins to shed, spray with Paris green, three ounces to the barrel of water; to this add about a quart of whitewash (milk of lime); or with Bordeaux mixture, adding to each barrel three ounces of Paris green.
6. In ten days or two weeks repeat the latter.
7. When fruit just begins to color, spray with copper acetate solution.
8. Repeat the latter in a week or ten days.

In preparing the Bordeaux mixture, especial stress is to be laid on the advantage of preparing beforehand a barrel of strong bluestone solution, made so that each gallon of the solution will contain say two pounds of bluestone.

It is a great advantage to buy the bluestone coarsely pulverized, as in this form it dissolves so much more rapidly. In this condition, and with hot water, a large quantity of a concentrated solution of the bluestone can be made very quickly.

It is also well to have another barrel filled with slaked lime or whitewash. By slaking a given quantity of lime for each barrel of the whitewash, provided the same is well stirred, it will be easy to tell about what weight of lime is in each gallon, and thus the necessary quantity can be readily added by measure.

In spraying use a nozzle which gives a misty spray; wet every part, but drench none.

It is better to spray on a cloudy or partly overcast day, or when the sun is not too hot; thus the foliage is less apt to be injured.

EXPERIMENTS AND DEPRAVITY.

From "Spraying for Peach Rot," in Bulletin No. 19 of the Delaware Experiment Station.

Mr. Townsend says: "I experienced great trouble in keeping people out of the orchard, and in some places along the road the trees were stripped of every sound peach. This applied equally to those sprayed and those not sprayed. Pilfering has continued from the time the fruit commenced to turn red until the day it was gathered. I had intended to ship in carriers, but found that because so much of the largest and most attractive fruit had been stolen from the trees it would not be profitable to so ship. The road is the main thoroughfare leading from Milford to the bay shore, and has a heavy travel over it. The extent of this pilfering is shown from the fact that from the twenty-one sprayed Amsden trees, near the center of the orchard, I expected to pick as many peaches as from twenty-eight sprayed trees near the road; on the contrary, I only obtained a little over one-half as many. This aforesaid prospect held good until Saturday. On Sunday I employed a man to watch along the road for the passers, and did not suppose that they would come into the center of my orchard by the back road: but they did. My neighbor informed me on Monday that seven carriages drove into my orchard from the back road inside of two hours on Sunday morning, and that in the afternoon several squads of boys visited it. One fact was certain—that the fruit was not there. I am satisfied that spraying will save the peaches; but placed as I am on a public thoroughfare, I shall take out the early fruit."

This experience of Mr. Townsend's shows one of the drawbacks liable to attend work of this kind. Blissful ignorance of what may

effect experimental work when we are not there to see may be more comforting, but we can never be certain that trees bearing attractive fruit are not more or less pilfered unless hedged in by some impassable barrier.

“LITTLE PEACH.”

A strange trio of diseases we have, says a writer in the *Michigan Fruit Grower*. “Yellows” throughout the country, “little peach” in Michigan and “rosette” in Georgia are all of very similar nature. The secret of nearly every fruit-tree disease has been discovered; the fungus, spore or bacterium has been captured and has been carefully studied, although some of them, such as the pear blight microbe, do not yield to any treatment with which we are at present acquainted.

There has nothing yet so baffled the investigator as “yellows” and its two brethren. “Little peach,” a disease closely related to “yellows,” and which is more prominent in the southern portion of our peach belt, seems to be gaining ground. In response to an appeal to the department of agriculture, an expert, probably Dr. Erwin F. Smith, will come to Michigan to investigate the disease. Doctor Smith, it will be remembered, wrote a monograph upon “yellows,” and is probably the most able man to take hold of this mysterious disease in the country.

SPRAYING FOR PEACH LEAF-CURL.

From the *Canadian Horticulturist*.

Mr. W. M. Orr, in 1898, was the first in Canada to try whitewashing his peach trees in winter season with a view of preventing the curl. His success was very marked, and was given to the public in his annual report. This spring Mr. A. H. Pettit, of Grimsby, sprayed his large peach orchard first in February, and then again in March, using for first application one peck of lime to forty gallons of Bordeaux mixture, and the second time one-half bushel. One row right through the orchard, embracing nearly every variety, was left unsprayed. As the growth began the result became more and more apparent, every row being free from curl except the one unsprayed, on which the foliage was considerably affected and the ground beneath was strewed with dead leaves, while under the others none could be seen. Numerous visitors studied the effects of the treatment and were convinced of its effectiveness, and believe that, had the season been a wet one, the difference between the treated and untreated trees would have been still more marked.

WINTER PROTECTION OF THE PEACH.

By PROF. J. C. WHITTEN, in Bulletin No. 38 of the Missouri Experiment Station.

SUMMARY OF RESULTS.

1. In Missouri, winter-killing of the fruit-buds of the peach is usually due to the unfavorable effects of freezing after they have been stimulated into growth by warm weather during winter or early spring.

2. This early swelling and growth of the buds is due to the warmth they receive, is practically independent of root action, and may take place on warm, sunny days in winter, while the roots are frozen and dormant.

3. Peach fruit-buds may safely endure a temperature of ten or twenty degrees below zero, provided they mature well in autumn, are entirely dormant, and the cold comes on gradually.

4. Zero weather may kill fruit-buds that have swollen during previous warm days, or that were not properly ripened in autumn.

5. Shading or whitening peach trees to prevent their absorbing heat on sunny days opposes [retards] growth of the buds, and is, consequently, a protective measure.

6. Shading the trees with board sheds enabled peach buds to survive the winter uninjured, when eighty per cent. of unprotected buds were killed. Trees protected in this way blossomed later, remained in bloom longer, set more fruit in proportion to the number of apparently perfect flowers, and held their fruit better than any other trees on the station grounds. This is the most effective means of winter protection tried at the station, but it is probably too expensive for commercial orchards.

7. Whitening the twigs and buds by spraying them with white-wash is, on account of its cheapness and beneficial effects, the most promising method of winter protection tried at this station.

8. Whitened buds remained practically dormant until April, when unprotected buds swelled perceptibly during warm days late in February and early in March. Whitened buds blossomed three to six days later than unprotected buds. Eighty per cent. of whitened buds passed the winter safely, when only twenty per cent. of unwhitened buds passed the winter unharmed.

Thermometers covered with purple material registered, during bright, sunny weather, from ten to over twenty degrees higher than thermometers covered with white material of similar texture, thus indicating that whitened peach twigs might be expected to absorb much less heat than those that are not whitened.

WINTER-KILLING OF PEACH BUDS.

One of the most serious drawbacks to peach growing in some parts of Missouri [and Kansas] is the winter-killing of the buds. In many parts of the state serious winter-killing is not frequent, and magnificent crops of peaches, particularly of certain varieties, are reasonably sure. In other portions, however, killing of the buds is sufficiently common to cause frequent loss of peach crops. Probably in every part of the state the peach is in enough danger from unfavorable winter conditions to make the question of winter protection one of considerable economic importance. Even where a good crop is reasonably certain, the fruit-buds are often weakened during the winter.

CAUSES OF WINTER-KILLING.

Low temperature, and consequent severe freezing, is often the direct cause of winter-killing of the fruit-buds of the peach. Peach buds, however, have often withstood a temperature of ten degrees, or even twenty degrees, below zero and subsequently produced flowers and fruit. On the other hand, five degrees below zero has sometimes entirely killed the peach buds throughout considerable areas. This shows that other conditions besides mere cold weather must be studied in attempting to ascertain the causes of winter-killing of buds or plants.

Imperfect ripening of the wood and buds in autumn renders them more susceptible to injury from cold weather. This imperfect maturity may be caused by late cultivation, or by warm autumn rains, which prolong the season of growth. Often the dry weather and cool nights of August induce partial ripening of the wood and buds. Subsequent rains and warm weather induce an autumn growth that is somewhat akin to a spring awakening; so much so that occasionally some of the flower-buds burst into bloom in autumn.

Sudden change of temperature is always more dangerous than gradual change. A sudden drop from our ordinary winter temperature to five degrees below zero, particularly if accompanied by strong wind, is more severe on peach buds than a gradual fall to ten or fifteen degrees below zero. Sudden thawing is sometimes more damaging than sudden freezing. Buds and twigs are also unfavorably affected by bright sunlight during times of low temperature.

Growth of buds during warm weather in winter renders them very susceptible to injury from subsequent freezing. This is the most common cause of winter-killing of peach buds in this state. It very often happens that a warm spell as early as February causes the peach buds to make considerable growth. If growth starts to any great extent the subsequent cold weather is almost sure to kill the buds. The peach is quite easily stimulated into growth by warm days, even in

winter. The purple color of the twigs favors the absorption of heat during sunny days. Purple-twigged varieties are more easily stimulated into growth, and they bloom slightly earlier than the green-twigged varieties like Snow. Peach buds sometimes remain dormant throughout the winter and suffer from late spring frosts after they have begun to blossom.

METHODS OF WINTER PROTECTION EMPLOYED.

Numerous methods of protecting peach buds during winter have been tried, with more or less success. Layering, or bending down, in autumn, and covering with soil, mats, pine branches or other protecting material has been resorted to. To facilitate bending down the trees are usually headed low, the roots are cut on one side of the tree, the tree is then bent over in the direction opposite the cut side, and may be quite readily laid on the ground. This should only be practiced on trees that have been bent down each year after setting. If an old tree is treated in this manner for the first time it may seriously impair its vigor. The Iowa station advises shaping trees to be thus protected by training the trunks horizontally along the ground and allowing the upright head to form several feet to one side of the stump. Grown in this position, the prostrate trunk may be twisted sufficiently to allow the head to be laid over on the ground.

Some growers are reported to have successfully laid the peach by planting the young tree so its roots are guided laterally, in two opposite directions, by a trough-shaped piece of sheet-iron embedded in the ground. The roots in this position may be twisted sufficiently to permit the laying of the tree. Coating the buds by spraying with glue and other sticky substances has been tried, with the hope of affording winter protection. "Baling," or drawing together the branches as closely as possible in a vertical bundle and wrapping them with coarse grass or corn-stalks, has been tried with some success.

Whitening the twigs and buds by spraying with whitewash has been given more attention at this station than any other means of protection. [The results are summed in Nos. 7 and 8 above.—SEC.]

AN EFFORT AT LAWMAKING.

The following law, in the form of a "bill," was introduced in the lower house of the legislature of 1899 and passed by a vote seventy-six to two, but it failed to get through the senate for lack of time to consider it. We need some such law, and it is hoped that the next legislature will enact this or something better:

AN ACT to promote and protect the horticultural and agricultural interests of the state by creating a state entomological board.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. There is hereby created a state entomological board, which board shall consist of the associate professor of entomology of the University of Kansas, the acting professor of entomology of the Kansas State Agricultural College, and the official entomologist of the Kansas State Horticultural Society. The members of this board shall be designated as state entomologists, and shall serve upon this board without remuneration other than that each may receive as occupant of said professorships or official entomologist. The said board shall meet on the third Tuesday of March each year and organize by the election of a chairman and secretary, who shall hold such offices until the annual meeting of the board thereafter.

SEC. 2. Whenever it shall be known to any one of these state entomologists that there exists in any locality of the state an insect seriously pernicious to the horticultural or agricultural interests of the state he shall report the matter to the chairman of said board, and said chairman shall personally inspect premises reported to be infested, or appoint one of the members of said board to inspect said premises. The members of the said board are hereby empowered to enter upon infested premises, use such means and employ such assistance as will insure the eradication of noxious insects, their eggs and larvæ.

SEC. 3. Before beginning the work of extermination, the owner of the infested property, his agent or tenant, must be notified: and in case of objection by said owner, his agent or tenant, to the findings or procedure of the state entomologist conducting the inspection, an appeal shall be taken to the board of county commissioners of the county wherein infested premises are situated, and their decision shall be final. An appeal must be taken within three days, and shall act as a stay of proceedings until it is heard and decided.

SEC. 4. The expenses attached to the inspection of infested or probably infested localities, together with material and labor employed in destroying pernicious insects, shall be met by the board of county commissioners of the county in which said premises are located, and said board of county commissioners shall pay said expenses, upon presentation of itemized statement of expenses by the state entomologist conducting the work, out of any funds not otherwise appropriated. In case it is deemed expedient to destroy infested plants or trees, no indemnity shall be allowed for said plants.

SEC. 5. In case any person or persons interfere with the members of the state entomological board in the performance of their duties, or fail or refuse to execute the directions of the said board of county commissioners after an appeal, the said person or persons shall be deemed guilty of a misdemeanor, and shall be fined in any sum not exceeding \$100. It shall be the duty of the county

attorneys of the several counties of the state to enforce the provisions of this section.

SEC. 6. Whenever a resident nurseryman desires his trees, scions and all such stock as is commonly known as nursery stock inspected for pernicious insects, he shall communicate his wishes to the chairman of the said board, and said chairman shall arrange with one of the members of said board for the inspection of said nursery stock or said chairman shall personally inspect said stock. The time of inspection shall be arranged at a date convenient for said nurseryman and state entomologist conducting the inspection. If, after careful examination, said state entomologist finds no insects pernicious to said stock, either upon said stock or upon premises whereon said stock is located, he shall, upon payment of expenses incurred by said inspection, issue certificate of inspection to that effect.

SEC. 7. The secretary of said board shall keep a full record of the work done by said board, or the members thereof, the places inspected, and the result thereof; also a record of all certificates of inspection issued, to whom issued, and date of issue.

SEC. 8. All acts inconsistent with this act are hereby repealed.

SEC. 9. This act shall take effect from the date of publication in the official state paper.

GROWING PEACHES IN KANSAS.

On the pages following will be found experiences, conclusions and advice from quite a number of the older peach growers in Kansas. The state is divided into four fruit districts, corresponding to the four quarters, and the reports, or interviews, are classified according to those districts. They are, all of them, worthy of careful study and consideration. Through the experience of others we may learn much.

THE FIRST DISTRICT.

W. H. Tucker, Effingham, Atchison county, has lived in Kansas thirty-nine years, and now has an orchard of 125 bearing peach trees and 200 seedlings not yet bearing. His trees have been planted from six to fifteen years, in a black, sandy soil, which he is not sure is best: he would prefer the red clay soil near Missouri river. Does not regard any particular slope as essential. His budded varieties are Amsden, Heath Cling, Early and Late Crawfords, Crosby, and Elberta, and he would recommend this list to others. He would plant one- or two-year-old trees, 15 x 30 feet, cut back to two feet, using all the roots they may have. Has headed in bearing trees, and says they did better than the others. His Amsden are often ripe for July 4. Says the extreme cold of February, 1899, injured the tree growth and killed all the fruit-buds. Some years his peaches cook on one side in hot sun. Curculio troubles his peaches some; has not tried spraying. His peach trees are between apple trees. He grows no crop among them; allows swine to pasture among them. Picks carefully in baskets and sends to market in same—generally half bushels. He retails them, obtaining sixty cents to one dollar per bushel. Says they would not pay planted largely in his locality, if the experience of the last fifteen years is to be repeated. He lets the swine have the culls.

H. M. Rice, Muscotah, Atchison county, a Kansan for twenty-nine years, has twenty bearing trees set five years, and fifty set three years, growing on sandy loam, which he considers the very best for them; says any slope will do. He is growing Elberta, Crosby, and some others, bought of a reliable [?] nurseryman, yet not true to name. Says he has not had experience enough with properly named varieties to advise others what to plant for market or family. He prefers good one-year-old trees, set 15x15 feet, cut to a walking-stick. Says Elberta cooks on sunny side while on the tree. Not troubled with insects. Says the leaves on his peach trees all curled up last spring [1898], which he thought was caused by excessive wet weather. The rot was also very bad last year and destroyed many peaches. He grows potatoes and clover among his trees, and allows no live stock to roam among them. Has sold a few at home, at one dollar per bushel. Says, further, "the great curse of the fruit-tree planter is the substitution of inferior varieties [and seedlings] in tree orders by nurserymen." He bought 100 trees in twelve varieties, only two of which came true as ordered—of one other he is uncertain—and, although he ordered no very late varieties, he

had a tree that last fall was full of peaches when the first snow fell, October 16. [A valuable trait; call them Snowball.] He ordered early peaches, and his earliest came middle of August. He says, when he sets out a big peach orchard, the nurseryman who sells him the trees must give a bond that they shall be true to name. Why not? If a man contracts to build a house he gives a bond to do just as he agrees to. If a man buys 1000 peach trees, paying good money for them, and cultivates them three or four years, his orchard should be worth at least \$1000, but finds when they bear that the nurseryman has unloaded on to him a lot of "odds and ends." Why not make him give a bond? An honest nurseryman would not object. If he is not honest, the more reason why he should be bound for damages. [There is certainly some good hard sense in this proposition.—SEC.]

B. F. Oxley, Morrill, Brown county, has 200 peach trees; 150 of these are seedlings: "all of medium, some of fair, quality." They are on ordinary black loam. Says it is not good, as it causes too much wood growth. He would prefer light clay, with an east or northeast slope. His budded fruit is Elberta, Champion, Crosby, Alexander, Amsden, and Crawford's Late; but he would discard the Crosby. For market he would advise Elberta, Champion, Stump, Crawford's Late, Amsden, Alexander, Hill's Chili, and Wonderful. Sets one-year-old trees, 12x16 feet apart, pruned to a "stick" twenty inches high, and roots trimmed when too long, bruised, or broken. His earliest are Alexander and Amsden—last of June. Latest is Crawford—1st to 10th of October. Cold of February, 1899, killed most all the trees to the ground; no particular variety escaped. Some Elberta on south side of orchard "cooked" on sunny side while on the tree. Has some curculio on early freestones. Never sprayed any. Has noticed no other insects. Some of his trees had leaf-curl bad last spring [1898], with consequent loss of fruit. Cultivates in sweet corn, beans or potatoes the first year. Never allows live stock near them. Thinks irrigation would pay. Sold best fruit at \$1.50 to \$2 per bushel. Says they would pay well with a crop once in three years.

Geo. A. Wise, Reserve, Brown county, has lived in Kansas twenty-nine years; has over 300 bearing peach trees, 250 of which are seedlings. All of his seedlings are of fine quality. He selected his seed, planted it, and is pleased with the results. His trees were set out in the spring of 1893, in black loam soil, on south slope. His budded trees are all Elberta. He proposes to set this spring [1899] some Alexander and Champion. He is an enthusiast on Elberta and recommends only the above three varieties for all purposes. He would set out two-year-old trees, and never any older than three years. His trees are planted north and south, two rods apart, between the rows in his apple orchard. At planting time he cuts back some and trims broken limbs or roots. The extreme cold of February, 1899, injured all his seedlings much more than Elberta; not a seedling escaped. The curculio troubles his freestones mostly; has no other insects or diseases. He grows corn among the trees until they begin to bear: then seeds to clover. He allows all kinds of stock among the trees at certain times but not for permanent pasture. Picks in baskets and buckets, and sells to neighbors in the orchard, who help to pick them. Sold last year at fifty cents to one dollar per bushel. Never has any refuse; "everything goes."

John Reed, Longford, Clay county, has been in Kansas twenty-one years, and now has 200 peach trees; 100 of them are seedlings; twenty of these seedlings bear choice fruit. His other trees have been planted from four to eight years:

some are growing on sandy land and some on heavy loam. He would prefer a rich, sandy soil, so that roots could run down good and deep. Does not care much for slope, but if he had a choice would take north. He has neglected to keep track of the names of his trees, but thinks every farmer ought to keep a record of the trees he plants, and then he could give the facts about them. He intends planting a new orchard this spring, and has sent for quite a variety. He plants eighteen feet each way, cutting back the tops and the scraggy roots only. He thinks that trees that are inclined to bear too heavily should be headed in. No curculio in his orchard, nor other insects or diseases. Grows no crop and allows no live stock among the trees. Does not irrigate. Has not marketed any; his family pick and use them as they desire. There is a good demand at home at from fifty cents to one dollar per bushel. He says further: "A few years ago the peach crop was a failure so often that farmers quit planting them, but we have had fair crops of peaches for the last four years. Mr. Secretary, I am not a stickler after law, but I must say that some of our Kansas nurserymen must get out of existence, as myself and neighbors received a lot of peach poplars last spring. You would have thought they were grown in a glass house. I think the sooner such nurserymen get out of business the better for Kansas, as I am satisfied we can grow fruits as well as anywhere, and with less labor, if our nurserymen will only do us justice."

A. D. Arnold, Longford, Clay county, has been in the state twenty-one years. He now has 250 peach trees in bearing, from twelve to fifteen years of age; have been completely cut off once, and formed new tops. Of these 200 are seedlings, but of inferior quality and size. They are on a black loam with clay subsoil, which he says answers very well, but he would prefer sandy bottom. Does not think any slope essential. His budded varieties are Bokara, Crosby, Elberta, Hale, Globe, Mountain Rose, Wheatland, Stump, Wonderful, Champion, and Alexander; he would recommend the Elberta as best for market. He would prefer two-year-old trees, trimmed just enough to shape well, and bruised roots clipped. His Alexander comes in June, his Mountain Rose in July. The cold of February, 1899, killed the tips of the new wood. Many of his peaches cook on sunny side, without regard to variety. Has no trouble with curculio or any insects or diseases, excepting borers. Grows nothing among his trees, and allows no live stock among them. Markets at home, at about fifty cents per bushel, feeding all refuse to swine. Believes if choice budded varieties were used it would pay to plant largely for market.

A. Munger, Hollis, Cloud county, a resident of Kansas for sixteen years, says he has 4200 peach trees, planted from three to fifteen years, on sandy soil underlaid with a black loam of drift formation; thinks any soil is good that does not get too dry, and any slope good. Twelve hundred of his trees are bearing, of the following varieties: Sneed, Alexander, Triumph, Early June, Hold-on, Elberta, Heath, Old Mixon, Stump, Fox Seedling, Summer Snow, Salway, Fitzgerald, Greenboro, Rivers, St. John, Mountain Rose, Steadly, Crawford (Early and Late), and Crosby. He expects to sort these over and reject some. He advises planting for market Alexander, Elberta, and Early June, and for family would add some later varieties. He would plant trees one year from bud, 12x15 feet, and thin out when they crowd. Trims to a switch and clips broken and bruised roots. Believes in heading in bearing trees annually. His earliest are Early June, July 1 to 4 (has not yet fruited Sneed). Says freezing hurt the immature, unripened wood on all varieties. Curculio troubles the Early June; has not tried

spraying. Says box-elder bugs sometimes collect on juicy peaches and spoil them. Borers trouble his trees some. Says there has been but little leaf-curl for seventeen years, but in 1898 his trees were generally affected by it, to the destruction of the fruit. He grows only rye among the trees and plows it under in the spring. Allows no live stock but poultry among his trees. Has sold seedlings at twenty-five to fifty cents per bushel; budded fruit from \$1.50 to \$2 for choice. Thinks it would pay well to plant largely for market.

Geo. R. Barnes, Chapman, Dickinson county, a resident of Kansas for twenty-eight years. He has only a few trees now of bearing size; many years ago he grew seedlings enough to gather them by the wagon-load. He now has Amsden, Alexander, and Crosby. The seedlings he had and some now growing are very fine, good size, luscious, and cannot be beaten for family use. He would recommend, for market, Elberta, Crosby, and Dean's Orange [a Saline county seedling]. He would plant young trees never over two years old, sixteen feet apart each way, and thinks the nurserymen should trim them to stubby proportions, cutting off all long and broken roots, making all symmetrical. He does not head in or prune bearing trees. His Alexanders ripen July 4, and Heath is his latest. Thinks the cold of February, 1899, killed the tops of the trees. Says hot, dry winds cook his late peaches sometimes. Has some trouble with curculio; has had peach-tree leaf-curl from wet feet. He says borers at the collar are the worst pest he has. Says the trees will not grow with crops among them; and no live stock but fowls should be allowed among any fruit-trees. For two years past peaches have sold for fifty cents per bushel. As to planting largely for market, says it is doubtful as several have tried it and quit.

J. D. Hazen, Leona, Doniphan county, is an old settler, having resided in Kansas over forty years. Has 300 bearing peach trees fifteen years old; 100 of these are seedlings, but none of his seedlings are of superior quality. His trees are on high, clear land, which he firmly believes is the best. He prefers northeast slope. He has also 100 young trees set out. He has several varieties, but has lost the names. For family use, he says plant for the seasons, to have them from earliest to latest. He sets two- to three-year-old trees, sixteen feet apart; prunes some, cutting about a foot off the top, and does not trim the roots at planting nor the tops of bearing trees. All were injured by cold of February. The sun cooks many of his late peaches on one side. The curculio troubles his Crosby most; has never tried spraying. Has no disease on fruit or trees. Allows horses to pasture among the trees. Picks from ladders by hand, and markets in half-bushel baskets, retailing at about fifty cents per basket. Feeds culls to hogs. Does not think it would pay to go into growing peaches largely in his locality.

A. H. Griesa, Lawrence, Douglas county, thirty-two years in Kansas, has 275 peach trees, 200 of bearing size, all choice budded varieties, planted from three to eighteen years, on black prairie soil, which he thinks good; says any slope is good if it drains well. He is growing Early Rivers, Elberta, New Prolific, Ringgold's Mammoth Cling, Grey's Rareripe, Shippers' Late Red, Stevens's Rareripe. He has discarded Early and Late Crawford, Hale's Early, Troth's Early Red, Early York, Heath Cling, Tong-pa, Heath Free, Morris White, and Haines's Golden. He would recommend for market and family use Early Rivers, Elberta, New Prolific, Bray's Rareripe, Emma, Ringgold's Mammoth Cling, Grey's Rareripe, Shippers' Late Red, and Stevens's Rareripe. Put out only trees one year from bud, sixteen feet apart each way, cutting away most

all limbs and mutilated roots; heads back severely after a hard winter. His earliest are Alexander, Amsden, Arkansas Traveler, etc., but says they are no good—curculio is too fond of them. His latest is Bray's Rareripe. Says leaf-curl prevails during cold, wet seasons, but has done no permanent injury. No crops or live stock allowed among his trees. Picks by hand into ten-pound grape baskets, and sells to central Kansas grocers; gives culls to pickers. Says good kinds always pay. Says the greatest injury was done in October, 1898, by the snow and the cold succeeding it; the trees were not prepared for it. Says further: "No doubt old trees are most seriously injured, which will make room for new plantings of better kinds, and in time revive tree planting. The profits in peaches fail because the kinds are no good. Experts here make a good profit on special varieties not in the old lists."

T. J. Brewster, Lawrence, Douglas county, has only a few trees, on upland. He is growing Arkansas Traveler, Elberta, Heath, Snow, Early and Late Crawford. Believes Elberta and Heath best for market or family. Plants 10 x 20 feet, pruning tops to correspond with mutilation of roots. Has not tried heading in. Says twenty per cent. of new growth was killed by the cold weather. No insects of any kind trouble his fruit. Does not believe there is a diseased peach tree in the county. Grows potatoes and corn among young trees; prefers potatoes. Allows calves and hogs in his orchard, but keeps large animals out. Believes irrigation would be a great help at times. He receives one dollar per bushel at home. Thinks they would pay if planted largely in his vicinity.

P. Voorhees, Lawrence, Douglas county, has 2700 peach trees: 1800 of these in bearing, on dark upland soil, which he thinks is good, although he thinks in a wet season a red land may be better. He likes a north or eastern slope. He is fruiting Alexander, Triumph, Sneed, Early and Late Crawford, Early Rivers, Japanese Dwarf Blood, Mountain Rose, Early Michigan, Emperor, Orange Free, Summer Snow, Lorents, Late Rose, Lemon Free, Lemon Cling, Wilkin's Cling, Bonanza, Gold Dust, Bequet's Late, Bray's Rareripe, Crosby, Old Mixon Cling, Old Mixon Free, Moore's Favorite, Troth's Early, Champion, Pride of Franklin, Chair's Choice, Beers Late, Wonderful, Early York, Steadly, Hale's Early, Stump the World, Salway, Elberta, Foster, Globe, Smock, Golden Rareripe, Grey's Rareripe, Reed's Early Golden, Jennie Wosthen, Connet Early, Bishop Early, Wheatland, Horton's Rivers, Greensboro, Fitzgerald, Belle of Georgia, Boyds, Iron Mountain, Emma, Walkers, Variegated Free, Couper, Skillman's Beauty, Fox Seedling, Stevens's Late Rareripe, Bokara, Christiana, Ward's Late, Reeves's Favorite, Hill's Chili, Wager, Susquehanna, Minnie, Bilyere's Late October, and many others. He has tried and discarded Early and Late Crawford, Foster, Early Rivers, Troth's, Wonderful, Bokara, Summer Snow. He recommends, for market, Horton, Rivers, Mountain Rose, Stump, Old Mixon Free, Grey's Rareripe, Elberta, Beers Smock, Globe, Lemon Free, Lemon Cling, Crosby, Gold Dust, Wilkin's Cling (sometimes called Ringgold's Mammoth), Bonanza: for family, Alexander, Early Rivers, Mountain Rose, Reeves's Favorite, Stump, Elberta, and Smock. Sets trees one year from bud, pruned to a stick two feet high, with roots severely pruned, set eighteen feet apart each way. Believes in heading in bearing trees; says all were injured by cold winter, and will never fully recover. His earliest are Sneed, Japanese Dwarf Blood, July 1. Latest: Bilyere's Late and Bonanza, in October. Planted to have peaches every day from July 4 to October 10, and did it in 1898, with a large crop. Curculio sometimes troubles his early freestones. Elberta has curled badly for two years

past. Has had "signs" of yellows, but always dug and burned the suspects. Allows no live stock in, and plants only cultivated crops. Cultivates thoroughly, from spring to July. Picks from ground or ladders into baskets, and markets in peck baskets when available. Packs systematically and all of a size, rejecting small or imperfect ones, which he finds readily salable at bakeries and restaurants for immediate use, and to families for peach butter, at about twenty-five cents per bushel. His best markets are Lawrence and Topeka. Two grocery-men in Lawrence handle for him from 50 to 200 baskets per day. Prices vary from fifteen to thirty cents per basket. Says certain varieties would pay if planted largely. Is so well satisfied with varieties named that he will replant all killed trees with same varieties.

David Brown, Richmond, Franklin county, has 550 peach trees—500 of these are twenty years old; half are seedlings; they are on red soil, which he prefers. Says any slope will do. His varieties are Alexander, Stump, Crawford's, Early York, Rareripe [?], Crosby, and White Heath Free; all of which, excepting Alexander, he recommends for all purposes. He sets one- or two-year-old trees, sixteen feet apart each way, without pruning; trims bad roots. His Alexander comes on June 20, and White Heath Cling in October. This latter sometimes "cooks" on the tree. Curculio troubles his early varieties of freestones; never has leaf-curl, yellows, or any diseased trees. His best market is Ottawa; he sells in one-third-bushel crates, discarding all undersized or defective ones, averaging eighty cents. Says they will pay if planted largely. Lets culls rot. Says, further, "people have become careless about peach trees, and let their orchards run down."

William Cutter, Junction City, Geary county, has lived in Kansas twenty-eight years; has 2000 bearing peach trees, from three to thirteen years planted, and 1000 younger ones. They are growing on high and low lands, but he claims the higher is the better, with north and east slope. Grows too many varieties to mention. Has discarded Bokara No. 3, all "blood" peaches, Crawford's Early, Globe, and others. He recommends, for market, Elberta, Mountain Rose, Champion, Salway, Heath Cling, and Crosby: and for family use would add some early varieties. Plants only one-year-old trees, 12x16 feet apart, pruning to a stick two and one-half feet high; has tried severe root pruning with success. Believes in heading in well, especially if injured by cold. His earliest is the Sneed; latest the Bonanza, October 15. The cold of February, 1899, killed the nursery trees, and severely injured the bearing trees—many are dead. Curculio bothers the earliest always. Has sprayed, but it did no apparent good. Other insects that trouble his peaches are wasps, tree-cricket, and grasshoppers. No insects on trees. Some leaf-curl comes and goes: does no damage. Grows melons and potatoes among his trees for a few years. Allows no live stock in on purpose—finds live boys will get in at night [bless the boys; he was once one]. Picks in eight- to ten-pound baskets, and markets in ten-pound baskets and one-third-bushel crates, mostly without wrapping, rejecting all overripe, small or specked ones. Markets as near home as possible. He wholesales to storekeepers, receiving from one to two dollars per bushel. He thinks it would pay well to plant largely in his locality. He gets his refuse dried for half.

J. W. Williams, Holton, Jackson county, has lived in Kansas forty years, and grown many peaches; he now has but twenty-five bearing trees and eight or ten in bud on three town lots. Has retired from active, hard work, but his ex-

perience is valuable to our coming horticulturists. He fruits six seedlings of choice quality and good size. His bearing trees are from six to nine years old, growing on black prairie soil underlaid with hard-pan. This happens to be all the soil he has, but he would prefer a soil rather sandy, underlaid with a porous subsoil, with a northern slope. He is growing mainly Amsden and Elberta, and, if planting over, would discard the Amsden, as it is too sour and insipid and rots badly on the tree. He would recommend for all uses the Elberta, Hill's Chili, Large Yellow York, Early and Late Crawford, Old Mixon Free, Heath Cling. His preference, if any, is for the first and last named. He would plant two-year-old trees, sixteen feet apart each way, pruning pretty closely, and cutting all large roots back pretty short. He heads in all bearing trees, so they will not break down when full of fruit. His earliest is Amsden, July 10, and Alexander, about August 1. His latest is a seedling called "Shields." The extreme cold of February, 1899, bursted the bark on old trees and killed tender twigs. Sometimes a few of his peaches scalded or cooked on one side in hot sunshine. Curculio troubles his early varieties. Has sprayed, but could see no benefit in it. No other insects trouble his trees or fruit. Had some leaf-curl, but did no appreciable damage. Never saw a case of yellows. Grows small fruits under and among the trees: allows no horses or cattle among them, but turns hogs in occasionally to eat up fallen fruit. Picks carefully by hand into baskets, and packs in peck baskets for market, when in good condition and not too ripe, rejecting small, soft and unshapely ones. Markets at home in Holton at retail, from fifteen to thirty cents per basket. If handled right, he thinks they would pay if planted largely in his vicinity. He feeds refuse to hogs.

R. D. Osborne, Soldier, Jackson county, a resident of Kansas thirty-two years, has 2275 peach trees; 275 of them are not in bearing; about 400 are seedlings, of which perhaps 50 are valuable: 2000 are of bearing size; the varieties are Champion and Crosby. He has never had any other variety, and says "there may be a better market peach than the Crosby but I could not name it"; and "they are good enough for me." His ground, which he thinks is just right, is a gravelly loam, with clay subsoil and an eastern slope. He plants one-year-old trees, fifteen feet apart each way, only trimming injured roots. He thinks heading in the best way to manage bearing trees. Fears the cold of February, 1899, killed most of his trees. He will cut top within one foot of trunk. Has no trouble with curculio or other insects excepting borers. Knows no diseases. Grows corn among the trees for two years, afterwards nothing. Allows swine in for a short time after fruit is gathered, to consume the culls; no stock at any other time. Picks in small baskets, and sold some last year at sixty cents a bushel for budded, and twenty-five cents for seedlings. He thinks it would pay to plant largely in his vicinity.

H. Roberts, Perry, Jefferson county, forty-one years a resident of Kansas, with 200 peach trees growing on a mellow, reddish upland; believes it suits them well. He prefers such land made fertile by plowing-in green crops. Any slope but southwest is good. His varieties are mostly Elberta. Plants trees one year from bud, twenty-five feet apart, cutting away from one-third to one-half of top, and leaving all roots in good order. Curculio troubles both free and cling if early. Grasshoppers are sometimes troublesome. He thinks leaf-curl largely due to hard winter weather. Grows nothing but weeds or red clover under the trees, and allows no live stock inside. Picks with care, rejecting all unsound fruit. His nearest market is best. Sells any way he can, but never puts any out to be sold on com-

mission. Prices range from fifty cents to one dollar per bushel. Does not think they would pay if planted largely. Fears almost total destruction from cold of February, 1899.

E. M. Gray, Perry, Jefferson county, has been in Kansas forty-one years, and has 15,000 bearing peach trees, six years planted, on high, dry, ashy upland, with clay subsoil, and likes that best. Would prefer a gentle southern slope. He grows for market, and advises others to plant, Early Rivers, Alexander, Elberta, Early Oneida, Crawfords, Beers Smock. For family use he would advise adding seedlings, Triumph, and Greensboro. He plants one-year-old trees, 15x20 feet apart, pruning away one-half of the top. He believes in heading in bearing trees: says Sneed is his earliest, and Smock comes about September 20. His trees are uninjured by the cold of February, 1899, but fruit-buds were damaged. Curculio troubles his early peaches, but he has not tried spraying. No other insects or diseases trouble his trees or fruit. Prefers corn as a crop among the trees, but allows no live stock among them. Ships in both crates and baskets, about one-half-bushel size, and retails at home at fifty cents to one dollar per bushel. Dries the best culls. Does not believe it would pay to plant largely in his locality.

Lou Miller, Perry, Jefferson county, has cultivated Kansas soil for thirty years, and has now a peach orchard of 600 trees, ninety of which are seedlings. Of these seedlings fifteen or twenty bear large, choice fruit. Only 100 of his trees are now of bearing size, having been planted six to fifteen years, on a gray loam soil, which he says is a disadvantage, as he would prefer a deep, rich soil on a northern slope. His budded fruit is Stump the World, Salway, and Heath Cling. He would advise for all purposes Elberta, Stump, Salway, Triumph, and Late Crawford. Plant one-year-old trees, 20 x 20 feet. Prune mangled roots and trim top to balance. Has not tried heading in bearing trees. He has a good unnamed seedling that comes in by July 4, and another that comes in the last of October. He says the extreme cold of February, 1899, killed the yearling growths to the ground, but his two-year-olds are all right. Curculio troubles his early freestones only. Never saw yellows. Grows corn or vines among his trees for a few years. Never! no, never! allows live stock among them. Picks and markets as first and second quality, in half-bushel baskets, rejecting wormy ones, and retails in Topeka at fifty to seventy-five cents per basket. Can tell whether it pays to plant largely "when he tries it."

E. P. Diehl, Olathe, Johnson county, has been in Kansas thirty-five years, and always a horticulturist. Has 300 bearing peach trees and twenty-five younger. Grows no seedlings for fruit. His trees are seven years old, and growing in black loam. He prefers a mulatto land, with north slope. He is growing Amsden, Elberta, Mountain Rose, Old Mixon Free, Crawford's Late, Heath Cling. He would recommend for all purposes the Elberta, Mountain Rose, George the Fourth, Crawford's Early and Late, and Heath. Always plants one-year-old trees, twenty feet apart, pruning the top very lightly and the roots if necessary. He thinks heading in the best way to treat bearing trees. His earliest is Amsden, and latest Heath Cling. Says the extreme cold of February, 1899, injured all trees and killed many. His peaches often "cook" on sunny side while on tree. Curculio troubles his early and medium varieties; has sprayed for them and says it did good. He is troubled with borers. Says his trees are affected with yellows when the nights are very cool. Grows nothing and allows no live stock among

his trees. Picks carefully by hand and packs in one-third-bushel crates. Sells on commission mostly in Omaha; bring eighty cents to one dollar. Don't think they would pay in quantity.

J. C. Beckley, Spring Hill, Johnson county, thirty-one years in Kansas, has only 125 peach trees: 25 of them are seedlings; they are from six to eight years old, planted on mulatto soil; but he would prefer high top, level land, with loose, dry soil, naturally well underdrained, and reasonably enriched with decayed vegetable matter—such land as is well adapted to the growth of corn. Would like some protection on the south side. He is growing Crosby's Early, Elberta, Alexander, Crawford's Early and Late, Stump, Foster, and Heath Cling; and has discarded Amsden, Hale's, Old Mixon Free and Cling, as they rot so badly. Ward's Late dried up on the trees. He recommends Crosby's Early and Alexander for early, Stump and Foster for medium, and Heath Cling, Globe and Crawford's Late for late. Thinks it best not to have too many varieties. He plants two-year-olds, twenty feet apart, pruning the tops about one-half and the lacerated or damaged roots. He has of late years headed in bearing trees, and likes it. Says curculio troubles his early freestones. Tried spraying, but there was "too much rain." Says peach buds are killed, but his trees are not hurt, "as they are protected on the north." As to diseases, he says: "For several years the peach orchards of Kansas have been injured by the leaf-curl, which is a fungous disease that is only present in spring when the weather is cold and wet. As a result of the work of this fungus, the leaves become swollen, puffed, and curled, and soon drop from the trees. If the attack is severe, much of the fruit may also drop. The disease is quite wide-spread, and may appear at any point where the climatic conditions for two or three weeks after the opening of the buds are favorable to its development. Peach trees are also often attacked by brown rot, scab, and black spot, which are also of a fungous nature, and do great harm to the fruit. Owing to the fact that rot is most troublesome in warm, muggy weather, at about the time the early varieties are ripening, it is a difficult disease to control by spraying." He grows potatoes, sweet corn or other crops that require thorough cultivation for three years; then sows to clover. Never allows any live stock among them. He markets in boxes loosely, rejecting "all such as I would not want to buy myself." Retail in home market, averaging about one dollar per bushel; feeds all culls to the hogs. He continues: "The condition of all fruit-trees is not very flattering; location and protection, I think, have something to do with the varying condition of the trees. I have been over Johnson county considerably in the last week, and I find in some places fruit-trees are not hurt and in others they are partially damaged, and again in others they are killed. Those killed are mostly three-year-old trees. On some the bark has been cracked. Peach buds all dead."

C. D. Gaiser, Lansing, Leavenworth county, has lived in Kansas forty-one years; has now 200 peach trees, planted from four to six years, on rich mellow loam with clay subsoil; thinks it right. Don't care what slope. His varieties are Elberta, Crosby, Stump, Old Mixon, Mountain Rose, and Hale. Plants one-year-old trees, 12 x 20 feet, cutting back all branches to six inches, trimming the roots some. His early freestone varieties are somewhat troubled with curculio. He grows strawberries and clover among his trees, never allowing any live stock among them. Has not yet harvested a full crop, but believes they would pay if planted largely.

Stephen Stout, Axtell, Marshall county, has lived in Kansas for twenty years: has a peach orchard of 1100 trees of budded varieties, planted eight years, part on clay and part on loam; he prefers clay soil where the top is washed off, with a northeast slope. His varieties are Early York, Alexander, Amsden, Old Mixon Free, Elberta, Champion, Foster, and a few others. Has discarded the Smock and some others on account of shy bearing and poor quality. He would recommend for market and family use for his locality Early York, Amsden, Elberta, Champion, and Old Mixon Free. He prefers to plant June buds, one year from pit, 14 x 20 feet, the rows running north and south, trimmed according to roots and condition of the tree. His earliest are Early York and Alexander, ripening June 20, in 1896. Had a few peaches on the trees the 17th of October, 1898. The cold of the past winter did not hurt his peach trees very much. The Elberta and Champion appear to have escaped injury. He has very few curculio and sprays to protect the buds, and thinks there is something in it. He says: "We are searching for a solution to keep the buds from swelling during the warm spells in cold weather and to protect them from colds spells during the spring; we have hopes of success." No other insects trouble his trees. He had some peach curl last year, causing the blooms to drop off and ruining the crop on the trees. He grows corn among his trees until they come into bearing, but never allows stock among them. He does not irrigate. He picks and ships in peck baskets, rejecting all small ones. His best market is in the West, but he sells anywhere he can, receiving last year \$1.50 per bushel. He sells his refuse at some price at home, and believes they would pay if planted largely in his vicinity, if properly handled. He says further: "Most of the old peach trees are badly damaged—froze and split open—and will die; young orchards not damaged badly, and will recover."

James M. Williams, Home, Marshall county, has 400 peach trees growing; fifty are seedlings, twenty or twenty-five of which are nice. They are on rich, black, limestone land, which his experience demonstrates is best. He likes an east or south slope. His varieties are Champion, George the Fourth, Early York, Bergen's Yellow and Hyslop Cling. Champion has done best with him. He planted two-year-old trees, 12x14 feet, closely top-pruned, and all bruised and broken roots trimmed. Does not prune or head in bearing trees; has tried it but can see no benefit. His earliest is York, June 15. Cold of last winter killed all his trees. He grows corn and potatoes among his young trees, and allows stock, especially hogs, to pasture among the trees after the fruit is gathered. Picks carefully and sells in orchard; people come for them and pay \$1 to \$1.50 per bushel for early, and fifty to seventy-five cents per bushel for later ones. "Peach crop for 1898 was tolerably good quantity but quality very poor, with the exception of the Champion and a few other varieties I cannot name, seedling fruit being small and wormy. The fall of 1898 was dry and hot and I think most of the peach trees died: I know they are dead now. Some of my peach trees froze so hard that they cracked open. I have set out, within the last fourteen years, 500 peach trees, and have had but two good crops off them. I have come to the conclusion that it is money lost to invest it in peach trees. I have noticed several peach orchards and find the trees in bad condition, and crop for 1899 a failure. Some peach growers claim that the extreme cold winter is the cause of it, while others claim the dry and hot fall of 1898 is the cause. I will say that the thermometer registered 34½ degrees below zero at my place on February 12, 1899."

John E. Sample, Beman, Morris county, has been twenty-two years in Kansas, and has 500 seedlings, four of which took first premium at Morris county fair. They are growing in a black loam, with a clay subsoil. He likes a south-east slope. For market he would plant Crawfords only, both Early and Late. He plants one-year-old trees, sixteen feet apart each way, cutting back tops and injured roots. His four premium seedlings come in from middle to late of October. Curculio and borers have found him out. He grows clover under trees. No live stock admitted. He sells his best at the orchard for twenty-five to fifty cents and one dollar per bushel. Feeds culls to the hogs. Says it would pay to plant good varieties in large quantities in his locality for market. Mr. Sample says "the best remedy for borers is to graft [bud] the peach on apricot stock about six inches above the earth." Says, also, "that the fruit is better and the trees live longer"; says "they would live as long as apple trees."

W. H. Robinson, Dunlap, Morris county, has resided in Kansas thirty-one years; has now only seventy-five peach trees, twenty-five of them six years old. The varieties are Heath Cling, Crosby, Champion, Wager, Wonderful. Grows no seedlings. Says he is going into it strongly, and will try many varieties. Uses one-year-old trees, twenty feet apart, pruned back about one-third, and roots trimmed. Has not yet tried heading in bearing trees. Alexander ripens by July 4. His latest is the Wonderful. Thinks about one-half of last year's growth was killed by cold of February, 1899. Says hot sun cooks his peaches on one side when exposed. Curculio troubles all varieties; has not tried spraying, but believes it would pay. His trees always seem healthy. Grows sweet corn and other small corn among the trees. Has none for market. Believes good varieties would pay if planted largely for market.

F. B. Harris, White City, Morris county, has 300 peach trees, from six to seven years old; one-half of them are seedlings. None of his seedlings are considered valuable. His trees are on flat, high prairie, but he prefers second bottom—thinks this most suitable—or a natural draw south of a hill: any slope will answer, but perhaps east is preferable. In budded varieties, he is growing mostly Early Alexander: fifteen years ago he preferred Hale's Early. He has discarded the midsummer kinds, as the sun is then too hot and the weather too dry. For family use he would plant all fruits of budded varieties, excepting the clingstones. He plants trees two years old from seed, fifteen feet north and south and twenty-five feet east and west. Trims off one-half of the limbs, but leaves the leader untouched and never heads back—thinks it not best; he cuts the tap root at planting time. His earliest is Early Alexander; comes in the middle of July. He has some Heath's Cling that come well in October. Budded varieties suffered most from cold: all kinds were injured some. He finds that natural fruit and midsummer fruits often "cook" on the sunny side. Curculio has troubled his peaches for the past two years only. Has never sprayed, but says he intends to hereafter whenever there is a prospective crop. Tent-caterpillar has troubled him some; has had some leaf-curl, which he attributed to lice on the under side of the leaves; says that root-louse has injured some of his trees, but that the worst enemies are borers and cotton-tailed rabbits. He grows corn or any hoed crop among his trees, but never allows live stock to pasture among them. Would irrigate if he had the facilities; thinks it would pay. Picks by hand as fast as they ripen, in bushel baskets, as his market is near home. Packs them carefully as picked, rejecting only the small, inferior ones, which he dries.

He retails them in near-by towns at from \$1 to \$1.25 for budded fruit, and twenty-five to fifty cents for seedlings. Thinks it would not pay to plant them largely, as the crop is too uncertain and the buds are killed too often.

A. Oberndorf, jr., Centralia, Nemaha county—a Kansan for twenty years—has 225 peach trees: fifty are seedlings, twelve of which are nice. His trees have been out from five to eight years, and are of the following varieties: Briggs's Early May, Snow, Heath, Crawford's Late, Elberta, and about eighty budded from choice original seedlings. For early market he advises Briggs's Early May. He sets one-year-old trees, sixteen feet apart, pruned back to a "stick" one foot high, with roots trimmed to correspond. Has had no experience in heading in bearing trees. He had a freestone seedling that ripens about October 11. Says the cold of February, 1899, "killed all of the buds and most of the trees." He picks carefully in half-bushel baskets, covers with muslin, and sells, thus receiving in 1898 from \$1 to \$1.50 per bushel. Puts in only choice fruit, and succeeds in finding a home market at a low price for his culls.

T. S. Anderson, Oneida, Nemaha county, has lived in Kansas twenty-eight years, and now has 1000 peach trees of bearing size planted four years and 2000 planted three years. Not a seedling in the lot. They are on a sandy soil; he would like it better if it had a clay subsoil and south slope. He is growing Elberta, Crawford's Early and Late, Alexander, and Foster. He would recommend for both market and family use Elberta, Foster, Crawford's Late, and a late cling [probably Heath]. He plants trees one year from bud, twelve feet each way, cutting away one-half of top at planting. He does not head in bearing trees. His earliest are Alexander and Crawford's Early, in July; and latest, Crawford's Late and an unknown cling [probably Heath]. The extreme cold of February, 1899, killed about one-half of last year's growth, all varieties being affected. Many of his peaches of every variety "cook" on sunny side while on the tree. Curculio troubles his early freestones. Borers work at root. Has no other insect or disease. Grows corn or potatoes among his trees. Picks carefully from step-ladders and markets in bushel [?] crates. His best market is home, and he retails them at one to two dollars per bushel. Feeds culls to hogs. Doubts the advisability of planting largely for market in his locality.

H. L. Ferris, Osage City, Osage county, has lived in Kansas twenty-two years, and handled much fruit. He now has a peach orchard of 150 bearing trees and 50 younger ones, all budded excepting a few here and there where the original top has died and a sprout from the seedling root has taken its place. His trees are from four to sixteen years planted, and are on a sandy loam, which he claims is the best. Says slope makes little difference. He is now growing Early and Late Crawford, Heath Cling, Elberta, and Crosby. He has tried and dropped Amsden and Hale. He recommends as most profitable the Heath Cling and Late Crawford. Would plant only one-year-old trees, twenty feet apart, pruning to a stick three feet high, with roots pruned to five inches. Thinks it best to head in bearing trees annually. Thinks the cold of February, 1899, injured only the old and weakling trees; says he will cut down many of them and start anew. All varieties seem similarly affected. Says the curculio bothers only his early freestones, but he has never sprayed for them. Borers bother him some. Never saw peach curl. Grows corn among young trees; never allows live stock among them. Picks into a spring wagon, and markets in crates holding about a peck, rejecting the small, ill-shaped and wormy ones. The best of these culls he makes

into peach butter. His best market is his home town of Osage City. He retails, getting from fifty cents to two dollars. Does not believe there would be much pay in growing them largely for market.

C. D. Martindale, Scranton, Osage county, a resident of the state for fourteen years, has 450 peach trees; 150 of these are seedlings, one-half of which are of choice fruit. His trees are in a black loam, the oldest being ten years planted. He would prefer northeast slope. His varieties are Alexander, Champion, Early Crawford, Elberta, Crosby, Old Mixon Free and Cling, Stump, and Martindale. Has discarded Amsden as "too wormy." For market, would advise Elberta, Early Crawford, and Old Mixon Cling; and for family would advise Martindale, Elberta, Early Crawford, and a yellow peach of his. Plants one-year-old trees, trimmed to a stick four feet high, with damaged roots trimmed, 15 x 18 feet apart. Says heading in is the proper way to prune bearing trees. Has had Amsden and Alexander ripe by July 4. As for late peaches, he has two varieties that get frozen annually before they are ripe—has lost the names. Some of his peaches "cook" on the tree in the dry season, a yellow seedling and the Crosby being the worst. Curculio troubles his early clings most. Nothing else but bees [?] trouble his fruit. Never had yellows; had some curl-leaf, but did no harm. Peach rot has been bad for past two years. He grows corn among the trees while young, then clover. Never allows live stock near them, but thinks of turning in small pigs and young calves. In picking, he goes over his trees carefully four or five times, taking only the ripest each time. Markets in third-bushel crates, sorting into three grades, rejecting all ill-shaped and sunburnt specimens. Generally sells at home; can easily sell all the good ones at from fifty cents to two dollars per bushel. Feeds all culls to the hogs. Cold of February, 1899, killed all fruit-buds. Thinks if it ever pays to plant largely it will be after buyers come in to buy the fruit.

J. L. Steele, Minneapolis, Ottawa county, has lived in Kansas fifteen years; has now 200 budded and 50 seedling peach trees; 10 or 15 of the seedlings are good. His trees are from four to eight years of age, on upland, with clay soil, but does not think it best; would prefer a sandy loam and a north slope. His choice varieties are Heath Cling, Crawford's Late, Elberta, Mountain Rose, Early Rivers, Governor Goodland, Yenshi, Crosby, Champion, Sneed, Bokara, and Triumph; the five latter ones not yet in bearing. Says our rainfall is not sufficient to develop any fruits properly for market. He sets out trees one year from bud, twelve to fifteen feet apart, cut back to a cane two feet high, and broken roots trimmed. His earliest varieties are Rivers and Governor Goodland; latest, Crawford. Says trees were all killed by extreme low temperature of last winter. Some of his seedlings "cook" in the sun on the trees. Curculio troubles his early freestones; never tried spraying, but believes it would be beneficial. No other insect troubles his trees or fruit; one row of early trees yielded so little fruit for past two years as to be profitless. He grows potatoes among the trees and bars out all live stock. He irrigates some from a well; it is too deep (90 feet) to make it pay; says thirty or forty feet is as deep as a well may be to successfully use the water by windmill pump for irrigating. Says peaches would not pay to grow largely for market in his locality. He says, further, the Yenshi, Champion, Crosby and others were sold him by a nurseryman claiming they were "iron-clad;" that Yenshi had stood a temperature of thirty-two degrees below zero and yielded a crop of peaches, but they were all killed at twenty-nine degrees below zero; so he considers the "iron-clad" claims a fraud.

Gust Hansen, Olsburg, Pottawatomie county, has resided in Kansas thirty-six years. He grows only a few peaches, for home use. He has some choice seedlings fifteen years old, on black highland loam, but he believes good, rich bottom the best, and he would choose a southeast or eastern slope. He also has, growing, some Alexander and Crosby. He would recommend, for his market, Alexander, Amsden, Crosby, Stewart, Blood Cling, Chinese Cling; and, for family, would add Champion, Globe, Crawford's Early, and Mountain Rose. He plants two-year-old trees, twenty feet asunder, pruning well. He heads in bearing trees. His Alexanders ripen in June and his Blood Clings in October. Says his trees were not injured by cold of February, 1899. Says some of his late peaches cook or sun-scald on sunny side of the tree. Curculio troubles his early freestones. No other insects or diseases trouble his peaches on the trees. He grows small fruits among the trees; never allows live stock among them. He retails a few in the home market at Olsburg, at one dollar per bushel. He further says: "The peach tree requires a moderately rich, well-drained soil, and in order to preserve the continued healthy growth of the tree, and thus cause it to produce well-matured fruit, its branches should be headed in each year. Each tree when planted should be set twenty feet from its fellow, or they may be planted between apple trees. Plant them deep enough that the crook in the tree where they were budded is covered over with earth. In Kansas we cannot expect a full crop of peaches each year, owing to our cold winters which kill the fruit-buds; but if you can only get a full crop once in three years they will pay you better than any fruit crop that can be raised in the state."

James Andrews, Leonardville, Riley county, has lived in Kansas seventeen years; has thirty bearing and twelve young peach trees. He set out five years ago Red Roman (?), Alexander, Amsden, Hale's Early, but only four trees—one of each kind—were true to name; all the others were worthless. From his experience he is unable to say what varieties should be planted, but he would plant two-year-old trees, sixteen feet apart each way, in black loam with "gumbo" underneath. Does not believe in heading in. His first bear late in August; his latest in October. The cold of February, 1899, killed every fruit-bud. His Amsdens cook badly on sunny side. Has no trouble with any insects or diseases whatever on any of his trees. Has never marketed any.

J. S. Williams, Manhattan, Riley county, has a peach orchard of 700 bearing and 600 young trees, all choice budded fruit. They run from three to twenty-five years of age, and are on drift soil, which he does not believe is best; he would prefer black loam, with clay subsoil (limestone formation) and an eastern slope. He has Hale's, Troth's Early and Late, Old Mixon, Stump, and about fifteen others, to continue the season until the second week in October. He has discarded Alexander, Amsden and a few others that were not a success in his locality or satisfactory to the trade. He advises planting only varieties that are of "fine size, good quality, and ripening in succession until frost." Elberta and Crosby have failed with him. He plants trees one year from bud, twenty feet apart; he grows and buds his own trees, and trims them while in the nursery row; heads back bearing trees when they get too long and heavy; cuts off the roots to six or ten inches at planting. His earliest is Hale, middle of August; latest is Lagrange, middle of October. Cuts back severely all trees hurt by cold weather. Curculio troubles all ripening before Early Crawford; sprayed with splendid effect. Borers are troublesome. Says he has noticed a small, brown worm a half inch long eating out the tender bud of growing shoots—a recent in-

roduction. Had some peach scab. Grows no crop under trees. Would pasture with hogs; they will eat fallen fruit and worms. Picks in baskets from a step-ladder, and markets in both crates and baskets, dividing into firsts and seconds. His best market is local; he receives an average of one dollar per bushel. Thinks peach planting on a large scale would not pay; too severe droughts. Throws refuse away. His varieties were so chosen that he can fill orders at any hour, from earliest to latest; to explain: "Hale's Early laps on to Troth: between Troth and Early Crawford—about six days—there is no standard variety that I know of, yet we have a good unnamed variety that fills that space." He discarded many varieties because they dropped too badly during drought. Lagrange—his latest—sheds fruit very badly. He is now trying a new yellow freestone that ripens late. His trees bloom from the first week in March to the first week in April, and ripen fruit similarly.

W. J. Griffing, Manhattan, Riley county, is an old-timer, grew up in Kansas; been here forty years, and for many years secretary of the Manhattan Horticultural Society; has now only about eighty peach trees, fifty of them in bearing; twenty-five are seedlings. His bearing trees have only been out from three to five years. They are on upland, with clay subsoil, and he believes it good; says any good upland will grow peaches. He is growing Crosby, Triumph, and Elberta, but would advise, for market and family, Stump, Elberta, Triumph, Early and Late Crawford. Would plant two-year-old trees, one rod (16½ feet) apart, pruning all bruised roots and cutting the top nearly all off. Amsden comes earliest, about July 1, but is too tender. Says cold of February killed all buds. Says curculio troubles him only when crop is light. Has lost several hundred trees with rosette. Grows corn or any hoed crop among trees. Markets in half-bushel baskets, avoiding the specked and imperfect specimens. He markets at home and in Manhattan, at fifty cents to one dollar per bushel. Thinks if planted largely they would pay largely for a while.

James Wilson, Assaria, Saline county, has lived in Kansas twenty years; has a peach orchard of seventy-five bearing trees and fifty younger ones. Of these twenty-five are seedlings, fifteen of which bear uncommonly fine fruit. His trees have been set nine years, on a heavy, sandy mold, which he believes the most suitable. He likes a southeast aspect. He is growing Elberta, Yellow Cling, White Honey Cling, and others; would especially recommend Elberta and White Honey Cling. He planted two-year-old trees, twenty-three feet apart, without pruning, and does not prune at any time. Curculio troubles his late freestone varieties; has sprayed, with very gratifying effect. Borers trouble him some. Says peach yellows is caused by a failure to bear, following a year in which they were overproductive. He allows swine to range among his trees. He picks and packs in half-bushel baskets, covered with mosquito net or slats, leaving out all defective, small or wormy specimens. His best market is Salina, Kan. He sells at both wholesale and retail, generally getting a very satisfactory price. He doubts the advisability of planting largely for profit in his locality. Says peach orchards in his neighborhood are neglected, thus causing inferior fruit in small quantities. Thinks that owing to cold in February the conditions are not favorable for a good crop.

Martin Dean, Bavaria, Saline county, has 1800 peach trees. He is the originator of Dean's Orange peach. Seventeen hundred of his trees are seedlings. Seven hundred of these are fine, as Dean's Orange is a persistent seedling, com-

ing free from pits. His trees are from four to twenty-five years of age, on sandy loam; some on heavy loam. He prefers sand, with a clay subsoil and a north slope. He is growing Hale, Amsden, White Imperial, Dean's Orange, Ward's Free, and Smock. Has discarded Hale, Salway, Red Melocoton, Early and Late Crosby, Lemon Cling, Yellow Rareripe, and Early Barnard. He plants one-year-old trees, sixteen feet apart, pruned to a stick two and one-half feet high, with roots trimmed. His Hale bears by June 15; Smock, September. Says the cold injured all trees that have borne four successive crops. Dean's Orange that has borne one or two crops will bear some fruit in 1899. Curculio troubles his early peaches. For borers he plants deeply and mounds up eight or ten inches around them. No peach disease. Grows corn among young trees. Allows no loose stock near them. Picks and markets in half-bushel baskets, rejecting undersized and defective specimens; sells at Salina at forty cents to one dollar per bushel. He uses some culls, sells some, and feeds balance to hogs.

A. C. Moore, Wanamaker, Shawnee county, has resided in Kansas thirty-four years, and has 200 peach trees, planted from three to fifteen years. Of these 100 are budded fruit and sixty are seedlings; twenty of the seedlings bear choice fruit. They are on a clay soil, which he believes is detrimental, and he would prefer a sandy soil with clay subsoil, and an extreme north slope. He is growing the Coaster, St. John, Mountain Rose, Mrs. Brett, Gold Dust, Bonanza, Columbia, Salway, and the Hughs IXL. He has discarded the Hughs IXL, as it is too tender of cold, and Mrs. Brett is a shy bearer. For market he would plant Gold Dust, St. John, and Olden, and for family use Mountain Rose, Wilkins, and Lucia. He prefers two-year-old trees, planted fifteen feet apart each way, not trimmed or pruned at planting or any other time. His St. John fruits August 1; Olden last of September. The Coaster stood the extreme cold of February, 1899, the best, while all others were hurt badly; one-fourth are killed. Some of his seedlings cook in hot sunshine. Curculio in early peaches, but not bad. Thinks spraying would do no good. Grows corn among trees while young; allows no live stock among them. Picks and sells in half-bushel baskets to local trade, rejecting all inferior specimens. Sells mostly in Topeka, receiving fifty cents per bushel; feeds culls to swine. Feels sure that it would pay to plant them largely for market.

C. H. Taylor, Eskridge, Wabaunsee county, has resided in Kansas thirty-eight years, and has a peach orchard of 600 bearing trees and 200 not yet bearing. Grows no seedlings. His trees have been set from four to ten years, on clay bottom land, and he thinks that the best peach land is clay bottom, good and rich, preferring north and east slope. Is growing Crawford's Early and Late, Old Mixon Free and Cling, Cooledge, Early York, Smock, Elberta, Stump, and others. Has discarded Hale's Early, Amsden, Alexander, Beatrice, Rivers—all too small and subject to rot. For market and family, choose the first nine varieties. Sets one-year-old trees, 12 x 20 feet: cuts to two feet from ground, and all mutilated roots trimmed. Says the cold of February, 1899, killed all fruit-buds and injured the trees some. Is not troubled with insects or diseases. Grows corn among the trees for first two years, and allows hogs to run among them. Picks carefully by hand, and markets in both peck and half-bushel baskets and crates, discarding all small or blemished, canning and drying such refuse. His best market is Topeka, and they usually average one dollar per bushel. He is sure they would pay if planted largely in Wabaunsee county for market.

J. A. Courter, Barnes, Washington county, has lived in Kansas thirty-one years. He has 500 budded trees set in 1892, 100 set in 1896, and a few hundred older seedlings, set in 1873. These latter have for the last three or four years proven quite worthless. His land is ordinary prairie. His varieties are Elberta, Chinese Cling, Old Mixon Free, Wonderful, Stump, Globe, Hill's Chili, Foster, Alexander, York, Early and Late Crawfords, and Heath Cling. He also has Champion, Hale, Triumph, Bokara No. 3, Sneed, Elberta and Smock not yet in bearing. He would advise for market mainly Elberta. He plants one-year-old trees, not less than eighteen feet apart. His earliest is Alexander—in June—and he picked Heath in snow on October 12 [17], 1898. Says Hill's Chili has cooked badly on the tree for the last three or four years. His only insects are borers. Leaves have curled the last two years: very bad in 1898. If any crop among the trees, let it be corn, and admit no live stock among them. Uses Michigan half-bushel baskets, and sells at home at seventy-five cents per basket. Says buds are all killed and trees much injured.

Theo. Bedker, Linn, Washington county, has lived in Kansas twenty years: has 125 bearing peach trees, 100 of which are seedlings: ninety per cent. of the seedlings are of choice quality and fair size. These trees have been planted from four to nine years, in a black, sandy soil. He thinks trees live longer on a northeast aspect. He has four varieties of budded fruit, coming early, medium, and late—names unknown. For market he prefers the earliest varieties; plants one-year-old trees, fifteen feet apart east and west and twenty feet apart north and south. At planting he trims all roots to about eight inches in length, and the top to a "stick" three feet high: does not head in bearing trees, but believes it the best way. Says the cold of February, 1899, killed all the buds and the late growth of limbs. No varieties escaped damage. Some seasons he says his peaches cook on sunny side. He is troubled with peach-borers, but no other insects or diseases. Grows oats between the trees; never allows live stock among them. Picks in baskets by hand, and packs in half-bushel baskets, sewing cheese-cloth over, and markets them at Washington, receiving from fifty cents to one dollar. Feeds culls and refuse to hogs.

Thomas Brown, Palmer, Washington county, has been in Kansas twenty-nine years, and has 400 peach trees of choice budded varieties, from four to six years old, on a stiff, black soil. He thinks it would be better if a little sandy, and that an eastern slope is preferable. He is growing Alexander, Rivers, Crawford, Elberta, Mountain Rose, and Stump. Has tried many other varieties, but had them killed by borers. Does not know what other varieties to recommend. He plants two-year-old trees, 16 x 24 feet, cutting the tops and roots back one-half. Has never headed in bearing trees. Cold of February, 1899, killed all growth of the previous year; no variety escaped. His Alexanders often "cook" on the sunny side while on the trees. Curculio does not trouble his peaches, but the borers are awful pests. He grows potatoes and corn between his trees. Does not irrigate, and does not allow live stock among them. Picks in baskets. Finds his best market at home, receiving from twenty-five cents to one dollar per bushel. He is also successful in selling all his refuse. Has had good crops for the last three years, but thinks the buds are killed for this year. Believes it would pay to plant them largely in his vicinity.

A. Chandler, Argentine, Wyandotte county: I have 2000 bearing peach trees six years old, and 1000 young trees set out. Of these four per cent. are seedlings; half of the seedlings are of fine size and quality and worthy of culture.

My place is a heavy clay, on the Kaw river hills. I would avoid low, rich bottom land; I prefer clay land with a red subsoil, on a north or east slope. My budded peaches are of the following varieties: Early Rivers, Elberta, Champion, Old Mixon, Crosby, Smock, Salway, Picquet's Late. I have discarded Amsden, Alexander, Hale's, and Wyandotte; the curculio like them too well and they also rot badly. For market I would recommend Family Favorite, Elberta, Champion, Smock, Salway, Heath Cling, Old Mixon; these are also all good for family use. I prefer to plant one-year-old trees four to five feet high, sixteen feet apart, 170 trees per acre, cut to a stick two and one-half feet high, with roots slightly trimmed. They then form low heads from one and one-half to two and one-half feet from the ground. I head in all my bearing trees and unquestionably believe it right. My early varieties are Sneed, Triumph, Amsden, July 1. I have as my latest an unnamed cling coming in about November 1. The extreme cold of February, 1899, killed about forty per cent. of my trees and the tops of all; all varieties suffered about alike. I find the curculio worst on the very early freestones. Have never sprayed. The borers and tree-cricket are troublesome. I know nothing of peach yellows from experience. The curl is bad on the Elberta soon after leafing out. In 1898 I lost thirty per cent. of my peaches by rot. If too much rain many peaches drop in June. I plant cow-peas and hoed crops between the trees: never allow live stock among them. I pick by hand in baskets lined with burlaps, and market in peach baskets, excepting when shipping; then I use one-third bushel crates, packing solidly all perfect fruits, rejecting small, wormy or disfigured specimens. My best market is Kansas City, Mo. I sell at retail, usually at forty cents per basket or sixty cents per crate. I believe they would pay if planted largely in my vicinity. We dry and can soft and imperfect fruit.

W. D. Cellar, Edwardsville, Wyandotte county, has had twelve years' experience in the state; has 500 bearing trees five years old, and 300 younger ones. Has no seedlings; says "peach growing is too much like gambling without the added uncertainty of seedlings." Says any good soil, not too wet, will do, but that his soil has a clay subsoil: likes an eastern slope best. He is now growing Early Crawford, Family Favorite, Champion, Mountain Rose, Old Mixon Free, Elberta, Stump, Crosby, Melocoton, Smock, Salway, and Heath Cling. Would plant for market, Family Favorite, Old Mixon Free, Elberta, Stump, Smock, and Salway; and for family use would add Early Crawford, Champion, Mountain Rose, and Heath Cling. Would discard all the Alexander class, for poor quality and worms, Crosby for small size, and Melocoton for shy bearing. Plant only one-year-old trees—older trees are no good—15x20 feet apart. Prune to a switch and trim the roots to about ten inches. Head in bearing trees. The earliest are of the Alexander class but are not worth planting. The latest *good* peach is the Salway. Curculio troubles the early varieties. No other insect infests the fruit but the borer troubles the trees. He has some leaf-curl, said to be caused by gall gnats: does no perceptible damage. He grows corn and potatoes among his trees. Allows hogs in, as they do no damage and pick up wormy fruit. Picks in baskets with padded bottoms. Packs only perfect fruit, in peck baskets for market, and in one-third-bushel crates (so solid as not to shake), for shipping. Rejects all small or imperfect specimens. He retails and consigns, and finds Kansas City, Mo., his best market. Average price, one dollar per bushel. Cannot say whether it would be desirable to plant largely or not in his locality. Feeds all refuse to hogs. The damage done by cold in February, 1899, in his locality, was very great: peach buds all killed and wood badly injured.

Maj. Frank Holsinger, treasurer of State Horticultural Society, Rose-dale, Wyandotte county, has had thirty years of experience in Kansas, most of it as an active horticulturist. He has 4000 peach trees in bearing and 2000 younger ones set out. Of these 250 are seedlings, 100 of which bear fruit of good size and fine quality. His bearing trees have been out from three to twenty years, on mulatto soil, formerly in native timber. He likes his soil, and says all slopes are equally good. He is growing Sneed, Alexander, Reeves, Family Favorite, Tillotson, Henrietta, Mamie Ross, Mountain Rose, Old Mixon Free and Cling, Thurber, Gold Drop, Susquehanna, Stump, Picquet's Late, Snow, Hill's Chili, Heath, Greensboro, Elberta, and Salway. Has discarded all the early sorts, such as the Amsden, Waterloo, Governor Garland, etc., because they do not ripen up evenly, have faults in color, are not good bearers, and seem to possess general "cussedness." He recommends for market—from experience—Early Rivers, Reeves's Favorite, Crawford's Late, Family Favorite, Elberta, Chair's Choice, Old Mixon Free, Stephenson's Rareripec, Picquet's Late, and Salway. For family, he would add a few clings and Champion, Stump, and a few Columbia. Plants one-year-old trees of small size, either 12 x 16 or 16 x 16. At planting he prunes only to make top uniform and shapely: does not prune roots, unless broken or mutilated; says life is too short to do many things for fun. Heads in or shears in one-third to one-half of growth on bearing trees; says it is the easiest method of thinning and to have the fruit as compact as possible, which also prevents the limbs from breaking down when loaded. The earliest come about June 25, and are Sneed, Triumph, Alexander, etc. The latest is Bilyer's Late October; never knew a season long enough to ripen them. Says the injury by cold of February, 1899, was so great that buds are all killed: trees so badly injured that young ones may fail to grow. Older ones are not much better. The only ones not injured were those kept in cellar. He says the curculio, also the gouger, are fond of his peaches: says they commence on the earliest ones and keep it up throughout the season; they know a good thing. As both feed inside the fruit, to spray would be a joke for them. Says he is somewhat troubled with wasps, but this year he will have the laugh on the curculio and gouger, as there will be no peaches; these insects will be *very* lonesome. Mr. Holsinger has just returned from the East, where yellows and San José scale are destroying thousands of peach orchards. He saw acres and acres being dug up, and thinks our growers should make strenuous efforts to prevent the introduction of the above two greatest of all misfortunes to the peach. It seems to him that there cannot be too great care taken to prevent the spread of scale and other insect pests. [Attention is called to a copy of a bill introduced into the house and passed by a vote of 76 to 2. It was not reached in the senate. See page 88.] As yet the yellows have not affected trees west of the Mississippi river. There is no known remedy for yellows. He has also had some rosette, leaf-curl, and insects innumerable. He grows corn only among the trees the first few years. He allows horses and mules to pasture or run among the trees, but details a man to watch them. Picks very carefully by hand; places one at a time—the best on top (*sic*)—in peach baskets for market, rejecting all that are blemished or unsightly. His best market is Kansas City, Mo.; generally sells "to the trade," or any way that opportunity offers. Works over culls, allowing useless ones to lie and rot. Prices and demands vary with season, quality, and quantity. He believes there are enough now growing around Kansas City to admit of fair remuneration to growers. Says regarding results of freeze, there could be no worse condition than is now manifested; he does not believe a single fruit-bud of peach is alive. He further advises that all small peach trees be cut back to snow line, or nearly so; older or

bearing trees should have all limbs cut off within twelve to twenty-four inches of the trunk. Trees thus served will, in a measure, recover and form new tops that will bear some fruit another year; unless thus treated, the heart of the wood, being killed, will break badly should they set a crop of fruit another year. It is his opinion that all the old trees will be found to be badly injured to the snow line, and that they will decay and in a few years become extinct—dead. This may in a measure be avoided by the severe cutting back recommended. All small trees cut low will soon be renewed, and should have attention and proper training this summer. If cultivated and cared for, the new growth, owing to strong roots, will be amazing, and the trees will not be as far behind as you think. It will pay in the near future to grow peaches, as he predicts that fully one-half of the trees will succumb to present conditions. He further predicts that those who exercise careful attention to the business in the present emergency will reap the reward that comes by prudence and right action intelligently applied.

THE SECOND DISTRICT.

B. F. Campbell, St. Francis, Cheyenne county, has been in Kansas fifteen years, and has twenty-six peach trees, one of which is a seedling, and it bears fine fruit. His trees are only three years planted on sandy soil; prefers a north slope. Has planted the Champion, Foster, Crawford's Early, Smock, and Crosby; he is not well posted on varieties other than these. Has planted two-year-old trees, ten feet apart; trims the tops at planting sufficiently to keep the wind from blowing them about; trimming no roots but damaged ones. Grasshoppers are the worst insects he has to contend with. He grows garden-truck among his trees, but never allows any live stock among them. His ground is subirrigated from a ditch. His trees are growing exceedingly well, and he looks forward in anticipation of profitable results. He says that the cold of last winter killed most of last year's growth on all varieties.

Isaac Clark, Oberlin, Decatur county, has resided in Kansas eleven years, and has 600 peach trees, 500 of them in bearing; 250 are seedlings, of which number 150 are of fine size and choice quality. His trees have been planted from three to seven years, in coarse, rich, black soil with a north slope. He is growing Early and Late Crawfords, Chair's Choice, and Japanese. Plants trees of one- or two-years' growth, 10x20 feet apart; prunes off one-third of top and trims mutilated roots at planting time. Never heads in bearing trees. His latest is Japanese, October 15. Cold of February, 1899, did no perceptible injury. No insects trouble him but borers. He sells at home, at two dollars per bushel, and thinks they would pay if planted largely in his locality on high, rich ground.

J. B. Griffiths, Kanopolis, Ellsworth county, has been in Kansas nineteen years, and grows only a few seedlings of choice quality for home use; these were planted ten years ago, fifteen feet apart, on dark loam with clay subsoil. He never prunes. Says cold of February, 1899, killed half his trees and all of last year's growth on the others, and all are in bad shape. Has sprayed for curculio without success. Has no other insects or diseases. Grows sweet corn among his trees. He finds ready sale for his peaches at from 50 cents to \$1.50 per bushel, and believes choice varieties planted for market in large quantities would pay well in his locality.

Jesse Royer, Gove, Gove county, has lived in western Kansas over thirteen years; has 1000 bearing peach trees seven years old, and 200 young trees set out. Half of his bearing trees are seedlings, and 250 of these seedlings are of large size and choice quality. He is on high upland prairie, and considers it preferable; likes an east and north slope. He is growing, of budded varieties, Champion, Crosby, Elberta, Excelsior, and one other—name lost; has tried none unsuccessfully. Would recommend specially for market the above list, and the same for family; says they are all acceptable. He plants one-year-old trees, from eight to ten feet apart (owing to high winds), cutting back to one foot or eighteen inches, a low top being desirable. Does not head in bearing trees. Never prunes roots, as he says there is little enough root with them any way. His peaches all ripen between September 25 and October 5. The extreme cold of February, 1899, injured his trees fifty per cent. Some of the seedlings seem uninjured. He is not troubled with curculio, but the flat-headed borer is with him. Has no other insects, nor any diseased trees. Cultivates well, and grows some corn among his peach trees. Would irrigate if he could, but has raised two good crops of peaches and plums without irrigation. While prices range from \$1 to \$1.50 per bushel he sells but few. He and his family enjoy them, and give to neighbors and friends. He is not sure that it would pay to plant largely in his vicinity.

J. Weidman, Lincoln, Lincoln county, has resided in Kansas twenty-nine years, and is a life member of the State Horticultural Society. Has now 100 peach trees in bearing, and 150 smaller. About 75 are seedlings, half of which bear good fruit. His bearing trees are fifteen years year old, and on sandy soil at foot of a prairie hill. The varieties are Alexander, Crawford's Early and Late, Elberta, Wheatland, Smock, Stump, and Salway, and thinks this list a fine one for all purposes. He plants one year from bud. Prefers western slope. Plants fourteen feet apart. Does not prune at all. His earliest is Arkansas Traveler, coming July 8; his latest, a seedling coming from Smock, in October. Fruit-buds were all killed the past winter. His earliest varieties often "cook" on the trees. His fruit is not troubled with curculio, insects, or any disease, excepting borers. He grows no crop and allows no live stock among his trees. He says further: "I sell the fruit at home. Demand is good when we have a good crop. Prices from twenty-five cents to one dollar. Extra good seedlings with small pits bring thirty to forty cents per bushel. Peach crop too uncertain to risk large plantings. Feed all refuse to pigs." About cold weather he says: "On Sunday morning, February 12, the mercury stood at twenty-seven degrees below zero; on the previous Friday it stood at twenty-two below for ten hours. Before and after those dates the weather was not cold enough to harm any well-matured trees or buds. The Elberta stood it the best of any on my place."

Rev. P. J. Eitzen, Oakley, Logan county, says there are many small peach orchards in the county, mostly seedlings. They do well on any soil, and slope makes no difference if protected from the northwest winds. None are grown for market, although there are many that are large and nice. They plant ten to twelve feet apart, trimming off twigs and side branches to correspond with the size of roots. "If top is larger than roots the tree is apt to die the first year." No insects or diseases are known to trouble the peach tree or its fruit. "There would be many more trees if people would keep live stock from them." They irrigate by running water in ditches close to the trees. "All kinds of fruit-trees grow very low and bushy; limbs grow out a few inches above the ground; this is explained by some people as being too high here, but I think it is on account of

dry earth, as there is no moisture below two feet, and the trees which have been irrigated reasonably are of medium height, but bearing trees so far are very few: in fact, there are but a very few small orchards here. This spring one nursery shipped in \$700 worth of nursery stock, showing that the people are just beginning on fruits of different kinds: grapes, cherries, a few apples, strawberries, and peaches."

W. B. Stockard, Beloit, Mitchell county, twenty-nine years in Kansas, with 300 bearing peach trees and fifty younger ones: part of these are seedlings. He had fine seedlings of the Thurber (see below). His trees are from two to twenty years planted, on upland, but he thinks river bottom and a south slope best. He is growing R. E. Lee, Globe, Alexander, Red May, Wheatland, Beers Smock, Wager, Champion, Crosby, Elberta, Imperial, Thurber, Carpenter's Late, Crawford's Early, Stump, and Lemon Free. Has discarded Globe, Champion, Stump, and Lemon Free. Would recommend as best for family and market Alexander, Thurber, Crosby, Elberta, Carpenter's Late. He prefers trees one year from bud, set sixteen feet apart north and south and twenty-four feet east and west. Does not cut the top at planting, and only the damaged roots. His earliest is Alexander, and latest Carpenter's Late. Thurber is his heaviest bearer. Curculio troubles Champion most. Borers also troubles his trees. No diseases known. Grows corn and potatoes in young orchard. Sells at home, feeding small and damaged ones to hogs. Receives from 50 cents to \$1.50 per bushel. Does not think it would pay to plant largely. Says buds are killed and young trees damaged by cold. He says further: "I have six trees alike, ten years old, growing from Thurber seed, that bear heavier than any trees I have, hardy, and ten days later than the parent, not as sour, same size, same color, and a perfect freestone. It is a seedling from Thurber, somewhat larger, and very sweet. I have some yellow freestones from seed brought from Illinois: comes the same from seed; very fine, similar to Crawford, but later; red flush on sunny side, bears well, good shipper. My opinion is it will be the coming yellow peach. My neighbor has a seedling resembling in color and shape the Heath Cling, but larger; ripening about heavy frost."

W. J. Brumage, Beloit, Mitchell county, has resided in Kansas twenty-five years, and has 1250 peach trees from four to twelve years of age. Six hundred of these are seedlings, very few of which are of any special merit. His peaches are planted on upland, well manured, and he believes it just right. Says northeast slope is best. His budded varieties are Elberta, Sneed, Wager, Wonderful, Old Mixon Free, Crosby, Stump, Family Favorite, and Foster. For market he would recommend Elberta, Wonderful, Old Mixon Free, and Foster; and for family use he would plant Family Favorite, Crawford's Early, and Arkansas Traveler. He plants trees eighteen months after budding, 20 x 20 feet, with about one-half of the top trimmed away; he heads back bearing trees, and thinks it the best way. He trims all the long and damaged roots at planting. His favorite earliest are Arkansas Traveler, Alexander, and Sneed, coming July 4, and his latest are Wager and Stump, the latter part of September. The cold of February, 1899, injured all the trees; killed the buds and the ends of the limbs. Seedling peaches have "cooked" on the sunny side, but not of late years. Curculio troubles all his peaches, but he has never sprayed them. Has no other insects nor diseases. He grows garden-truck among his trees, and allows cattle to run among them in the winter time. Does not irrigate. He picks his peaches in baskets and crates holding from one peck to one bushel, rejecting the small and scabby ones. His

best market is in the orchard; retails them, and gets from 25 cents to \$1.25 per bushel. He thinks it would pay to plant peaches largely in his vicinity. He dries the refuse.

W. G. Short, Twin Creek, Osborne county, has ninety trees; fifty of them are seedlings, and says none are good. His bearing trees are twelve years old. His land is low, black bottom, which he believes unsuitable, and would prefer light, sandy land, part gravel. He is growing, besides the seedlings, Early and Late Crawford, Stump, Crosby, Elberta, and Triumph. For money he would put out Arkansas Traveler, Stump, Early Crawford, and other early varieties, and for family add for succession. He plants fifteen feet apart, pruning away only the injured parts. Borers are troublesome. He grows no crops among the trees. Thinks hogs would be beneficial occasionally. Prices with him are good; early \$1.50, late 40 to 50 cents per bushel. Fifty per cent. of buds are all right.

F. T. M. Dutcher, Phillipsburg, Phillips county, has been a Kansan twenty-six years, and has about fifty peach trees in bearing. They have been planted three and four years, and are on high prairie, in a sandy loam with north-east slope, all of which he believes are the best. The varieties are Alexander, Amsden, Foster, Crawford's Early and Late. He recommends for market only Crawfords. Prefers to plant two-year-old trees, trimmed closely, and all injured roots trimmed off, set twenty feet east and west and twelve feet north and south. He heads back bearing trees slightly. His earliest are Amsden and Crawford's Early; latest, Crawford's Late. Thinks the extreme cold of February, 1899, did some injury to his trees and killed buds. Has no curculio or other insects or diseases on tree or fruit. Grows potatoes among the trees: Lets no live stock in if he knows it. Irrigates about ten trees with good results. Home market takes the crop. Feeds culls to hogs. Believes it would pay to plant largely in his locality.

Thomas Cellars, Bunker Hill, Russell county, has 200 peach trees, 150 of them seedlings, "all fine fruit, if the land is cultivated in fine style." They are on a black prairie soil, which appears to suit them. He has lost his record of varieties, but would plant "any kind if they are fine peaches." Plants two-year-old trees, twelve to sixteen feet apart, pruned only to balance well; never prunes afterward. Cold killed all of last year's growth; no variety escaped. Curculio troubles all varieties some. Sprayed in spring of 1896, but "it fogged or rained" always about the time he was done, and did little good. Does not allow any crop, "not even a weed," to grow near his trees. Says his live stock break and injure his trees; he allows none near them. His best market is at Bunker Hill and Russell. He "piles them into a lot of old baskets and boxes and gets two dollars a bushel for them." No one has tried them largely there. He rakes up the refuse and feeds to the hogs. He further says: "On June 3, 1897, a hail-storm struck my trees, but left a few peaches on the under side of all limbs; in 1898, had a fine and large crop." Trees grow as good here as in any other state I ever worked in, with as fine a quality of fruit, but the orchard must be cultivated and kept clean. If weeds are allowed to grow, the trees all seem to dry up and die in a few years and before any benefit is received from them. I take great pride in showing my orchard and explaining to visitors my mode of cultivation. A stirring plow spoils an orchard in any state. Bunker Hill is near the geographical center of the state.

James L. Williams, McDonald, Rawlins county, has seventy-five trees ten years old; forty are seedlings; thirty-five of these are nice, bearing good fruit. His soil—a dark loam—he believes is all right. Prefers a north slope. He is growing Triumph, but would recommend Mamie Ross, a half cling. Plants two- and three-year-old trees, thirty feet apart, trimming the top in proportion to the roots. Knows of no insects or disease affecting the peach. Grows corn among the trees. Picks from a step-ladder and packs in half-bushel crates. Sometimes packs in sawdust, rejecting all that are not first-class. His best market is at home, where he receives from \$1.50 to \$3 per box. Says they would pay well planted on a large scale there. Says the trees never were in better shape than now.

W. H. Ingle, Tyner, Smith county, has 340 seedlings, of which forty bear choice fruits, and sixty Crawford's Early and Foster, all on high prairie, without irrigation. He plants ten feet apart each way, trimming back about one-third. Trees hurt some by freezing and fruit-buds badly killed.

Chas. Buschow, Colby, Thomas county, is growing some seedlings eleven years old, on sandy loam—the only soil there—on a south slope. Says it is hard to grow any fruit-trees there. His trees are planted ten feet apart, pruning away two-thirds of the previous year's growth, with roots smoothly cut where mutilated. Knows of no insect or disease. Sometimes irrigates by running water on ground from tank, when it gets very dry. Has had poor success and thinks they will not pay. The late cold snap injured all the fruit-trees.

G. T. Galloway, Ogallah, Trego county, has 3000 seedling peach trees, planted from three to fourteen years, on fine Saline river sandy bottom land. He prefers sandy land with a north slope, well on the bottom. He has four budded trees; one is the Arkansas Traveler, the other three he has forgotten. He recommends for all purposes any good seedlings. Ten of his 3000 are extra fine, and all are good. He plants one-year-old trees, 20x20 feet, cut well back and roots trimmed. Has not tried heading back bearing trees. He has some seedlings coming the last of October. No pests except birds and borers bother his trees or fruit. He grows garden stuff among his trees. He irrigates, running water along the row on top of ground; says it is a success. Picks by hand, and sells at home and in Wa Keeney, receiving from \$1.50 to \$2 per bushel. Fruit-buds killed by cold of February, 1899, but trees seem all right. Says it would not pay to plant largely for market. [If his 3000 trees were of four or five, or less, choice budded varieties, under above conditions of irrigation, insects, and market, what a mine of wealth he would have.—SEC.]

C. A. Hascale, Sharon Springs, Wallace county, has 200 seedling trees. Twenty-five of these bear nice fruit, of good size. They are eight to ten years old, and are planted on upland, fifteen feet apart. Grasshoppers bother them. Says they do well if irrigated, and would pay. Trees in good condition, but buds killed.

M. A. Griggs, Wallace, Wallace county, writes similar to above. He irrigates with a pump.

THE THIRD DISTRICT.

D. D. White, Enon, Barber county, has lived in Kansas twenty years. Has 500 bearing trees from five to eighteen years old, and 100 smaller. Of these 500 are seedlings, 400 of which are fine in quality and size. Grows them in sandy loam, and considers it best if not too sandy. Would prefer permanent water within ten feet of the surface. Likes an eastern slope on account of hot sun. Grows the Crawford, Foster, and Heath Cling. Believes the Crawford the best for market, as they are solid and will not bruise in shipping. Prefers seedlings for family use, as they bear annually. Prefers two year-old trees for planting, and plants twenty feet apart north and south and forty feet east and west. Prunes at planting to three or three and one-half feet high, but does not prune the roots. Does not head back bearing trees. His earliest is Amsden—last of June; latest, White October—first to middle of October. Fruit does not cook "if planted twenty feet apart north and south." Has some curculio in early freestones. Has sprayed, but does little good. Troubled some with borers. Has no peach disease of any kind. Pastures with a few hogs; or, rather, pigs, as they do not "ride down" the limbs. Picks for market from step-ladder. For home use shakes them off. Markets in half-bushel baskets. Average price for ten years has been fifty cents. Does not think they would pay in large quantities for shipping. He evaporates all the culls, etc.

E. T. Daniels, Kiowa, Barber county, thirty-six years a resident of the state, has now 175 peach trees; about half of them are seedlings; six of these bear fine fruit. His trees were planted from six to seventeen years ago, in soil of a red loam, underlaid with red rock at from two to ten feet. Thinks the light red lands of Barber county the best he knows of for peach growing. Any slope is good, but low land is preferable. His varieties are Alexander, Hynes's Surprise, Rivers, Bishop, Reed's Early Golden, Old Mixon Free and Cling, Mountain Rose, Elberta, Heath, Reeves, Yellow St. John, Beatrice. Has discarded Crawford's Early and Late, as shy bearers. For market would recommend the above list, excepting the Yellow St. John and Beatrice, and would add "some of my seedlings, both for market and family." Rivers is too tender, excepting for near-by market. Plant yearlings, fourteen to twenty feet apart—the latter distance for lowlands; prune to a stick eighteen inches high, cutting roots back from two to four inches long. Head in bearing trees annually. Alexander ripens July 1; and seedling No. 2 the last week in October. A large per cent. cook on sunny side while on the tree. Never had curculio but one season, six or eight years ago; borers troublesome of late. Saw yellows or curl in Ohio, but never in Kansas. Lost a few trees on wet land with root-rot. Grow corn or potatoes only for first year or two. Pick with ladder or light picking table, and place in wagon on hay and haul to towns and to settlers in Oklahoma. Sells seedlings from twenty cents to ninety cents, and choice varieties from fifty cents to one dollar per bushel. Feeds all refuse to hogs. He believes the day for good profit has gone by. Says, further, cold of February killed soft-shelled almonds. Mr. Daniels has two peach seedlings originating with him, viz.: No. 2 and Cream. On examining fifty buds each of Crosby, Early Rivers, No. 2, and Cream, he finds Crosby, 42 dead and 8 alive: Rivers, 43 dead and 7 alive: No. 2, 40 dead and 10 alive; Cream, 31 dead and 19 alive: examined 160 Elberta buds—not one alive. Says he is proud of his two new peaches, and will propagate them largely. Says Cream is of the best quality, and No. 2 is better than Crawford Late. Says further: "There are four or five

old peach trees in the orchard of Sam Ishmael, at Kjowa, called Southern Early, that he believes are the hardiest in bud of any good peach he knows: tree very vigorous, with large leaves; fruit very large, free: ripens between early and late, when good peaches are scarce. He also has grown the Comet, an excellent bearer, of better quality than Rivers, which it should supersede." The Comet is the parent of Goldsboro, which should supersede Alexander, Amsden, etc.

A. S. Huff, Sharon, Barber county, has been in Kansas twenty-nine years, and has 2000 peach trees, planted from three to eleven years, on sandy loam, which he prefers. His trees are all seedlings but 100: most of his seedlings bear choice fruit. Of budded varieties he has Elberta, Alexander, Amsden, Crawford's Early and Late, Acme, Triumph, and four others—names lost. He has discarded most early kinds except Arkansas Traveler, Alexander, and Early Crawford, because they are of no account for anything. He would recommend for market, in his vicinity, Elberta, Crosby, Acme, and plenty of good seedlings. He plants two-year-old trees, sixteen feet apart, trimmed according to shape most pleasing to his eye, cutting back both top and roots somewhat. His earliest varieties are Alexander, Arkansas Traveler, and Crawford's Early; his latest are Parks and Picquet's, in September. The cold weather did not injure his trees any but hurt the fruit-buds of all varieties. His peaches often cook on the trees on the sunny side when it is awful dry. He is not troubled with curculio; has never sprayed; is troubled with peach-borer some, but has no peach-tree diseases. He does not irrigate; grows nothing among his trees, and allows no live stock near them. Picks from a ladder and sorts at the same time. Markets in baskets, from peck to one-half bushel, packing with great care in order to ship well, rejecting all unmarketable fruit, which he feeds to the hogs: ships his best quality to Colorado points, receiving from 25 cents to \$1.75 per bushel. Does not think it would pay to plant largely in his locality. Thinks sixty per cent. of the peach buds were killed by the cold. Barber county is very near the center of the state.

Ben. McCullogh, Ellinwood, Barton county, has been in Kansas twenty-three years, and has 2000 peach trees, mostly seedlings, which he claims are of good quality; they are from four to six years old, and planted on black, sandy soil, which he believes to be the right kind. Says that he has been "fooled" so much by tree agents that he has ceased purchasing budded trees; plants only the best of pits, growing his own trees, from which he sells large quantities of peaches. He is perfectly satisfied with both free and clingstones of his own growing. He plants in rows, from eight to ten feet apart, taking young sprouts two to three inches high from a bed of seeds stratified with earth the previous fall. He prunes back well during the first summer, also cutting back bearing trees, for they grow too high, and he knows it is beneficial. The extremely cold weather of the past winter froze the tips of some of the limbs on young trees. Curculio troubles his early peaches some; also has trouble with borers. He grows no crop among his peach trees, does not irrigate, and allows no live stock near them. Picks from a step-ladder, and sells all his fruit at home, parties often coming fifty miles from the south and north. He receives from twenty-five cents to one dollar, and thinks they would pay if planted largely in his vicinity. If refuse is not too badly rotted he gives it away. He says, further: "If a man will take pains as I do, he can raise good peaches from the pits. I get the best of pits from the best seedlings, put them in a bed, and keep them wet all winter. I prepare my ground, and when they come up in the spring, and are two or three inches high, I put them out. Five hundred I put out this spring in that

way are now standing from two to three feet high. I keep them well trimmed and top them back, and they are as fine as any budded trees, and a great deal healthier. Last year I got a good crop of seedlings, and I sold them readily in the orchard at seventy-five cents per bushel."

Geo. T. Elliott, Great Bend, Barton county, has been a Kansan twenty-two years. Has 500 peach trees, 200 of which are six years planted and bearing, 300 are younger, 200 are seedlings: 100 of these are choice in quality and size. They are on sandy land, which he says is the best. He prefers an eastern aspect. His budded varieties are Salway, Stump, York, Early and Late Crawford, Elberta, Crosby, and Champion. He would recommend for market, Elberta, Bokara, Crosby, and Champion; for family use, he would add a few early varieties. Would plant two-year-olds. He has been planting 18 x 18 feet, but will this spring [1899] plant 400 trees 12 x 12 feet. He would trim to a stick, and clip all bruised roots. He heads in bearing trees, and says it is the best way. His earliest peach is Wyandotte, coming July 1; his latest, Chinese Cling and Heath, in October. Says by heading trees low the fruit does not sunburn or cook on trees. Has few curculio on early and medium varieties. Has not sprayed for them. Grows corn among trees for two years, after that nothing; never allows live stock among trees. Picks carefully, and sells in bulk, in home market, at from one to two dollars per bushel. He thinks it would pay to plant largely for market, and he intends to plant 400 this spring—200 Elberta and 200 Bokara No. 10. He planted, in spring of 1898, 100, in ten varieties, as follows: Greensboro, Early and Late Crawford, Stump, Arkansas Traveler, Sneed, Henrietta, Elberta, Chinese Cling, Champion. Mr. Elliott says, further: "I have a wind-break of forest-trees around my peach orchard, and find practically no damage from the severe cold, excepting a few seedlings. The demand for peaches at Great Bend is good, and have received four dollars per bushel for extra-nice clings." He will continue to extend his plantings for commercial purposes. He believes there will be 100,000 peach trees set out in Barton county this spring [1899].

Jacob Rediger, Great Bend, Barton county, has resided in Kansas thirteen years, and tells the following: Has 300 peach trees, all seedlings, 200 of them of medium quality and very acceptable; 200 are sixteen years old, on high upland, but he would prefer "sandy river bottom," with north alope. He planted two-year-old trees, 10 x 16 feet, with tops cut back to about six inches. He is troubled with curculio and borers. Says the hot sun and southwest winds scald the trees and the borers attack them. Says it is best to grow no crop among the trees, but to turn in hogs. Says "it would pay to irrigate if the trees would bear every year, but I have had but two crops in twelve years. Some winters the bud is killed and other seasons the frost has killed them in May." Sells them to farmers at retail at from forty to fifty cents per bushel. Gives all refuse to hogs. Says they would not pay to plant largely for market. Says, further, that the cold of February, 1899, killed all buds and most of the "timber" on old and young trees.

J. W. Hollinback, Coldwater, Comanche county: resident for thirty-eight years. He has 250 bearing peach trees; three-fourths of these are seedlings; 175 of the seedlings bring choice fruit. His seedlings have been planted nine years; his budded trees have been planted seven years; all on sandy loam; slope no difference. His varieties are Stump, Alexander, Lord Palmerston, and Heath, all

of which are satisfactory. Prefers two-year-old trees, set 15x20 feet, pruned a very little at top and roots—the latter only when bruised or cut. He has no early peaches, but says Heath and Alexander [?] come October 10. No insects but borers harm his trees or fruit, and no diseases. Plants nothing among his trees, but cultivates constantly. Allows no live stock among them. Sells to local trade and wagons from Oklahoma, at from twenty cents to one dollar per bushel. Gives away the culls. Does not think that peach growing on a large scale would pay. Says, further: "Peaches, I think, are badly injured: do not think there is a promise of over twenty-five per cent. of a crop, and it may be a complete failure."

J. S. Liggitt, Belpre, Edwards county, has enjoyed Kansas climate for thirty-one years. He has seventy-five trees planted four years and 400 planted three years. These are all seedlings, twenty of them choice quality and fine size. They are on sandy loam, with clay subsoil, and he thinks that the best soil; likes a north slope best. He plants two-year-old trees, 12x15 feet apart, cut to a stub about two feet high, and the mutilated roots trimmed. He believes in heading in bearing trees, if done properly. Thinks all small trees were killed by extreme cold weather of February, 1899. Some seasons his late peaches are "cooked" on sunny side. Curculio does not trouble his fruit to any perceptible [?] extent. Grows corn among his trees while young, allowing no live stock among them; tried swine last year, but found they injured the trees trying to obtain the fruit. Sells to merchants in near-by towns, at from forty cents to one dollar per bushel. Feeds culls to swine. Believes it would pay to plant largely, especially of best early varieties.

A. N. Patterson, Ford, Ford county, has 1300 peach trees growing; ninety per cent. of them are seedlings; 400 of these seedlings bear fruit of fine size and good quality. His trees have been planted from seven to ten years, and the older ones are failing somewhat; they are on a black, sandy loam; he does not know that this is the best soil. He would prefer a north or northeast slope. He is growing Alexander, Crawford's Early and Late, and Osborne's Early. Says that the last three named are shy bearers. He would recommend for market the Alexander and Amsden; they are his favorites. He plants two-year-old trees, eighteen feet apart, pruned so that the top and root are nearly balanced. Never heads back bearing trees; does not think it the best way. His Alexander and Amsden are ripe in July, and he has some seedlings that ripen as late as November. Grasshoppers, wasps and borers are his worst enemies, for which he has as yet done nothing. Has never seen any diseases on his peach trees. He has grown corn among his young peach trees, but does not recommend it. He allows hogs among his trees when he can prevent them from rooting. He says, further: "I find a home market for most of my crop: when I have more than I can dispose of at home, I haul them to Dodge City and sell from house to house, receiving from 50 cents to \$2.00 per bushel. I feed my refuse to the hogs." He does not think it would pay to plant largely in his locality.

Henry Miller, Ulysses, Grant county, has been in the state sixteen years, and has a peach orchard of 165 bearing trees eight years old; 147 of these are seedlings, very choice in quality and size: they are growing in a sandy soil, which he thinks preferable. He likes a northeast slope. Has eighteen budded trees—he has lost the names; but in that dry climate he recommends only seedlings for all purposes, being careful to get those which bear good fruit. He planted the trees at two years old, 12x24 feet, trimming somewhat to balance the root and

top. Never prunes afterward. His peaches nearly all ripen during the latter part of August and early September. The cold weather injured the budded trees, but the seedlings were not hurt. His peaches cook sometimes on the sunny side. He is not troubled with curculio or any other kind of insect but grasshoppers. Has never sprayed for any purpose, and knows nothing of any peach-tree diseases. Grows no crop whatever among his trees and never allows live stock in them. He does not irrigate. His peaches are all sold in the orchard, bringing from seventy-five cents to one dollar per bushel. He uses the refuse for drying. He does not think it would pay to plant largely in his locality. Says his trees are in good shape, but that many of the buds are killed. Grant county is the second county from both the Colorado and Oklahoma lines, in the southwestern part of the state.

D. M. Trueblood, Tribune, Greeley county, grows a few peaches; some Crosby, all others are seedlings. They are on common prairie soil, northeast slope. 12x16 feet apart. Trimmed tops to half the size of roots at planting. Says a large yellow grasshopper eats the bark from the trees.

J. P. Emery, Cimarron, Gray county, experienced in Kansas for twelve years, has fifty bearing peach trees, set four years ago, all budded fruit, comprising Foster, Crosby, Early and Late Crawford, Alexander, Heath Cling, Mixon, and Hale's Early. They are on black soil, which he says does not blow, and slopes to south. Prefers to plant two-year-old trees, trimming to a straight stick, not interfering with the roots, and plants fifteen feet apart. Thinks the extreme cold of February, 1899, killed many of his trees. Sprays once a month with London purple and lime, and is bothered only by grasshoppers. No diseases whatever. Grows garden crops among the trees: allows only turkeys and chickens among the trees, with orders to catch the grasshoppers. He irrigates from a reservoir 70 x 70 feet, filled by wind pump. Prices range from \$1 to \$1.50 per bushel.

Joseph Lewis, Bluff City, Harper county, has been in the state twenty-three years, and has 1000 peach trees in bearing, and a great number of smaller ones. Of his bearing trees 900 are seedlings, of which 100 bear fine fruit both in size and quality. His trees have been planted from four to eighteen years, on dark, sandy bottom; he thinks this best. Prefers level land and a north slope. He is growing Early and Late Crawfords and Elberta. Is putting out some Triumph trees this spring. Has discarded several varieties on account of failure to bear, and short-lived. Would recommend, for market, Elberta, Late Crawford, Heath Cling, and the most profitable of all the seedlings, one of his own, which produces fine fruit when the budded varieties fail. Plants two-year-old trees, twenty feet apart, which are trimmed to a stick. Heads back bearing trees, and believes it the best way. His Crawford's Late comes about September 1; Heath Cling, October 15. Cold of last winter killed the fruit of all budded trees, but did not seriously injure the seedlings. Seedlings sometimes cook in September on the sunny side. Curculio often affect his early freestones. Has sprayed successfully. No other insects or diseases trouble his trees. Grows no crops among his trees; has some deer, but they make no trouble. Does not irrigate. Picks from a step-ladder into baskets, and markets in both baskets and crates, packing them carefully, so that the cover will press lightly. Gives the small and specked ones to the pigs. His best market is in the Cherokee strip, but he sells mostly in the orchard, at from fifty to seventy-five cents per bushel. Thinks it would not pay to plant them largely in his vicinity. Says further: "I

hear reports of peach trees being winter-killed, but do n't think any of mine are. The fruit-buds of my budded trees are all killed, but my seedlings are about one-third alive." [Harper county is on the southern boundary of the state, midway east and west.]

J. C. Curran, Curran, Harper county, has been in Kansas sixteen years and has 600 peach trees: 100 of these have been out twelve years, others not so long. They are on sandy loam, which he thinks preferable. He has two seedlings which he thinks quite worthy. As for slopes, he says, if he had a choice, he would take a northern or northeastern. He is growing Alexander, Arkansas Traveler, Elberta, Mrs. Brett, Heath Cling, Crawford, Smock, Crimson Beauty, and Salway. Has discarded Bonanza and Amsden as too small, and Stump the World as too coarse. He would recommend, for general use, Elberta, Crawford, Mrs. Brett, Smock, and Salway. He sets out thrifty yearlings, twenty feet apart; does no pruning excepting to cut off the ends of the roots. He heads back bearing trees if they seem to carry too much brush: "if you do not, your fruit will be small." His earliest fruit is Sneed, June 20; Alexander, June 25; Arkansas Traveler, June 30, and his latest McKevit Cling and Bonanza, November 15. Cold did not harm peaches with him. His seedling peaches sometimes "cook" on the trees where planted too thickly. Curculio is found in his early peaches. Has never tried spraying—thinks it would not pay for the trouble. Says he is troubled with boys in short breeches. Has no peach disease whatever. Does not irrigate, grows no crop, and allows no live stock among his trees. Leaves his peaches to ripen and fall off; gives most of them away, but believes it would pay to plant them largely in his vicinity. He says, further: "Old orchard mostly dead; they generally bear themselves to death: later plantings are thrifty: seedlings, where protected by close planting, are not injured. If fruit was planted in quantity, so that we could load a car or more every day, then we could sell our fruit: the quality, flavor and size are much superior to the Missouri peach, and failures are infrequent."

A. P. Heminger, Santa Fe, Haskell county, says peaches have borne well during the past two years, but that drought is their worst drawback. No insects but grasshoppers; no diseases. He has 200 trees. Some are Elberta, Crawford's Early, Old Mixon Cling, one or two others (names forgotten), and seedlings. His trees were one year old, planted 12x20, pruned back one-half: only bruised and broken roots were trimmed. Fruit-buds are all killed and trees are somewhat damaged.

C. H. Longstreth, Lakin, Kearny county, has been in Kansas thirty years: has 800 peach trees: about 100 are seedlings; about one-fifth of these are of fine size and quality. His trees are mostly five years old, growing in sandy loam with clay subsoil; thinks it very good, but not the best. Would prefer deep, sandy soil, with porous subsoil. Says level surface is good, but of all slopes he would choose north and east. He is growing Alexander, Elberta, Early and Late Crawfords, Crosby, Salway, Stump, Heath and Snow Cling. Says this list is quite satisfactory, being as hardy as any and coming in succession during the season, from early to late. Invariably sets small one-year-old trees, sixteen to eighteen feet apart, pruned to a short stick, leaving four or five good buds to form a top, pruning all injured roots. He cuts back one-third of each year's growth on bearing trees, and believes in it. His earliest is Alexander, last of June to July 1. Heath and Salway come in October. Cold of past winter has not injured his

trees; wood is perfectly healthy and sound to the tip ends. Severe cold seems not to have affected them in the least. Fruit-buds were, however, all killed. Never saw peaches cooked on sunny side of tree. Never troubled with curculio or other insects, excepting grasshoppers, and they are easily kept off. No diseases whatever; health of the trees of the best. Says if yellows appeared he would dig and burn every affected tree, and for curl he would spray. Grows corn and vegetables among the trees, and prohibits live stock among them. He irrigates by open ditches, flooding the entire surface when necessary. Could not otherwise succeed satisfactorily. Picks while still firm into cloth-lined baskets, and always ships in third-bushel crates, pressing them in firmly with the hands, rejecting all soft, overripe or small ones. Shipping to Denver, Colo., after supplying a limited home market; selling on commission and realizing from fifty cents to one dollar per third-bushel crate. Thinks crop too uncertain to advise any one trying it largely in Kearny county. By careful cultivation and irrigation his culls are too few to notice. He further says: "As to the peach in this portion of Kansas, the tree is perfectly healthy and I believe long-lived; no insects or diseases seem to trouble it; but its fruiting is very uncertain. Severe cold like the past winter will invariably kill the buds; again, in mild winters a warm spell in February is liable to start the buds and place them in such condition that a light freeze or frost, later on, will get them. While we get a few peaches most any and every season, we cannot safely count on a full crop to exceed one year in every five, making them a very unsatisfactory crop to grow for profit. However, I would advise the planting of a few trees, enough for family use; further than this I do not think it wise to plant. It is claimed by some that the seedlings are more hardy and certain to bear than the budded fruit: such may be true; I don't know; but I do know that I would not plant seedlings for market purposes; there is no profit in them, even with a full crop every year; they as a rule are too small and uneven in size and will not bring price above cost of handling them."

John H. Gosch, Norwich, Kingman county, has lived in Kansas twenty years; has grown a good many peaches for home use, and finds that choice, fine varieties will do very well in his locality, unless two or three years of drought follow each other. No one there grows peaches for market. He plants nothing among his trees, and cultivates well.

D. E. Winters, Haviland, Kiowa county, has 5000 seedlings, mainly of good quality and fine size. He also grows some Crawfords, and recommends Crawford and Alexander for market, with Yellow Cling for family. He sets three-year-old trees, 16x24 feet apart. Believes sandy land the best; north slope preferred. Has a red-cheeked peach which ripens in June. Says all buds and many trees were killed by the extreme cold of February, 1899. Troubled with no insects but borers: knows no diseases. Grows no crop but "sand-burs" among his trees. Finds ready sale for all good ones, in boxes, baskets, or wagon loads, at from 20 cents to \$1.25 per bushel, rejecting only those gnawed by grasshoppers or wilted. Says early peaches would pay well if planted largely there.

Jacob Graves, Healy, Lane county, has 105 peach trees 9 to 14 years old; 75 are seedlings, 65 of these being of fine size and quality. His land is a sandy loam; he would prefer coarse sand. He has Alexander, Amsden, Early Crawford, Arkansas Traveler, and Elberta. Sets one-year-old trees, 9x16 feet, pruned back one-half, and roots smoothed off some. Cold of February killed about one-

third. Has some curculios, a few leaf-crumplers, and no disease. Grows corn among young trees, and allows cattle and horses among them occasionally. Irrigates successfully, while young, from a spring branch. Picks carefully into baskets, rejecting all unsound ones, and selling at retail at home at from one to two dollars per bushel. Sells refuse at a low price. Thinks they would pay if planted largely on suitable ground and properly cared for.

J. J. Ablard, Lawndale, Pratt county, has been in the state thirteen years; has 840 peach trees, planted from six to twelve years. Less than twenty of these are seedlings, only three of which are worthy of notice. They are on black loam with a clay subsoil; he believes some sand would be better. Thinks all slopes are equal. His varieties are Stump, Old Mixon Free, Old Mixon Cling, Elberta, Crosby, Champion, Salway, St. John, Triumph, Beers Smock, and several others. He has discarded Alexander as too wormy; Crawford's Early as too tender in the bud. For market or family use he would recommend only the above. He plants yearlings or June buds, 12 x 24 feet, trimming off nearly all the branches, and trimming the roots to stubs one to two inches long. His Amsden have borne early in June, and a large white cling (probably Heath) comes in the middle to the last of October. Cold of last winter killed all the fruit-buds, but did not injure his trees. His peaches often "cook" on the sunny side. He is troubled with no insects except borers, and no peach diseases. Grows corn among his young trees; never allows live stock near. Does not irrigate. Uses all the product at home. Thinks railroad rates are too high to make peach growing pay in his vicinity.

Joseph Bainum, Arlington, Reno county, has lived twenty-six years in Kansas, and has 1300 peach trees, all seedlings but twenty-three; all are above the average in quality. His bearing trees—1000—have been set from fifteen to twenty-five years, on black, sandy soil, which he believes just right. He likes southeast slope best. His budded varieties are Amsden, Champion, Elberta, Crawford, and Crosby. He would discard the Amsden as too watery, soft, and wormy, and would recommend the balance of the above list for all uses. He sets one-year trees twelve feet apart, but would recommend sixteen feet as preferable. He only prunes top at planting time to balance root. The Amsden comes with him about June 20. Says the cold of February, 1899, did not injure his trees at all. Curculio troubles him; he sprayed, and killed the leaves on his trees. Borers are a great trouble. In very wet times the leaves have curled and died. Grows no crop after three or four years. Sometimes he turns in the hogs. Picks and markets in half-bushel baskets, rejecting all imperfect ones. Sells near home at fifty cents to one dollar per bushel. Says they would pay if "good ones" were planted largely.

E. Morgan, Hutchinson, Reno county, has lived in Kansas eighteen years, and has now growing 1025 peach trees, all choice budded fruit, now planted five, six and seven years, on heavy, light sandy loam, on which they have done well. Says all slopes will give same results in his county. Varieties are Mountain Rose, Elberta, Crawford's Early, Crosby, Heath, Champion, Chair's Choice, Salway, Smock, and three others (names lost), and would recommend the above list for all purposes. Sets trees one-year-old from bud, 15 x 15 feet, with all branches trimmed off and all injured roots trimmed. Heads back bearing trees annually; and thinks it the very best way. Curculio troubles early and medium freestones. Root borers are troublesome. Has some curl in spring, but it disappears. Grows

corn in young orchard, and allows no live stock but fowls among them. In picking, he goes over his trees every other day and picks the ripest. Handles entirely in half-bushel baskets, rejecting windfalls, which he sells cheaply. His best market is Hutchinson, selling to grocers and produce dealers, getting, in 1898, from 70 cents to \$1.50 per bushel. Says cold of February, 1899, killed all fruit-buds, many trees killed to the ground, bark of twigs turned reddish and nearly black, older wood is brown: thinks they will leave out. Says further: "Cannot give much information on varieties owing to 'mistakes' of the nurseryman. Do not think I got any seedlings, but received some worthless kinds which I did not order, which I dug up. Many farmers about here have planted many seedlings received and paid for as budded fruit, so that while many trees have been set out, yet there will not be an oversupply of choice peaches."

Clay Hodgson, Little River, Rice county, with twenty-seven years of experience in Kansas, says he has 2500 peach trees; 500 in bearing, of which one-third are seedlings; very few of these are valuable. His trees are from three to ten years old, growing on upland mulatto soil, and they are of fine growth. His budded varieties are Amsden, Alexander, Bokara, Champion, Early Crawford, Elberta, Rivers, Crosby, Old Mixon, Globe, Lemon Cling, Greensboro, Triumph, Stump, Hill's Chili, Wager, and Foster. He puts out one-year-olds, ten by twenty feet, pruning tops about one-third and roots to smooth the ends. Has never pruned bearing trees. His first are Amsden, July 1. Curculio troubles his early free varieties. Has some curl; no diseases. Grows corn and potatoes among the trees and allows no live stock among them. Markets principally at home, feeding culls and inferior ones to hogs. Says the "buds are all killed, trees much damaged, especially the older ones," by cold of past winter.

B. E. Mirick, Linndale, Rush county, has 150 peach trees, from five to ten years of age, all seedlings but five or six. Thinks budded trees are earlier, but not as hardy as seedlings. Likes northeast slope. Recommends only seedlings for all purposes, planting ten feet apart. They ripen from July to September. Trees sheltered were not hurt by the cold of February, 1899. Borers trouble his trees some. No diseased trees, and no crops or stock among them. Does not irrigate. Picks by hand and sells in immediate neighborhood, and gives many away.

Amos Hendrick, Linndale, Rush county, cultivates a few peaches for home use: trees from three to fourteen years old. His trees are all on a west slope, high prairie. All seedlings, excepting some Crosbys. He plants among his apple trees both ways, trimming away damaged roots. Mulches his trees and fertilizes with ashes; says it improves the size and quality; says his peaches are larger than those he finds in the markets. He sells none, but thinks they would pay well if planted in large orchards. "Last fall a big flock of blackbirds spoiled a lot of my peaches by picking holes in the upper side of them."

C. P. Hart, Rush Center, Rush county, has about 240 peach trees, all seedlings, from one to twenty years of age, on limestone upland, which he prefers. He would choose a north slope. He has tried Crawford's Early and Late, Old Mixon, and some other budded varieties, and discarded them as too tender for this climate. Says all peaches are nice for family use, but they should comprise both free- and clingstones. Plants one-year-old trees, ten feet apart, in rows twenty feet apart, without pruning above or below. Says cold did not hurt trees

but killed fruit-buds. Says the peaches "cook" on the trees when the season is excessively hot and dry. Has a few curculio; borers are bad. Knows of no peach-tree disease. Grows corn, sorghum and potatoes between trees. Does not irrigate. Picks when nice to eat out of hand. Markets by the bushel in home town, La Crosse; sells from wagon to suit purchaser, at from \$1 to \$1.50 per bushel. Feeds culls to hogs. Says to plant largely would overstock the market, and would not pay.

Frank Jergins, Scott, Scott county: Mr. Jergins has 450 peach trees, from four to eleven years planted in light black soil, which he believes the most suitable for peach growing; 300 of his trees are seedlings, ten per cent. of them being of fine quality and size. His varieties are Crawford's Early and Late, Champion, Stump, and Old Mixon Free. For market he would recommend Champion, Crawford's Early, and a big yellow seedling of his own. He plants trees one year old, ten feet apart, in rows fifteen feet apart, trimming the top very closely and cutting off all bruised and damaged roots. He sometimes heads back bearing trees, and thinks it the best way. His earliest is Crawford's Early, and the latest is a big yellow seedling, coming in the latter part of October. Curculio troubles his late cling peaches, but he has never tried spraying; other insects and diseases do not trouble him. He grows rice-corn, potatoes and garden-truck among his trees; never allows live stock among them. He irrigates some from a reservoir. Markets mostly in one-third-bushel crates, packing them point end downward, rejecting all damaged specimens. He retails, and sells them through commission men at Scott, Leoti, and at home, receiving from 50 cents to \$2.25 per bushel. The refuse he uses largely at home, and gives some away. He believes they would pay if planted largely in his vicinity. He says, further, "as far as I know the trees are all in good condition, but many buds were killed." Scott county is on the middle line of the state, the third county from the west.

D. J. McNeal, Scott, Scott county, has tried Kansas ten years, and seven years ago planted 300 seedling peach trees, all of which bear fine, large fruit; also has 200 younger ones planted. They are all in sandy loam, which he prefers. There are no slopes where he is. He prefers a two-year-old tree, planted 8 x 12 feet, cutting off one-third of the top, and using all of the root. Never prunes nor heads in—just lets them go. Has white and yellow varieties by September 10—none earlier—and a large cling that never gets ripe. The extreme cold did not hurt his trees or his prospect of peaches this year. He further says: "My trees are planted more for windbreaks than for fruit, but the last two years has demonstrated that fruit will do well here. There is some danger from late spring frosts." He believes they would pay if planted largely for market. [We are glad to hear this from a western county.—SEC.]

Sam. O. Willard, Springfield, Seward county, has sixty-five bearing peach trees of budded varieties and 1000 seedlings: twenty-five of the seedlings are of choice quality, none of them large. His trees have been out from six to fourteen years. They are in level, buffalo prairie, which he considers as good as any upland, but he would prefer sandy bottom. Says that in his county low, level land on which water can be run, and high, level land are the best. He has lost the record of his named varieties, and knows the names of none of them. He would advise planting fruits that bloom late, so as to avoid late spring frosts. He would plant trees one year old, twelve feet apart, trimming off everything but the main stem. He does not believe in heading back bearing trees in his climate: "Does

not trim the roots, as he believes "the more roots the better." *Curculio* bothers his peaches. Says he can see no difference in varieties. Has never sprayed. Says that wasps and a striped black-and-white bug, larger than the squash-bug, are quite destructive. He has observed no other insects nor any diseases. He grows no crops among his young trees, but turns hogs in among them. Nature irrigates his ground by running the rain-water of every large and sudden shower from higher ground. He raises none for market, but the price has been from one to two dollars per bushel. Says there are a few large orchards there that have produced a few good crops. Says the buds of the peach trees are about all killed with the extreme cold of last winter.

E. T. Wright, Seward, Stafford county, has 375 peach trees, five years old, on sandy loam; seventy-five are seedlings, which are choice and large. He prefers a north slope. He is growing *Elberta* and *Heath*. He plants two-year-old trees, twenty feet apart, pruning the tops to within a few inches of the stem, and trimming smoothly all injured roots. Much of last year's growth was killed by the cold of February last. *Curculio* troubles early freestones; knows no peach-tree diseases. Grows nothing among the trees, and forbids live stock among them. Does not irrigate. Picks and packs in baskets, and sells at seventy-five cents to one dollar per bushel. Does not think they would pay planted largely.

Tom Keeler, Ellinwood, Stafford county, has ninety peach trees, mostly eight years old; thirty-five are seedlings, of which twenty bear choice, large fruit. His land is very sandy; he would prefer more loam, with a northern slope. He is growing *Alexander*, *Wheatland*, and *Crawford's Early*; would recommend *Crawford* and *Alexander* for market or family. Plants one-year-olds, ten feet apart each way, pruned to look nice. Does not trim roots. Says cold hurt to some extent. All early varieties "cook" on sunny side while on the trees. *Curculio* is troublesome. Grows no crop, but keeps the weeds down at all times. Does not irrigate or allow live stock among the trees. Sells at orchard or in Ellinwood, at wholesale. Feeds culls to hogs. Does not think they would pay if planted largely. He further says: "Some trees in this county are all right, where there is not too much sand. The sand gets so hot that it burns the bark on the trees; then worms get in and soon kill them. I don't go much on peaches here: they 'cook' on the trees in dry seasons."

Norton Hockett, Lafayette, Stevens county. Mr. Hockett lives near the south line of the state, the second county from Colorado, and says he has 3500 peach trees; 300 are six years old and 150 seven years, and 100 nine years; the remainder are young; 450 are seedlings, nearly all of nice size and good quality. His budded fruit is mainly *Susquehanna*, *Foster*, *Wagner*, *Wallett*, *Globe*, *Stump*, *Rareripe*(?), *Early Canada*, *Early York*, *Crawford's Early*, and many others. They are on sandy soil, with clay subsoil, which he "emphatically" considers the very best. He prefers a north slope. He plants one-year-old trees, one rod apart north and south by two rods apart east and west, cutting them down to a stick ten inches high; does not prune afterward. His earliest come July 4, and are *Arkansas Traveler* and *Early York*; his *Rareripe*(?) come October 15—giving him peaches for three and one-half months. Says the cold injured the tips of limbs of some young trees. Insects and diseases are unknown to him. He crops his orchard with milo maize, Indian corn, and sorghum, and pastures with calves during the winter months. When all his trees get to bearing he will can all he cannot sell in orchard. He dries the refuse. He commonly receives one dollar per bushel; they pay well. Some seedlings were not hurt by winter cold.

Geo. Weninger, Selkirk, Wichita county, has 700 peach trees; 500 of them are seedlings, 150 of these being of choice quality. They have been planted six to ten years, on black, sandy loam, which he believes most suitable; prefers valley to any slope. He has Heath, Hale's, and Foster, and recommends them for all purposes. He planted two-year-old trees, ten feet apart, trimming back to a stick from twelve to eighteen inches long, with damaged roots trimmed smoothly. His Hale's come July 1; Foster, October. Has no pests or diseases. Grows potatoes and beans among the trees and allows no live stock among them. Sells at home, at one dollar per bushel. Does not think they would pay if planted largely for market. One-year-old trees mostly killed to the ground or snow line by cold of February, 1899; buds all killed.

THE FOURTH DISTRICT.

A. R. Baxley, Humboldt, Allen county, an old Kansan, has 100 peach trees planted ten and sixteen years ago. Sixty are seedlings; forty of these are bearing valuable fruits. They are growing in a loose, sandy soil, with yellow clay subsoil, which he believes to be the right thing, if not too flat. He prefers a western aspect. His budded fruit is all Amsden. He prefers one-year-old trees, planted 20x30 feet, and knows nothing of pruning—does not practice it. He has a choice late cling coming about October 1. Says all varieties in his orchard were injured by extreme cold of February, 1899; at least a foot of all tops was killed. Some of his peaches cook on one side while on the tree, a white seedling with thin foliage being most affected. Curculio troubles his fruit some. Borers have caused a loss of one-third of his plantings. He grows rye among his trees and pastures it until early summer; then sows sorghum and pastures it down: all this with hogs only, and they are taken out when the crop is eaten. Picks and markets in half-bushel baskets, selling at retail in home town at twenty to forty cents per bushel. Uses refuse in family preserves and butters. Hardly thinks commercial peach orcharding will pay there, but has seen no practical test made.

William Newcomb, Welda, Anderson county, has 400 peach trees, 175 of which are seedlings. His trees have been planted five years, on black limestone land, but says he would prefer red limestone. He is growing the varieties that are recommended by the Kansas State Horticultural Society in its reports (see elsewhere in this book). He plants his trees 16½ feet apart, making 160 to the square acre, trimmed to a whip, and the roots trimmed somewhat. Curculio troubles his early freestones, and the borers will get in his trees. Grows no crop among his trees. Says that the cold killed all of the peach buds for this year's crop.

B. F. Pancoast, Iola, Allen county, is an old settler, and has long been secretary of the Allen County Horticultural Society; has twenty-five bearing trees, twenty-three of which are very choice seedlings of his own growing. His trees are from four to sixteen years old, and are growing on black bottom land, which he considers the best. Of budded fruit he has only two trees, one Grosse Mignonne and the other Stump the World. He prefers trees one year from bud, and cuts top and root quite short. His peaches are planted among his apple trees, which are two rods apart. He heads back about one-third of each year's growth in his bearing trees. Curculio troubles his freestones; has no other insects or diseases, excepting a little leaf-curl, not serious. Is troubled with fruit rotting

when it commences to ripen. Grows no crop and allows no live stock among his trees. Sells only locally. Believes they would pay planted largely, if rot could be prevented. Mr. Pancoast further says: "I have some very fine quality seedling peaches, no two alike, both cling and free, all raised from seed of same tree, viz., Stump the World, maturing from August to October 15.

C. J. Norton, Morantown, Allen county, has long been an active Kansas horticulturist. He has 125 peach trees, most of them ten years of age. One hundred of these are seedlings of fine quality and fair size. His trees are on land of only medium fertility but must be in that spot. He would prefer rich, sandy loam, with southern aspect. He has few budded varieties. He recommends for all purposes a few early varieties and then Indian peaches. He plants two-year-old trees twenty feet apart, pruning the top close. He sometimes heads in, and says it is the best way if done right. Thinks cold did a little harm. His peaches "cook" some on one side of tree. Curculio come to him also; never tried any cure. His trees are in blue-grass, and he pastures with sheep and horses. He picks most any way and sorts in a [potato] machine sorter. Markets in crates of one peck and one bushel. Wholesales in local markets, at from thirty to sixty cents per bushel, feeding culls to hogs; says sheep will not eat them. Does not believe it would pay to grow peaches largely for market in his locality. Says "if the extreme cold weather of February (27 degrees below zero) did not injure them, they are as well off as usual, but we must all commence to spray at once or raise nothing."

William Price, El Dorado, Butler county, has lived in Kansas thirty-five years. Had 300 peach trees of following varieties among his apple trees, but they have all been removed, as they retard the growth of the apple tree, viz.: Old Mixon Free, Early and Late Crawford, Amsden, Alexander, and Smock. He now has fifty seedlings eighteen years old, and twenty-five younger ones, all bearing medium-sized, fair-quality fruit. They are on thin soil, with stiff clay, non-porous subsoil. He would advise planting Crawford's Early and Late, Hale's, Amsden, Smock and York for all purposes. He prefers to plant two-year-old trees, twenty feet apart, cutting the outer and upper branches—save the center. On this subject, he further suggests that "We must commence right at the root of the young tree that is now to be transplanted; the tree should be taken up from the soil in a careful manner—getting as many roots as possible. Now check the rows twenty feet apart, and at the intersections clear away the soil sufficiently to let the tree down about an inch deeper than it was in the nursery; examine the roots and, if they are badly bruised, broken, or diseased, prune back to the sound, living tissue. As to the top or branches, we should cut off all bruised or broken twigs and cover the wound with damp soil. In the case of a young tree with plenty of fibrous feeding roots, the top of such a tree only needs to be pruned a little to improve shape; but if the roots are badly damaged, and have to be pruned, then more severe pruning of the tops is necessary. If leaves form before the old roots heal and new ones develop, the sap in the stem is soon exhausted, and the tree dies. To be able to prune intelligently, the structure and growth of trees for fruit- and wood-production should be understood. As the tree develops from year to year, pruning is important in relation to cultivation, spraying, protection from winds, supporting the growing fruit, protection from sun-scald and against borers, terminal branches to induce growth of laterals, check growth of wood, and induce fruit growth. While we have no college set of rules for pruning, we do have furnished to us by nature underlying fundamental principles, which

we learn in the school of experience. The result of pruning depends upon the time when it is done. If you wish to promote vegetative growth and keep the trees in a vigorous state, then prune in the fall or winter. Cut out all interlacing twigs, sapsuckers, etc. This will reinvigorate the tree, and new wood will be rapidly made, if the tree has not received any permanent injury from disease, and fruit production will keep pace with vegetative development." The earliest are York and Amsden, in June, Alexander in July, then Hale's and Early Crawford. The latest is Crawford's Late, in October. Says the extreme cold of February, 1899, killed all the old seedling trees, and did no injury to the young seedling trees. Says his peaches often cook on the sunny side while on the tree. Curculio troubles his early varieties; has sprayed unsuccessfully. As to the yellows he says: "Peach yellows does not exist here to any great extent. Occasionally we see a few trees so affected, and such as are affected make slow growth and bear only premature fruit. It exists mostly in orchards not cultivated for years. The only remedy that is known to me to insure against the yellows is the liberal use of the knife, and if that fails, apply the axe to the root of the tree, and burn it. The life of such a tree is an unprofitable one. It does not pay, either as a fruit or wood producer. Peach rot has most seriously affected our peaches for years past. The earlier varieties are worse than the later, probably on account of more moisture. I sprayed all of my budded trees at the same time that I did my apple and pear trees, and with the same solution. Spraying was continued at intervals of ten days throughout the season. In no case was there any noticeable difference, so far as rot was concerned, between treated and untreated trees. For a year or two I sprayed with London purple, using one pound to 120 gallons of water. Then, again, I tried one pound of London purple, one gallon of kerosene, a half gallon of crude carbolic acid and five pounds of slaked lime to the same quantity of water as above, with no good result. The trees have gone up in smoke and ashes." He grows corn among his peach trees, and says: "Plant both ways, and cultivate at least four times during the season, in the right time of the year. The corn will shelter the trees from wind and sun. Keep this up until after bearing commences, and give the ground a 'right smart chance' of stable manure annually; then you'll have big corn, big trees, luscious fruit, and big success." He will allow hogs—well ringed—among his trees. He picks carefully and markets openly in bushel boxes at retail near home, culling out small and damaged ones. He receives from twenty-five to fifty cents per bushel, and leaves all culls on the ground. He does not believe it would pay to plant largely in his vicinity for commercial purposes.

Chas. Dumart, Murdock, Butler county: thirty-one years in Kansas; with 200 bearing peach trees—all choice budded fruit—growing on sandy soil, which he believes is the best, especially with north slope. His varieties are Hale, Amsden, Arkansas Traveler, Early and Late Crawfords, and Stump. Has discarded all seedling fruits. He prefers two-year-old trees, set from ten to sixteen feet apart, cutting away all the top and trimming the roots to correspond. His Amsdens come in about June 15; Late Crawfords about the last of September. Says curculio troubles his late freestones. Borers also trouble his trees. Has no diseased trees. Grows his trees among other fruit-trees, with no crop between or under them. Sells in orchard at from twenty-five to fifty cents per bushel. Lets refuse lie and rot. Says they would not pay if planted largely there. Says "my trees and fruit-buds are all right; not injured by severe weather of February, 1899. My neighbors claim half or more of their peaches are dead."

R. H. Chandler, Bazaar, Chase county, has 125 peach trees, planted from three to fifteen years. Ninety per cent. of them are seedlings. Fifty per cent. of these seedlings are fine in quality and size. They are on second bottom, but he prefers first-bottom land, and demands a northeast slope in that county for any fruit. He grows entirely Early and Late Crawford's, putting them out when one year old, from fifteen to twenty feet apart, according to soil, pruning the top back about one-third and the roots to balance. Has a seedling of extra-fine quality that ripens in October. The hot wind often "cooks" his peaches on the windy side, and is the worst scourge for peaches in his locality. He grows grapes and small fruits among his trees, but allows no live stock among them, and does not irrigate. Picks by hand and with pleasure, when he has any, giving them away with pleasure to any one who will come after them, throwing the refuse in the hog-pen. He says, further, that they would not pay planted largely in his locality, and that the severe cold of last winter killed the peaches for 1899, but owing to the snow and freezing weather he looks for a smaller crop of insects of all kinds. He has planted peaches for home use only and as a protection for other and smaller fruits, and when they get too old or thick cuts them down for fire-wood and lets them sprout up again.

J. Ellison, Chautauqua, Chautauqua county, has tried Kansas for thirty-three years, and grows a few peaches for home market—all choice, large seedlings; all on light, sandy soil with clay subsoil, which he believes is excellent. Says the best slope is ridge land, high and dry. He believes the best budded peaches for all purposes are Stump, Elberta, Crawford's Late, and Heath Cling. He would plant them two years from bud, twenty feet apart; trim the roots to eight or ten inches, and the top, leaving a stick two and one-half feet high. At ten years he would head them by cutting back severely, especially such trees as overbear. In his neighborhood, Amsden and Hale ripen in June and Heath Cling in October. His trees were not injured by cold in February, 1899. Has few curculio, and only in early freestones. Has no other insects or diseases, but leaves curl some, caused by wet, cloudy weather. Allows only poultry among trees. Ships a few to Indian territory in third-bushel crates, pressed so they will not jolt; gets from fifty cents to one dollar per bushel. Does not think it pays. He grubbed up 500 elegant trees. Lets culls rot on the ground; says there are no stills in his country, and it is too far to Missouri. Has not had a failure in peaches in eighteen years.

W. W. Smith, Le Roy, Coffey county: Mr. Smith is an old resident of Kansas, and has a peach orchard of 200 trees, planted from four to twelve years, on alluvial river bottom, which he thinks quite suitable. Of his trees twenty are seedlings, and the others are Amsden, Chair's Choice, Rivers, Old Mixon, Hill's Chili, Stump, Smock, Foster, Crosby, and Wonderful. He has discarded Hill's Chili, because it is small and of poor quality. He recommends for market Amsden, Rivers, Amelia, Early York, Old Mixon, Stump, Smock, Heath, and Blood Cling, which with him are very satisfactory. He prefers one-year-old trees, and would plant them in good, deep, rich soil that would stand drought, on any slope that he happened to have, from sixteen to twenty feet apart, trimmed to a whip two feet high. He has headed back bearing peach trees, and thinks it the best way. His earliest are Amsden and Alexander, coming July 1; his latest is Smock, ripe September 25. The Hill's Chili and Wonderful "cook" on the sunny side while on the trees. Curculio troubles his early freestones; has never sprayed. Is troubled with no other kind of insects but borers, and no diseases. He grows

corn and potatoes among his trees for three years. Allows no live stock of any kind among his trees. He does not irrigate. He picks in tin water-buckets, with a hook to hang them on the limbs, and markets in "diamond" one-half-bushel baskets, selling at home and near-by towns, receiving from sixty cents to one dollar per bushel. Feeds the refuse to hogs. He does not think it would pay to plant peaches largely in his vicinity. He further says: "Too early to determine whether the extreme cold has seriously injured the trees. Of course all peach fruit-buds are killed."

Johnson Keller, Arkansas City, Cowley county, has been in Kansas twenty-two years, and has 500 bearing peach trees, one-half of which are seedlings of choice size and quality; they are planted on a black, sandy loam, which he prefers. He believes that an east or north slope would be best. His varieties are Red June, Yellow Crawford, Stump, Heath Cling, and a few others, names unknown. He has discarded Red June and Amsden as too wormy and unfit for market or to eat. His best-paying fruit is the Heath Cling, but he would grow some Crawfords for family use. He sets out two-year-old trees, twenty feet apart, trimming off one-third of the top, and allowing all the roots to remain. By experience he finds it decidedly preferable to head back bearing trees. His earliest is the Amsden, coming in June, and his latest is Heath Cling, coming the middle of October. Says that the extreme low temperature of last winter did not injure his trees. Many of his varieties cook badly on the sunny side while on the trees during the hot, sunny weather. Curculio troubles his early peaches badly, and has caused him to discard such varieties; no other insects or diseases affect his trees. He grows no crop among his peach trees, and allows hogs to run in his orchard to eat up the wormy peaches. Does not irrigate. Picks by hand from step-ladders, and packs at once in crates under the trees, placing them—by hand—in layers, closely in the crate, rejecting all except the best. Says he has shipped to some extent, but it came very near destroying his religion. His most satisfactory market is at home, where he receives from twenty-five to fifty cents per bushel. Thinks it would not pay to plant largely in his vicinity, unless for canning or drying. Feeds all refuse to hogs. Says, further: "I have noticed a great many reports in papers concerning the injury done peaches in this state by the hard freeze in February last. In this locality the peaches are not all killed; the injury done was mostly among the budded and grafted varieties; there will be enough left of seedling varieties to supply the wants of all our home people."

L. M. Howard, Girard, Crawford county, has fifty budded trees, on black, sandy soil, north slope. His varieties are Elberta, Early and Late Crawford, Old Mixon Free, Greensboro, and Triumph. The first named he considers best for market. He sets "June buds, one year old," 16x20 feet apart, cutting the tops within six inches of the bud, and heads back one-third of new growth each year. Thinks Triumph his earliest variety. Says the cold injured all varieties to some extent. Grows no crops and allows no live stock among his trees. Picks and markets in baskets holding one-fifth of a bushel. He further says: "Sort them nice and be sure to put the best on top (*nit*)." Does not think they would pay if planted largely there. He further says: "In 1879 I brought from Michigan choice stock, comprising Hill's Chili, Smock, Rareripes, etc. Of these I planted, in spring of 1882, 800 dormant buds. They grew finely, but it was six years before I obtained a crop. I discovered that choice Michigan varieties were not a success in Kansas—the fruit cracking, sunburning, etc. The following winter was so severe the fruit-buds were again killed, so was my patience, and I dug

and burned the whole 800. Growers here are putting out Elberta largely. In Michigan the yellows appeared in many orchards; the trees were immediately cut and burned; by this method the disease was stamped out there. I know no other remedy."

H. A. Condra, Longton, Elk county, has been in the state twenty-two years; has sixty peach trees, five of them seedlings. None of his seedlings are considered good. His trees have been planted five years, on black limestone, but he would prefer a sandy loam, with a northeast slope. His varieties are Stump, Hale's Early, Crosby, Elberta, Old Mixon Cling, Meur, Champion, and Albergs. For market he would recommend Stump, Elberta, Old Mixon Cling, and Champion Cling. He plants two-year-old trees, twenty feet apart, pruning in such a way as to have more roots than top. His earliest are Hale's Early, coming July 1; and for late he has varieties that ripen in October. Curculio trouble his early freestones, for which he has sprayed, with some benefit. Had some trees affected with the yellows last year, but did not understand the cause of it. Cultivates clean, not even allowing a weed to grow in his orchard. No live stock allowed among his trees. Does not irrigate. Raises peaches for family use only, giving the refuse to the hogs. Does not believe it would pay to plant them largely in his locality. Says that the cold of last winter killed nearly all of the peach buds and some of the older trees.

H. D. Porter, Hamilton, Greenwood county, grows peaches for his family only. He has Amsden, Foster, Globe, Crawford, Heath, and others. Soil rather thin. They make a good growth. He planted two-year-old trees, twenty feet apart, pruning all they would bear. His Amsden comes in June, his Heath in October. Cold destroyed the fruit-buds, but the trees never made such a growth. Curculio gets into his early peaches. He sprayed with good effect, but not often enough, "or I would not have any wormy fruit." Grows weeds only under trees. Allows no live stock among them. Does not irrigate. The family gather them for the house and home.

A. J. Saltzman, Burrton, Harvey county, has resided in Kansas thirty-two years and has 350 peach trees growing, from four to sixteen years, on sandy loam, which he thinks preferable. His trees are all seedlings but about seventy-five. These seventy-five are in the following varieties: Early and Late Crawford, Amsden, Alexander, Stump, Wager, Old Mixon Free, and Lemon Cling. He would recommend, for market and family use, Alexander, Early and Late Crawford, Crosby, Elberta, Old Mixon Free and Cling, and Lemon Cling. He sets one-year-old trees, from sixteen to twenty feet apart, cutting back some unless the tree is very stocky. Sometimes he cuts back bearing trees and thinks it good policy. His earliest peaches are Amsden and Alexander, coming in by July 4; does not know which is his latest. The cold of last winter killed some of the old trees, and some of the youngest trees had part of last year's growth killed. The only ones uninjured by the cold were a few seedlings. His Early Crawfords and some of his seedlings "cook" on the sunny side while on the trees, in our dry, hot weather. Curculio bothers his freestones; has never sprayed for curculio: has no other insects or diseases. He grows artichokes, rye and oats among his trees, and turns in hogs to harvest the crop and any fallen, wormy fruit. He picks and markets in baskets holding one-half bushel covered with mosquito-netting, rejecting all runty and inferior fruit. His best markets are usually north and west; he ships mostly on commission; he received, last year [1898], from seventy-five cents to two dollars per bushel. He lets his hogs have the refuse. He believes it would pay well to grow them largely in his vicinity.

David Lehman, Halstead, Harvey county, has been in Kansas twenty years; has sixty peach trees, one-half of which are seedlings; ten of these seedlings bear fine fruit. His trees have been planted from five to seven years, on black, sandy loam. He is growing, and advises for all purposes, Early and Late Crawford and Heath Cling, planted eighteen feet apart, which are well trimmed, the roots trimmed smoothly where mutilated in taking up. He picks Early Crawford the 4th of July, and Heath Cling about the 15th of October. Some curculio in his early freestones; no other diseases or insects trouble him. Grows corn in his peach orchard for three years; allows no live stock near them. Grows his peaches entirely for home use in the family.

C. A. Seaman, Sedgwick, Harvey county: I have fifty bearing trees, from three to ten years old, and 200 smaller peach trees, all budded fruit of following varieties: Alexander, Bokara No. 3, Champion, Elberta, Crosby, Stump, Salway. They are in a sandy loam, which I prefer. I like a northeast slope best. I have discarded the Crawford as too tender [the tree]. For market, I recommend only the Elberta and Salway; for family, I would add the Alexander, Mountain Rose, Crosby, Champion, Stump, Old Mixon Free, and Heath Cling. I would plant trees of one year's growth from bud, one rod apart, pruning to a single stem when setting out; also trimming all mutilated roots. I head in all bearing trees. My earliest are the Alexander; my latest the Wonderful, coming in October. Trees much injured by the cold of February, 1899. The curculio trouble my early peaches; I have sprayed for them without apparent success; no other insects trouble my peach trees or fruit; have never had any diseased trees. I grow no crops among the trees, and will allow no live stock among them. We pick carefully by hand, and market in baskets and crates, placing each peach in carefully by hand; baskets are preferable. We reject all that are imperfect or too ripe. Never have sold for less than one dollar per twenty-pound basket for good ones. I feed all refuse to "town boys."

N. Sanford, Oswego, Labette county, has been in Kansas twenty-seven years. Has only thirty peach trees, from four to twenty-four years old, growing in common black prairie soil, which he thinks is as good as any; he prefers a north slope. Grows Early Crawford, Elberta, Arkansas Traveler, Ward's Late, Early York. Has tried and discarded Heath Cling, owing to cooking in hot sun, and Alexander, because of worms and rot. He would advise planting, for all purposes, Early Crawford, Hale, York, and Ward's Late. Would advise the use of two-year-old trees, planted twenty-five feet apart, never pruning top or root in any way. His Amsdens ripen in June, and he has no very late ones. His late varieties cook in the sun, and the curculio troubles his late clings the most. Has sprayed, but saw no benefit. Says borers are the worst enemy of the peach; knows of no peach-tree disease. Grows corn and potatoes among the trees, and pastures in fall with cattle and horses. Picks from step-ladders, and packs in third-bushel boxes, with stem end down, packed so they will not shake about, using only nice, sound fruit. Used to ship to Kansas City, Omaha and other large towns, but of late has sold all at home; receives from twenty to forty cents per box. He evaporates the culls. Does not believe they would pay planted largely in his locality for market. Peach trees grow vigorously and look healthy, but do not bear of late as they did some twenty years since.

Thomas Stanley, Americus, Lyon county, has nearly 1100 peach trees, 100 of which are seedlings, not very good. His 1000 bearing trees are ten years old, planted on upland with clay soil, which he thinks is best. His first peach

orchard sloped northwest and he thinks that a good aspect. He is growing about thirty-five varieties of budded fruit. He has discarded Chair's Choice, Silver Medal, Brandywine, Wheatland, Reeves's Favorite, and Foster; they are too tender. He would recommend, for general purposes, Elberta, Old Mixon, Fox's Seedling, Lovett's Good, Lovett's White, Wonderful, Salway, Champion, Sneed, Triumph, Carmine, Wardell, Mountain Rose, and Globe. He plants trees one year old, fourteen feet apart, trimmed quite closely. Has not headed back bearing trees, but thinks it the best way. Says Sneed is his earliest, coming on July 1; his latest is Salway, about the 1st of October. Says some of his peaches cook on the trees if not properly cultivated, the worst being the Silver Medal. Curculio troubles his earliest and freestones; no other insects trouble his orchard. For crops in the orchard he grows corn and potatoes, and would allow hogs, if any live stock, in the orchard. He does not irrigate. Picks from the ground or a step-ladder and markets in crates from one-half to one bushel. He rejects all faulty ones; retails most of his fruit in the orchard, at from twenty cents to one dollar. He thinks it would hardly pay to plant largely in his locality. Of his refuse he dries and cans the best and feeds the poorer ones to the pigs. He thinks that nearly all the peach-tree buds are killed and some of the trees, by the cold of last winter. His son, T. W. Stanley, adds the following: "I want to verify my father's statements about the fruit-trees. I place the greater value on Globe, Lovett's White, Mountain Rose, Champion, Brandywine, Salway, and Wonderful. Wilkin's and Newington do very well. I have over 1000 trees out, and have been very successful so far in having good crops of good-sized peaches, and find good sale for them. My land is also clay. I think good cultivation is one of the reasons of my trees doing well."

James McNicol, Lost Springs, Marion county, has been a Kansan for twenty-eight years. He has 700 peach trees in bearing and 600 soon to bear. They have been planted from four to nine years, in a black prairie loam. The varieties are Alexander, Hale's Early, Stump, Heath, Rivers, Early Crawford, Early York, Crosby, Elberta, and Triumph. He would discard Hale's Early. He recommends for commercial purposes Elberta, Stump, and Alexander, and for family adds Crosby. Plants one-year-old trees, twenty feet apart, pruning away three-fourths of the limbs, leaving all the root growth possible, to get moisture. His earliest fruit comes from Alexander—July 1 to 10. Says injury was considerable from cold of February, 1899—even Bokara and Crosby were hurt. Is troubled with curculio, but has never sprayed them. Cultivates in corn until they bear. Markets in ten-pound baskets at retail in home town; gets twenty-five to thirty-five cents per basket. Believes they would pay well planted largely in his vicinity.

O. W. Heckethorn, McPherson, McPherson county, has been in the state twenty-five years, and has 700 peach trees in bearing; 695 of them are seedlings; at least 600 of these bear nice fruit of good quality. These trees are planted on black, sandy loam from eight to ten years, and have done well. His few budded peaches are Heath Cling and Hale's Early, but for all purposes in his locality he thinks choice seedlings the best, setting them out at one year old from the seed, from eight to twelve feet apart, well cut back, and the roots trimmed even, to have sound unmutilated wood. The extreme cold of the past winter did not harm his trees. He is troubled with curculio some, but never with any other insects or diseases. Grows no crop among his trees, and allows no live stock among them. He irrigates from a ditch, and thinks it a great success. Picks by hand, and sells in the home market only.

P. C. Bowen, Cherryvale, Montgomery county, has lived in Kansas nineteen years. Has grown many peaches. Has now 231 trees—all choice budded varieties, no seedlings—200 planted from six to twelve years, in sandy loam. He likes a gravelly subsoil, and, if possible, a northern or western slope. He is now growing Alexander, Anderson, Wager, Foster, Stump, Early and Late Crawford, Chinese and Heath Cling, and others. Has discarded Amsden and most early varieties because they are unsalable and rot badly. For market, he recommends Chinese Cling and late varieties. Says “market is always flooded with early varieties, and they do not keep well.” For family, he would grow Alexander, Early Crawford, Stump, and a few Wager and Foster. Always plants one-year-olds, twenty feet apart, trimming to a stick twenty inches high, and trimming the bruised and broken roots from under side with sharp knife. When bearing trees get tall and old he cuts out the old wood and allows a new head to form. His Alexander and Amsden ripen in June: Heath Cling in October. The cold of February, 1899, killed the peach fruit-buds on all varieties. His early peaches often cook in sun while on the tree. Curculio is bad on about all kinds. Has sprayed, but no benefit was perceptible. Says honey-bees and flies injure his peaches, and that borers are very destructive. Never saw a case of curl or yellows in Kansas; grows no crop among the trees, and allows no hogs and chickens in orchard. Picks very carefully in baskets, and ships in one-third-bushel crates—sometimes in peck and half-peck baskets, each peach wrapped in tissue paper, always packing tight; rejects overripe, soft or scabby specimens. His best markets are Kansas City and Cherryvale: says they often go for commission and expressage, and that he most emphatically believes it would not pay to plant largely for shipping from his locality. Feeds refuse to swine.

F. L. Kenoyer, Independence, Montgomery county: I have a peach orchard of 140 trees, of which 115 are budded and 25 seedlings from choice varieties; eighty-five of these, all budded, were set out in 1895 and the remainder in 1896, making the trees four and three years old. The seedlings have not fruited yet. In addition to these I have a number of old seedling trees with which I have been experimenting on cultivation and pruning. My orchard is on rich, sandy loam, sloping slightly to the south. This is ideal peach soil. Any slope is good for peaches, and almost any soil, if well drained, but sandy loam is best. The varieties I have are Amsden, Sallie Worrell, Crawford's Early, Crawford's Late, Heath Free, Heath Cling, Stump, Elberta, Foster, Smock, Admirable, and Chinese Cling. For this locality I would recommend, for both family use and market, those that ripen in midsummer. Early peaches are more troubled by curculio and the rot fungus, while the late varieties are injured more by leaf-curl and black spot, which, combined with the hot, dry weather of August, causes them to fail to mature. Probably if the curl and spot could be eradicated they would mature properly. The late frosts of last spring [1898], and also of the preceding spring, revealed a weakness in some of our most popular peaches. The petals of the Elberta, Crawford, Stump, Smock and some others are small and undeveloped, furnishing but little protection against spring frosts. All of the defective-blossom varieties in southern Kansas and Missouri were badly “nipped in the bud,” while the varieties that had their infant fruits snugly folded in a fully developed corolla escaped unharmed and bore a full crop of peaches. The most critical time for the peach is just before it is in full bloom, when it is liable to be injured by frost. The blossoms with rudimentary petals open at the tip of the buds almost as soon as the pink is in sight, while those with fully developed petals completely hide the tender peach until in full bloom. The experiment stations have

been testing the efficiency of whitewash spray in retarding the blooming of peach trees. This is all very well, but what we need more is for some one to prepare a list of the best late bloomers, with buds protected by a full, showy corolla—the greatest beauty combined with the greatest utility. The Heath Free is the most profitable peach I have. It is a large white freestone of extra quality; usually escapes spring frosts, and is remarkably free from the leaf-curl and black-spot fungus which greatly damaged the Crawford and ruined the Elberta last season. My most profitable cling is the Sallie Worrell, a large white peach that seems to be but little known, although it is quite popular here. The best trees to plant are thrifty one-year-old on two-year-old roots, with plenty of roots—the more the better. I cut back the top to two and a half feet when planting, and remove all limbs. A tree thus treated will make double the growth the first season that it would if the top was allowed to remain. I do not remove any of the roots except mutilated ones, and cut back all that are too long to set in a two-foot hole. I set trees in rows running north and south, twenty-two feet apart; trees eleven feet apart in the row. Where trees are kept well headed back the rows may be a little closer together. I head back bearing trees severely, and remove all weak limbs before leafing out, every spring that the buds get killed. I would do this every year but for the fact that trees so seldom overbear here that I do not want to sacrifice any of the blossoms by cutting them away. Heading back pays well. Stunted trees, whether weakened by overbearing, poor cultivation, or insects, may be made vigorous and productive by cutting back all the leading limbs three-fourths their entire length. I have tested this on old, stunted trees, and find it makes them almost as vigorous as young trees. The Amsden peach ripens June 20; this is the earliest peach raised here. The late or October peaches seldom mature here, so I do not know what variety is latest of all. The sun never “cooks” any of my peaches. The only insect that troubles the fruit is the curculio. Have never sprayed for it. It attacks the early peaches most, and clings more than free. We have no insects that attack the foliage. The borers are quite troublesome some years. I have never seen a tree with the yellows. The leaf-curl fungus is quite abundant almost every year. Last year it did some damage; just how much I cannot tell, as most people attribute the damage of the black spot to the leaf-curl. About half of the leaves were affected by the curl, but I could not detect any on the fruit. The peaches, with few exceptions, were literally ruined by the spot fungus, which caused them to shrivel on one side, crack badly, and rot. The later the variety the worse they are injured. The Elberta is very susceptible to the disease, Crawfords some less, the Heath Cling the least of all my midsummer sorts. I shall try winter spraying for it hereafter. I am growing strawberries between my peach trees. I have never irrigated, but am satisfied that it would be beneficial, especially to late varieties. I keep trees headed back so most of the fruit can be picked from the ground. I retail all of my peaches at the home market. There were no choice peaches last year, from causes above named. Such as we had were readily sold at one dollar per bushel. They ordinarily bring about this price for fancy fruit. I think it would not be profitable to plant very largely, as the crop is rather uncertain. The intense cold of February, 1899 (21 below zero), would not have injured the trees but for the fact that we had a few warm days the last of January that started the flow of sap in those trees that had been well cared for and the ground kept bare of weeds. Trees that were neglected and the weeds permitted to form a dense mat over the ground seem to be uninjured. Thus nature sometimes rewards the lazy man. My trees are now—March 15—nearly all brown under the bark, from a point about four feet high to the ground. All above that point is but little injured.

The extremities of the limbs are wholly unharmed, while the cambium layer is blackest near the ground. The point beyond which the tree is uninjured marks the point to which the sap had reached before the freeze. I shall saw all my trees off near the ground and let them form new tops; these tops will be ready to bear next year. Many of them will no doubt be seedlings, as the union between root and scion is near the surface of the ground. All that send up seedling tops I shall either top graft or dig out as soon as I have tested them. This suggests the importance of securing nursery stock that has been budded very low down, and setting the trees deep enough so they can send up sprouts from the budded portion in case of injury from freezing.

W. W. Gardner, Chanute, Neosho county, a resident of the state for fourteen years, grows peaches in a small way, on a light, sandy land, and thinks it just the thing; prefers a northern slope. He is growing Chinese Cling, and Heath, Elberta, and others. He failed to make a plat and the tabs are lost. He recommends, for all uses, the above named and Crosby. Likes to set two-year-old trees, twenty feet apart, in rows thirty feet apart. Does not prune because "it makes the trees fork, and then they are apt to split and break by wind." Does not head in any. His trees had most of the tips killed and some were entirely killed by the freeze in February, 1899. He says: "I want to set out twenty or thirty seedlings this spring, as they will stand more cold weather than the budded trees. I have been told that twelve degrees below zero will kill budded peaches and fifteen degrees below will kill seedlings, and it was twenty-four below on the 12th of February; but as to killing the trees I think it a mistake, but they are badly damaged." Is not troubled by any insects or diseases. Grows small grain, oats and grass among his trees, but allows no live stock among them. Has none to sell.

O. M. Record, Thayer, Neosho county, has resided in Kansas twenty-two years; has grown lots of peaches, and now has seventy-five in bearing eight years old, and fifty young trees three years old. He grows no seedling fruit. His ground is a sandy loam, and the trees sometimes grow eight feet in one year on his ground, which slopes eastward. His varieties are Briggs's Red May, Triumph, Red Rareripe, Crawford's Late, Smock, Elberta, Heath Free and Heath Cling, Crosby, Alexander, Amsden, Beatrice, Morris's White, Crawford's Early, and Hale's Early. He recommends for market, Crawford's Late, Elberta, Smock, Heath Free, and Heath Cling; and for family would add, George the Fourth, Stump, Old Mixon Free. Plants trees only one year from bud, twenty feet apart, pruning the roots but little and the tops to a plain stick three feet high. Has never tried heading in on large trees. His earliest is Briggs's Early May, in July; his latest, Smock, last of September. The cold of February, 1899, did not injure his trees, but it destroyed the fruit-buds. Some of his fruit cooks in sun; the Smock the most. Curculio troubles his early freestones; has never tried to check them by spraying; has no other insect enemies. For the last two years he has been troubled with leaf-curl. Grows corn and potatoes among his trees while small. Allows no stock to range among them. Picks carefully in baskets. Markets in both peck and half-bushel baskets. Sorts into two grades, and leaves the specked and inferior grade at home; feeds the trash to the hogs. Sells in near-by towns, and ships occasionally to Kansas City, Mo., receiving generally about one dollar per bushel. Does not feel sure that peach growing on a large scale would pay in his vicinity.

D. M. Adams, Rome, Sumner county, has 200 peach trees, 150 of which are seedlings, and four of these bear fine fruit. They grow on upland. Believes damp, black soil, where they will get the moisture, is the best. He has Amsden, Lemon Cling, Elberta, Crosby, Salway, Hill's Chili, and Mrs. Brett. He set a new orchard last spring of Elberta, Crosby; Salway, Hill's Chili, Hale's Early, and Mrs. Brett. He would add Amsden for family use. He plants two- or three-year-old trees, pruning top about one-third and smoothing injured roots. Not more than half the buds of the early varieties are killed, but all the late ones are dead. Late varieties cook in the sun. Curculio troubles him some; no disease known. Grows corn and hoed crops among trees. He sells to neighbors, in the orchard, on the trees, at twenty-five to fifty cents per bushel. Thinks they would not pay as a business. "The greater part of the trees in this county have been injured by the dry weather of the last few years and overbearing when young. Three-fourths of the old trees are dead or dying. There is no commercial orchard here. We planted sixty trees thirteen years ago. The ground slopes slightly to the east, and there is a dry-weather creek forty rods from it. The south end of the orchard is a few feet lower than the north end. On the lower ground the trees are all thrifty, while on the higher ground many are dead or dying. We have always thinned our peaches as soon as they began to grow. Our trees have stood the dry weather better than those that have not been thinned. We get more bushels, and they are of better flavor, and the trees are not injured as much as those that are not thinned. Borers injure the trees some. Last spring I planted fifty budded trees, and seed, right where I wanted them to remain, for 100 trees more. I planted them in a draw in black ground, and intend to keep them headed back and cultivated without any crop for a year or two longer. I do not know enough about varieties to recommend them by name to others."

John A. Magill, Roper, Wilson county, a resident of the state for thirty-two years, has 350 bearing peach trees, 200 of which are budded to Harper's Early, Hale's Early, York, Old Mixon Free, Old Mixon Cling, Heath Cling: these trees have been planted from fifteen to twenty years, in red limestone, but he says he would prefer black loam, with a northeast slope. He has discarded Hale's Early, as they rot on the trees. He would recommend, for commercial purposes, Harper's Early, Crawford's Early, Old Mixon, Stump, Heath Cling, and for family would add more Heath Cling and Old Mixon. He would plant trees one year from bud, twenty feet apart each way, with the top trimmed to correspond with the quantity of roots. His earliest is the Harper, coming last of June. His latest is a seedling coming the last of October. Thinks the cold snap did no injury to his peach orchard. Says sometimes his seedlings cook on one side while on the tree and that curculio bothers his early varieties. He has never sprayed. He grows corn, potatoes and beans among his trees and turns in swine to eat the fallen fruit. He picks and markets in bushel baskets, discarding all not first-class, selling in home market and to railway men, at from forty cents to one dollar. Feeds all refuse to hogs. He does not think it would pay to plant largely for commercial purposes. The Harper's Early peach, referred to, was discovered in the orchard of Mr. Harper, in Guilford township, Wilson county, Kansas, fifteen or twenty years ago. It is about the size of Hale's and nearly two weeks earlier.

L. L. Lovett, Toronto, Woodson county, has 120 peach trees from three to thirteen years of age; they are on red limestone land, on which soil they do well, but he would prefer a soil with more sand. He likes a northern aspect. Twenty-five of his trees are seedlings; fifteen of these are valuable; of budded fruits

he is growing Hale's Early, Crawford's, Crosby, Elberta, etc. He planted his trees eighteen to twenty feet apart, with center pruned out and branches cut back; bruised and lengthy roots trimmed. His Hale's and Crawford's bear June 28. Curculio bothers early freestones; has not sprayed: borer is troublesome. No disease ever affects his trees, but he says: "The grafting or budding in some nurseries is poorly done, and causes a wax [gum] that starts a rot near the ground" [probably borers]. Says corn is the best crop among the trees for two years. Allows no live stock among the trees, and does not irrigate. Picks from step-ladders, rejecting the overripe ones, and markets at Toronto, retailing at from fifty cents to one dollar. Says that, if planted largely, he does not think they would pay *every* year. Buds were badly killed by cold in February last.

C. R. Davidson, Yates Center, Woodson county, has 125 budded and 300 seedlings; many of them planted from five to fifteen years, on light, sandy soil, which he believes fair for peaches. He is growing Stump, Early and Late Crawford's, Old Mixon Free and Cling, Smock, and Early Rivers, and would add, for family benefit, Heath and Honest John. He planted trees one year from the bud, twenty-five feet east and west, and twenty feet north and south; does not cut back much; smooths the root ends before planting. Curculio troubles his early freestones: has sprayed some, but could not see much difference; borers are bad; no diseases. Grows no crop among the trees after they are seven or eight years old. Says calves are better than hogs among the trees. Does not irrigate, and does not think peach growing would pay as a business there. Fruit-buds were all killed in February last.

A DESCRIPTIVE LIST OF THE VARIETIES OF PEACHES GROWN IN KANSAS.

Alexander. A chance seedling on the farm of O. A. Alexander, near Mount Pulaski, Ill. This peach ripens two weeks before Hale's Early; tree vigorous, productive; the fruit showy, of good flavor; an acquisition as an early market variety and for home use; leaves with globose glands; flowers large. Fruit medium, nearly globular, slightly depressed; suture shallow, ending at the apex, which is slightly sunk; skin greenish white, nearly covered with deep, rich red, almost purplish in the sun; flesh whitish, with a tinge of green, sometimes a little stained next the skin; a little firm, or half melting, sweet, slightly vinous, white at the stone, to which it adheres slightly, and which is small. (Downing.)

Amelia. Habit open and spreading; branches low; growth vigorous; foliage thick; health perfect; leaves large; glands reniform; bloomed March 11, 16, 23; ripe July 23; fruit very large, lemon yellow in color, with red cheeks; flesh yellow, red at stone; stone free; quality somewhat superior to Elberta; an immense bearer; no rot. (Bulletin No. 42 of Georgia Experiment Station.)

Amsden. A chance seedling on the grounds of L. C. Amsden, near Carthage, Mo. Tree vigorous and productive; it is said to ripen two or three weeks earlier than Hale's Early; leaves have globose glands; flowers large. Fruit medium, roundish, slightly depressed; suture rather broad, shallow, extending a little beyond the apex, which is slightly sunk; skin greenish white, nearly covered with light and dark red, almost purplish in the sun, and somewhat mottled in the shade; flesh greenish white, white at the stone, to which it slightly adheres, and which is small; flesh half melting, juicy, sweet, slightly vinous, and very good. (Downing.)

Arkansas Traveler. Medium size; white, nearly covered with dark red; juicy, sweet, nearly free. Early. From Arkansas; claimed by some to be identical with Alexander. (Thomas.)

Beatrice. Size medium to small, round; color yellowish white, streaked with red; flavor mild acid and very fair quality; free; tree a rather weak grower, shy bearer; ripe June 15; glands round. (Texas Agricultural Experiment Station Peach Bulletin.)

Beers Late. See Smock Freestone.)

Beers Smock. Large, oval, base rather narrow; color orange-red on yellow; flesh bright yellow, red at stone; moderately juicy, and rich. Good drying variety. First of October. New Jersey. (Thomas.)

Belle of Georgia. Large; white with red cheek; flesh white, firm, good. Seedling of Chinese Cling. Georgia. (Thomas.)

Bergens (yellow). One of the best yellow-fleshed peaches, but not a good bearer, and therefore unprofitable. Leaves with reniform glands; flowers small; fruit large (often measuring nine inches in circumference), globular, depressed, and broad; the suture well marked, and extending more than half round; skin deep orange, dotted with some red, and with a very broad, dark red cheek: flesh deep yellow, melting, juicy, and of rich and luscious flavor. Ripens at the beginning of September. Freestone. (Downing.)

Bishop. Habit low, spreading; growth moderate; health fairly good; bloomed March 14, 20, 31; ripe July 13; fruit large, yellow with red blush; flesh white; stone free; quality very good, juicy, and sweet, though vinous; moderately productive. (Bulletin No. 42 of Georgia Experiment Station.)

Bokara No. 3 (new). From Bokara, Asia. Said to be the hardiest peach known. Fruit yellow, with red cheek; skin tough: flesh of good quality; freestone. Professor Bailey says it is thirty per cent. harder than the old strain of peaches. September.

Bonanza. Very large; white flesh; red cheek; free; prolific; vigorous. (Munson & Son's Descriptive Catalogue.)

Braudywine. Large, yellow, free; does well South. (Thomas.)

Briggs's May. Medium, roundish oval; shaded and striped red on white skin: ripens with Amsden; leaves serrate. (Thomas.)

Briggs's Red May. Above medium; very highly colored; flesh greenish white, very juicy, vinous, of firm texture and very good quality, adhering somewhat to the stone; tree very prolific; ripens with the Amsden, July 13. (Sedgwick Nursery Company's Descriptive Catalogue.)

Carpenter's Late [White?]. Very large, round; white, slightly greenish: flesh white to the stone, juicy, melting, rich, excellent. Middle of October; promises well for market; vigorous and productive. New York city. (Thomas.)

Chair's Choice. Origin, Maryland. Has no superior in quality and flavor, and for profit is without a rival; large, yellow, free; rich in color: flesh very firm, and ripens after Smock.

Champion. Large; white, with red cheek; flesh white, firm, juicy, sweet; hardy. (Thomas.)

Chinese Cling. Large, globular; suture shallow; fine red or yellowish white; flesh white, red at the stone, rich, vinous, excellent. Middle of September; middle of summer at the South. China. (Thomas.)

Christiana. Originated at Pomaria, S. C. Fruit large, beautiful; flesh white to the stone; flavor delicious; freestone. September. (Summer's MS.)

Bilyer (Bilyer's Late October, Bilyer's Comet). Large, white, red cheek; flesh firm, white, juicy, sweet, free. Good shipper. Maryland. (Thomas.)

Columbia. Large, roundish oblate; suture distinct, passing half way round; skin rough, rather thick, dull dingy red, with spots of darker red; flesh yellow, rich, juicy, of excellent flavor. Origin, New Jersey. Ripens early in autumn. Shoots dark reddish purple; flowers small. (Thomas.)

Connet's Early. Large, cream white, with red cheek; flesh white; free-stone. A seedling of the Chinese Cling. New. North Carolina. (Thomas.)

Crawford's Early (Early Crawford, Crawford's Early Melocoton). Very large, oblong oval, sometimes round oval; apex with a prominent point; suture shallow; surface yellow, with a red cheek; flesh very juicy, rich, slightly sub-acid, of good but not the highest flavor. End of summer and beginning of autumn; productive; flowers small. Ranks very high in the Northern, Middle and Western states as a market variety. Origin, New Jersey. (Thomas.)

Crawford's Late (Crawford's Late Melocoton). Very large, roundish; suture shallow, distinct; surface yellow, with a broad, dark red cheek; flesh red at the stone; rich, juicy, vinous, hardly first-rate. Quite late, or latter part of September; flowers small. Origin, New Jersey. The common Red-cheek Melocoton is cultivated in some localities under this name. Often a poor bearer. (Thomas.)

Crimson Beauty. Habit tall and erect; growth and health perfect; leaves medium to large; glands reniform; bloomed March 12, 17, 26; flowers very few; ripe August 12; fruit medium, globular, greenish yellow overspread with carmine; flesh white, red at stone; cling; quality vinous but poor. A moderate producer and a bad rotter. (Bulletin No. 42 of Georgia Experiment Station.)

Crosby (Excelsior). Medium, roundish; orange yellow, splashed red; flesh yellow, red at pit, juicy, rich; prolific; hardy. New. (Thomas.)

Dean's Orange. Originated about 1875 by Martin Dean, Bavaria, Saline county, Kansas, who says: "It is the best seedling peach I have." His description of it is as follows: "Orange in color, fine grained, fine flavor: good keeper, more inclined to dry up than to rot; very hard in wood and bud—more so than any budded variety. It is a genuine reproducer" [coming true from seed].

Early Admirable (Admirable, Belle de Vitry erroneously). Size medium, nearly round; skin nearly white, with a red cheek; flesh red at the stone, juicy, rich, sweet, fine. Quite early, ripening immediately after Serrate Early York [middle of August]. Flowers large. French. (Thomas.)

Early Michigan. Medium size; white, with red cheek; handsome; flesh white, firm, and of fine quality. An early and good bearer. Middle of August.

Early Rivers. Raised by Thomas Rivers, Sawbridgeworth, England. It ripens a few days earlier than the Albert or Alfred, and is quite equal to them in flavor. The tree is thrifty, healthy, and productive; glands reniform; flowers large; fruit medium, roundish oblong, slightly compressed; suture slight at the apex, which is a little sunk, and has a very small nipple; skin creamy white, shaded with light red in the sun; cavity deep; flesh white to the stone, juicy, melting, sweet, rich, refreshing, slightly vinous, very good; separates freely from the stone. Ripe middle of September. (Downing.)

Early York (Early Purple, Pourprée Hâtive, Serrate Early York). The Early York has long been the most popular of early peaches in this country. It is at least a week earlier than the (true) Royal George, more melting and juicy, though not quite so rich, and deserves a place in every garden. In unfavorable soil, the ends of the branches are a little liable to mildew, but the tree is very productive and hardy. There are one or two newer seedlings from this, bearing the same name, in New Jersey, which are rather more thrifty for the orchard, but do not possess the high flavor of the old kind. They are easily known from it by the absence of glands on the leaves and by the large flowers of the true sort. It is quite distinct from the Red Rareripec, which is large, broad, deeply marked with a suture, later in ripening, and richer flavored. Leaves serrated, without glands; flowers large; fruit of medium size, roundish, inclining a little to ovate, with a slight suture only; skin very thin, pale red, thickly dotted over with a pale ground in the shade but quite dark red in the sun; flesh greenish white, remarkably tender and melting, full of rich, sprightly juice. Ripens about the 18th of August. (Downing.)

Early York (Large Early York, Honest John). Large, roundish, inclining to oblate in fully grown specimens; nearly white in the shade, with red dots, and with a deep red cheek to the sun; flesh nearly white, fine grained, very juicy, with mild, rich, excellent flavor; flowers small. (Thomas.)

Elberta. Medium to above average size, round oval, strongly sutured; lemon yellow, blush on sunny side; flesh pale yellow, tender, juicy. Tree vigorous, with large leaves, hardy—a cross of Chinese Cling and Crawford's Early. A good shipper. One of the best of the newer varieties. Origin, Georgia. (Thomas.)

Emma. Habit tall and eccentric; wood brittle; growth and health by no means satisfactory; foliage thick, leaves large; glands reniform; bloomed March 13, 20, 31; ripe July 28; fruit very large, globular; skin bright yellow, with red blush; color somewhat paler than Elberta, but much resembling it; flesh yellow, red at stone; stone free; quality seems but slightly inferior to Elberta; in productiveness fully equal to Elberta, with no rot. (Bulletin No. 42 of Georgia Experiment Station.)

Emperor [of Russia] (Cut-leaved, Serrated, New Cut-leaved, Unique). A very rich and fine-flavored fruit, raised by Mr. Floy, in 1812. Its growth is slow and its shoots are inclined to become mildewed; it is a rather shy bearer; the leaves are very deeply cut or serrated on the edge, without glands; flowers small; fruit large, roundish and broad, with one half more swollen than the other: skin downy, dull yellowish white, with a dark red cheek; flesh yellowish white, rather firm, rich, and high flavored; last of August. (Downing.)

Excelsior. (See Crosby.)

Foster. Originated with J. T. Foster, Medford, Mass. Tree said to be hardy, vigorous, and productive: a good market variety; fruit large, slightly flattened, with a slight suture, stem moderately depressed; flesh yellow, very rich and juicy, with a pleasant subacid flavor; freestone, of medium size; color a deep orange red, becoming very dark on the exposed side; ripe from the middle to the last of September. (Downing.)

Fox's Seedling. Round, slightly compressed, cavity narrow: white, with a red cheek; juicy, sweet, good; flowers small. Season medium or rather late New Jersey. (Thomas.)

Family Favorite. The Family Favorite originated with W. H. Docke, of Bonham, Fannin county, Texas, and is a seedling of the Chinese Cling, but a freestone, two weeks earlier, of fine color and quality, firmer, not as liable to rot, very large. Tree exceedingly vigorous, with very large leaves; very productive; flowers small; leaves with reniform glands: fruit large, inclining to oblong, but not as much so as its parent; suture shallow: apex medium; skin cream color, with a blush on the sunny side; flesh with red streaks next to the stone, firm, yet juicy; high aromatic flavor, but not very sweet, resembling the Chinese Cling in this respect, and it possesses that same peculiarly agreeable perfume when thoroughly ripened. (T. V. Munson, Dennison, Tex.)

Fitzgerald. A seedling of Crawford type, found at Oakville, Ontario, where it stands the winter perfectly, and for years has cropped regularly. Oakville is situated outside of the peach-growing district; other varieties will not grow there. It is undoubtedly very hardy, and the fruit averages larger than any variety known. Quality first-class, freestone, and we recommend it with entire satisfaction. (West Michigan Nurseries, Benton Harbor, Mich.)

George the Fourth. This is most certainly the most popular peach for garden culture in the United States. It is large, bears regular and moderate crops, is of the highest flavor, and the tree is unusually hardy and vigorous, succeeding well in all parts of the country. No garden should be without it. The original tree stood in the garden of Mr. Gill, Broad street, New York. Fruit large, round, deeply divided by a broad suture, and one half a little larger than the other: skin pale yellowish white, finely dotted with bright red, and deepening into a rich, dark red cheek on one side: flesh pale, marked with red to the stone (which is small), melting, very juicy, with a remarkably rich, luscious flavor; ripens the last of August; freestone. (Downing.)

Globe. Very large, globular; yellow-red cheek; free; flesh yellow, very firm, sweet and luscious; good shipper; ripens with Crawford's Late. (Thomas.)

Gold Drop. This variety has a sort of transparent, golden appearance, rendering it immensely attractive in market, selling for the highest price. Good quality: a very early and profitable bearer; hardy. Originated in Michigan, where it has rapidly forged to the front. One of the best market varieties. Ripens between Late Crawford and Smock. (West Michigan Nurseries, Benton Harbor.)

Gold Dust. Introduced by J. C. Evans, president of the Missouri State Horticultural Society. Large; rich golden color, with red cheek: cling. One of the handsomest peaches that grows; firm, excellent shipper, always commanding highest prices. Last of August.

Grosse Mignonne. Large, roundish, slightly oblate, apex depressed, with a deep suture: skin tinged with greenish yellow, mottled with red, and with a purplish red cheek; flesh reddened at the stone: juicy, with a very rich, high and somewhat vinous flavor; stone small and very rough; early, the last two weeks of August; of French origin; flowers large. The peach usually cultivated in this country under this name, although an excellent variety, is not the genuine Grosse Mignonne, but differs in its small flowers. (Thomas.)

Governor Garland. (See Alexander.)

Greensboro. Medium; red, shaded yellow; flesh white, juicy, good; early. (Thomas.)

Hale's Early. Medium, nearly round; skin mottled red, dark red cheek; flesh white, melting, juicy, and high flavored; free from the stone; flowers large. Last of July and the first of August. Tree vigorous and healthy: an abundant bearer; ripening ten days or two weeks before any other good variety. (Thomas.)

Heath (Heath Clingstone, Fine Heath, White English, Red Heath). The most superb and the most delicious of late clingstones. It seldom ripens in New England, but here, and further to the south, is one of the most valuable kinds; of very large size and of the very finest flavor. Coxe informs us that this is a seedling produced in Maryland from a stone brought by Mr. Daniel Heath from the Mediterranean, and it is still frequently propagated from the stone, without variation. The tree is vigorous, long-lived, and moderately productive; with the shortening-in method of pruning, the fruit is always large and fine, otherwise often poor. This tree is well deserving of a place on the espalier rail, or wall, at the North. Leaves nearly smooth on the edge, with reniform glands; flowers small; fruit very large, oblong, narrowing at both ends, and terminating at the apex with a large, swollen point; the suture distinct on one side; skin downy, cream-colored white, with a faint blush or tinge of red in the sun, or a brownish cheek; flesh greenish white, tender and melting, exceedingly juicy, with the richest, highest and most luscious flavor, surpassed by no other variety. It adheres very closely to the stone. It ripens in October, and frequently keeps for a month after being gathered. (Downing.)

Heath Freestone (Hendrick's Heath, Freestone Heath, White Heath). A large, showy, oblong peach, often growing to the largest size, and a very hardy tree, but the quality of the fruit is only second rate. This sort, which is a native of New England, is vigorous, and bears large crops. It is quite distinct from the celebrated Heath Cling. Leaves with reniform glands; flowers small; fruit very large, oblong, with a slight suture, and a small, swollen point at the top; skin pale greenish white, with a purplish red cheek; flesh greenish white, deep red at the stone, a little coarse, melting, quite juicy, with a subacid flavor. Middle of September. (Downing.)

Hill's Chili (Cass, Climax, Connecticut, Jenny Lind, Leopold, Madison, Queen of Sheba, Seagrove, Seagrove's Smolk, Stanley's Late, Smolk, Sugar, Wilcox). It is now pretty well ascertained that this peach originated on the farm of Deacon Pitman Wilcox, of Riga, Monroe county, New York, more than sixty years since, and is still healthy and bearing fruit. It was first called Connecticut Peach. The tree is hardy, vigorous, very productive, and considered a valuable market variety. It is also said to reproduce itself from seed, and the many names by which it is called in different localities is no doubt the result of its reproduction. Fruit medium, oval; suture slight, ending a little beyond the apex, which is a small point; skin deep yellow, shaded with dark red, often dark spots or blotches of brownish red where exposed; flesh deep yellow, red at the stone, moderately juicy, half melting, sweet, vinous; separates freely from the stone, which is rather small. Ripens last of September and first of October. (Thomas.)

Hynes's Surprise. True freestone when ripe. Resists rot better than Hale's Early, which it resembles. (Munson & Son's Descriptive Catalogue.)

Henrietta (Levy's Late). A new, large clingstone, which originated in the garden of W. W. Levy, Washington, D. C., and it is said to be a valuable and profitable variety for market at the South. Leaves with globose glands; flowers small; fruit large, roundish, slightly depressed; suture large, extending a little beyond the apex, which is a very slight point; cavity medium, deep; skin deep yellow, a shade of rich brownish red in the sun; flesh deep yellow, rather firm, juicy, half melting, sweet, a little vinous, and very good. Ripens middle of October, and continues into November. (Downing.)

Hold-on. A fine, large, yellow peach; ripens with or a little later than the Smock [last of September and first of October] and is probably a seedling from that variety. (Fulton.)

Imperial (Petit's Imperial Yellow). This was raised by David Petit, Salem, N. J. It is a large, handsome, late peach, one of the richest of the yellow-fleshed varieties, and continues in use longer than most kinds; tree vigorous, a moderate bearer generally, but some seasons produces good crops; flowers small; fruit large to very large, roundish, slightly depressed; suture shallow, extending a little beyond the apex, which is small; skin deep orange yellow, shaded and mottled with dark, rich red; flesh yellow, red at stone, juicy, melting, rich, sweet, and highly flavored; freestone. Ripe last of September. (Downing.)

Japan Dwarf Blood. Medium; yellow and crimson; flesh white, striated red, juicy; tree dwarf. Claimed to be the earliest of all. New. (Thomas.)

Jennie Worthen. Medium to large; yellow; free; rich crimson cheek; sure. (Munson & Son's Descriptive Catalogue.)

R. E. Lee. Half-round, spreading, with dense foliage; growth and health perfect; leaves very large; glands reniform; bloomed March 10, 15, 25; flowers very conspicuous, but few and scattered on the trees; ripe July 23; fruit very large, globular, greenish white with blush; flesh white, red at the pit, tender, juicy, and vinous; clingstone; quality very good to best. A light bearer but a heavy rotter. (Bulletin No. 42 of Georgia Experiment Station.)

Lemon Cling. Habit low, branching, dense; growth and health perfect; leaves large, glands reniform; bloomed March 13, 18, 30; trees very full of flowers: ripe July 22: fruit large, globular, piped, lemon yellow, streaked with carmine; flesh a pale lemon yellow, coarse, and flavorless; clingstone; quality poor. A heavy bearer and rots but slightly. (Bulletin No. 42 of Georgia Experiment Station.)

Lemon Cling (Kennedy's Cling, Pineapple Cling, Yellow Pineapple). Large, oblong oval, slightly narrowed at apex, terminated by a large, prominent point; surface deep yellow, with a dark brownish-red cheek; flesh firm, slightly red at the stone, with a rich, vinous, subacid flavor; flowers small. Rather late. Tree productive, hardy. Origin, South Carolina. (Thomas.)

Lord Palmerston. Very large; creamy white, with a blush; very good. Late. (Thomas.)

Lorentz. Medium; yellow, red cheek; flesh yellow; freestone; prolific; hardy. (Thomas.)

Mary's Choice. A very productive New Jersey peach. Requires thinning and high culture. (Thomas.)

Melocoton. (See Crawfords.)

Minnie. Large, oval, apex with acute point: color greenish white, with small, red cheek: free; flavor pleasant, subacid; ripe June 27. Tree vigorous and productive; glands reniform. A valuable peach. (Texas Agricultural Experiment Station Peach Bulletin.)

Moore's Favorite. Origin, garden of H. R. Moore, Chelsea, Mass. Tree hardy, vigorous; glands globose; fruit large, roundish; suture around the fruit; skin white, with a broad, bright blush; flesh white, fine, juicy, of a rich, vinous flavor; stone small, free. September 1 to 15. (Cole.)

Morris White (Morris White Rareripe, White Rareripe, Lady Ann Steward). Rather large, roundish or roundish oval, often obscurely obovate or a little larger towards the apex, suture small: surface rather downy, of a pale, creamy white at maturity, rarely tinged with purple to the sun; flesh slightly firm, wholly white, very free from the drab stone, melting, juicy, with a good, rich flavor; hardly of the highest quality at the North, better in the Middle States; very popular everywhere. Season medium or early in autumn. (Thomas.)

Mrs. Brett. A chance seedling in the garden of Mrs. Maria Brett, Newburgh, N. Y. Tree vigorous, very productive; flower small; fruit medium, roundish; suture broad and shallow, extending a little beyond the apex, which is a small, swollen point: skin whitish, shaded with dark, rich red where fully exposed; flesh white, red at the stone, juicy, melting, sweet, and rich; freestone. (Downing.)

Mountain Rose. Said to have originated in Morris county, New Jersey. Tree vigorous, and very productive. It ripens about the same time as Large Early York, is more highly colored, but is not as rich; glands globose; flower small; fruit large, roundish, slightly compressed; suture distinct, extending a little beyond the apex; skin whitish, nearly covered with light and dark, rich red; flesh white, slightly stained at the stone, juicy, sweet, slightly vinous; very good; separates freely from the stone. (Downing.)

Old Mixon Clingstone. Large, roundish oval suture, distinct only at apex; fruit slightly larger on one side; surface yellowish white, dotted with red, or with a red cheek; flesh juicy, rich, with a high flavor; flower small. Ripens first of autumn. This is one of the finest of clingstone peaches. (Thomas.)

Old Mixon Freestone. Large, roundish, slightly oval, one side swollen: suture visible only at apex; cavity shallow; surface a pale yellowish white, marbled with red, with a deep red cheek when fully exposed; flesh deep red at stone, tender, rich, excellent. Season medium or the first of autumn. Flowers small. Succeeds well in all localities, and has few equals as a variety for the North to succeed the early peaches. (Thomas.)

Orange Free. Medium, round; yellow mottled red; flesh yellowish, juicy, very sweet; freestone. New. (Thomas.)

Picquet's Late (Pineapple Cling). Quite large, round; yellow and red; flesh yellow, melting, rich; very good. Southern. September. (See Lemon Cling.) (Thomas.)

Red Rareripe (Early Red Rareripe, Large Red). Rather large, globular, broad, and depressed; suture broad and deep, passing nearly around the fruit; skin nearly white, with red dots in the shade, and a rich, dark red cheek in the sun; flesh whitish red at the stone, juicy, rich, and high flavored. Ripens during the last two weeks of summer. Flowers small. Resembles the Royal George, but superior in quality. Both are subject to mildew of the leaves. (Thomas.)

Reeves's Favorite. Raised by Samuel Reeves, Salem, N. J. A hardy and productive kind; glands globose; flowers small; fruit large, roundish, inclining to oval, with a swollen point; skin yellow, with a fine red cheek; flesh deep yellow, red at the stone, juicy, melting, with a good, vinous flavor; freestone. Middle of September. (Downing.)

Ringgold's Mammoth Cling. A greatly improved seedling of Heath Cling; superb. (Munson & Son's Descriptive Catalogue.)

Sallie Worrell. Originated on the farm of C. W. Westbrook, Wilson, N. C., and was raised from seed by an old lady named Sallie Worrell. It is regarded in that locality as one of the largest and best peaches they cultivate, either for market or family use. Tree healthy, vigorous, and an abundant bearer; leaves serrate, without glands; flowers small; fruit large, roundish, one side a little enlarged; suture shallow, but distinct, extending a little beyond the apex, which is a small, swollen point; cavity rather narrow, deep; skin creamy white, shaded and mottled over half the surface with light red; flesh white, juicy, melting, slightly vinous, rich, and of excellent quality. The flesh is red at the stone, from which it separates readily. It ripens with Stump the World, or the last of September. (Downing.)

Salway. Originated with Thomas Rivers, Sawbridgeworth, England. Tree vigorous, very productive; ripens soon after the Smock; flowers small; glands reniform; fruit large, roundish, oblate; suture broad, deep, extending beyond the apex; skin downy, creamy yellow, with a warm, rich, clear crimson red cheek in the sun; flesh deep yellow, stained with red at the stone, which is free, juicy, melting, rich, sweet, slightly vinous; very good. (Downing.) [Often produces valuable fruit from seed.—SEC.]

Shipley's Late Red. A very large white [fleshed?] peach, of good flavor. Ripens a few days before Beers Smock. [1st of October.] A good bearer and very desirable. (Fulton.)

Silver Medal. Large; beautiful white color; freestone. October. (Lee's Summit Star Nursery Descriptive Catalogue.)

Smock Freestone. Large, oval, base rather narrow; orange red on yellow; flesh bright yellow, red at stone; moderately juicy and rich. Good drying variety. First of October. New Jersey. (Thomas.)

Sneed (Peeble's May Cling). Medium, oval, yellow white, red blush; flesh white, tender. Claimed to be very early. Seedling of Chinese Cling. (Thomas.)

Snow. Large, globular: suture distinct only at apex: skin thin, wholly white: flesh white to the stone, juicy, sweet, rich. First of autumn. Flowers small. Very variable; sometimes worthless for the table. A beautiful peach for preserving. (Thomas.)

Steady. Originated with John Steady, Bluffton, Mo. Tree healthy, vigorous, and bears abundantly: it is a very promising late variety, of good size, handsome, and of excellent quality; leaves with globose glands; flowers small: fruit medium, roundish, inclining to oblong: suture rather shallow, extending a little beyond the apex, which is a small swollen point: skin whitish or creamy white, shaded and mottled with light and dark red where fully exposed to the sun: cavity medium, rather narrow, deep: flesh white, juicy, melting, sweet, slightly vinous, with a little of the Rareripe flavor: flesh white at the stone, from which it separates freely. Season first half of October. (Downing.)

Stephens's Rareripe. A vigorous grower, comes into bearing very young, and yields immense crops. The fruit in appearance somewhat resembles an enlarged, highly colored Old Mixon Free. It begins to ripen with the last of the Late Crawfords, and continues about three weeks. Freestone; white fleshed, juicy, and high flavored.

St. John. A yellow freestone, about the size of Early Crawford, and a week or ten days earlier. A desirable peach for market. (Fulton.)

Stump the World. Large, slightly oblong; red cheek: flesh white, with an excellent flavor: free from the stone; flower small. Ripens middle of September, just after Old Mixon Free, which it resembles in size, appearance, and flavor. (Thomas.)

Summer Snow. Medium: white; flesh white to pit: sweet: cling. A good preserving peach. (Thomas.)

Susquehanna. Very large; nearly round; skin rich yellow, with a red cheek; flesh sweet, juicy, rich, vinous. First to middle of September. Pennsylvania. (Thomas.)

Thurber. A new variety, raised from the seed of the Chinese Cling by Dr. L. E. Berekmans, Rome, Ga., and named after his friend Dr. Geo. Thurber. It is a handsome and very promising variety, and, as it is said to carry well, and being of good size, it will be an acquisition for market and general use. Tree very healthy, vigorous, and symmetrical in form; flowers small; fruit large, roundish, inclining to oblong: suture slight, extending to the apex, which is slightly sunken: skin slightly downy, creamy white, shaded and mottled with pale red and carmine when fully exposed; flesh white, a little red at the stone, which is free: fine grained, very juicy, melting, slightly vinous, rich, and delicious. Ripe from the middle to end of July in Georgia. (Downing.)

Triumph. Medium to large; orange and red: flesh yellow; free. New. Early. Georgia. (Thomas.)

Troth's Early (Red). A New Jersey peach, valued as an early sort: profitable for market: glands globose, flowers small; fruit medium, roundish; skin whitish, bright red in the sun; flesh white, red at the stone, juicy, sweet; freestone. Ripens early in August. (Downing.)

Tillotson (Early). Size medium, round, slightly flattened; color light cream, heavily splashed with red; flavor a little acid, but very good when fully ripe; semi-cling: ripe June 24. Tree fairly vigorous, and quite productive; glands few and round. A good, small, early peach. (Texas Agricultural Experiment Station Peach Bulletin.)

Variogated Free (Walbert's Variogated Free?). A white peach of the very best quality. Large as Crawford's Late, and ripens with it [latter part of September], at a time when white peaches are scarce. The fruit is beautiful and of excellent flavor. A fair bearer. No one should fail to plant it. (Fulton.)

Wager. Originated with the late Benjamin Wager, West Bloomfield, N. Y., many years since, and is considered in that section valuable as a market fruit and for canning. The tree is hardy, healthy, very productive, and bears good crops in unfavorable seasons when many other kinds fail. It is claimed that it often reproduces itself from seed, or nearly so. Fruit medium, oblong oval, varying in form, one side often enlarged; suture medium, extending to the apex, which is a small point, or a little beyond; cavity medium, rather narrow; skin quite downy, of a light golden yellow when fully matured; flesh bright yellow, rather firm, moderately juicy, sweet, slightly vinous, not very melting or rich: separates readily from the stone. Season the first of September, or a little later than Crawford's Early.

Ward's Late. Large, not quite of the largest size, roundish; surface dull yellowish white, with a red cheek, nearly the color of the Old Mixon Free, but not so clear nor bright: flesh nearly white, of excellent flavor. One of the finest late peaches of the Middle States. Flowers small. (Thomas.)

Wheatland. A chance seedling on the grounds of Daniel E. Rogers, Scottsville, N. Y. The tree is said to be remarkably vigorous, healthy, and somewhat resembles Crawford's Late, but more sturdy and strong, more spreading in its growth, and with larger foliage; it bears large crops of fruit of large size, showy, and ripens nearly at the same time. It is a very promising late variety for market, being quite firm, will endure distant shipment, and is valuable for all purposes in the family. The leaves have reniform glands; flowers large; fruit large to very large, roundish; a distinct suture on one side, but not large; cavity medium; skin deep golden yellow, shaded with dark red or crimson on the sunny side; flesh yellow, rather firm, juicy, sweet, and of fine quality; the flesh is light red around the stone, which is small, and from which it separates freely. It ripens between the Early and Late Crawford. (Downing.)

Wilkins's Cling. This is identical with the Heath Cling in everything but size and color, and all that can be said in praise of the latter can be said of the Wilkins, and even emphasized a little. It is considerably larger than the Heath, and the color is clearer and more creamy, giving the peach, when ripe, a more waxy appearance. It is, no doubt, a seedling of the Heath, which it closely resembles. Originated with Colonel Wilkins, of Maryland, whose name it bears. (Fulton.)

White Imperial. The White Imperial is a fruit of most estimable quality. This fine peach originated in the garden of David Thomas, of Cayuga county, New York, long known for his skill and science as an amateur horticulturist. Leaves with globose glands; flowers small; fruit rather large, broad, depressed, hollowed at the summit, with a wide, deep cavity at the stem; the suture moderately deep, and the fruit enlarged on one of its sides; skin yellowish white, with only a slight tinge of red next the sun; flesh nearly white, very melting and juicy, of a very delicate texture, and the flavor sweet and delicious. Ripens the last of August. Freestone. (Downing.)

Wonderful. Large, globular; yellow covered with carmine: flesh yellow, red at pit, rich; freestone. Tree vigorous and productive. Late. (Thomas.)

Wyandotte Chief. A fine early peach; ripens with Alexander [last of July], and of extra good size and finest quality. (Sedgwick Nursery Company Descriptive Catalogue.)

Yellow St. John. Where it succeeds well it is exceedingly prolific. Does well in California and eastern and western Texas. Tender in bud here, like Crawford. (Munson & Son's Descriptive Catalogue.)

Favorite Varieties.

Among the Kansas correspondents of this work, the following twenty are the leading varieties: Elberta, 59; Crawford's Early, 51; Crawford's Late, 41; Crosby, 40; Alexander, 38; Stump the World, 35; Old Mixon Free, 26; Heath Cling, 26; Amsden, 23; Champion, 22; Foster, 18; Smock, 16; Heath's Early, 15; Salway, 15; Early Rivers, 12; Mountain Rose, 12; Old Mixon Cling, 9; Early York, 9; Wager and Heath Free, 8.

PEACHES FOR THE TABLE.

SOME STANDARD RECIPES.

Peach Butter. Take pound for pound of peaches and sugar; cook peaches alone until they become soft, then put in one-half the sugar, and stir for one-half an hour; then the remainder of the sugar, and stir half an hour. Season with cloves and cinnamon. "Economy" Cook Book.

Peach Butter. Take pound for pound of peaches and sugar: cook peaches until they are soft, then put in one-half of the sugar and cook slowly for half an hour, stirring often: then the rest of the sugar, and cook and stir for an hour and a half. Season with cloves and cinnamon. "Kansas Home" Cook Book.

Peaches Canned. Select some fine freestone peaches; pare, cut in two and stone them: immerse in cold water, taking care not to break the fruit; see that the peaches are not overripe: place in the kettle and scatter sugar between the layers: the sugar should be in the proportion of a full tablespoon to a quart of fruit: to prevent burning, put a little water in the kettle; heat slowly to a boil. then boil for three or four minutes. Can and seal the fruit. "Economy" Cook Book.

Peach Cobbler. Make a crust as for a shortcake. Pare very ripe peaches, and let them lie in sugar three or four hours. Split and butter the shortcake, then spread on the peaches with more sugar. To be eaten with cream. Mrs. A. Lake, in "Kansas Home" Cook Book.

Peach Mangoes. Take unpared, fine freestone peaches: with a knife extract the stone from one side: place in a jar: pour over them boiling salted water, and let remain ten or fifteen minutes: wipe very dry: fill each cavity with grated horse-radish, a small piece of ginger root, one or two cloves and mustard seeds, prepared by pouring over them boiling water. Let them stand fifteen minutes and drain. Sew up the peaches and place in jars, as closely together as possible. Make a syrup in proportion of one pint sugar to three pints vinegar, and pour boiling hot over the peaches. They will be ready for use in a week. Mrs. Herbert Whitehead, in "Sunflower" Cook Book.

Peach Marmalade. Peel ripe peaches, stone them, and cut them small. Weigh three-quarters of a pound of sugar for each pound of cut fruit, and a teacup of water for each pound of sugar; set it over the fire; when it boils skim it clear. Then put in the peaches: let them boil quite fast; mash them fine, and let them boil until the whole is a jellied mass and thick. Then put it into small jars or tumblers. When cold secure it as directed for jellies. Half a pound of sugar for a pound of fruit will make nice marmalade. "Economy" Cook Book.

Peaches a la Strawberry. Ripe peaches cut in small pieces, with soft, mild, eating apples, in the proportion of three peaches to one apple, mixed with sugar and left to stand two or three hours, make excellent mock strawberries. "Kansas Home" Cook Book.

Peach Marmalade. The fruit for this purpose, which is a very delicious one, should be finely flavored and quite ripe, though perfectly sound. Pare, stone, weigh, and boil it quickly for three-quarters of an hour, and do not fail to stir it often during the time; draw it from the fire and mix with it ten ounces of well-refined sugar, rolled or beaten to powder, for each pound of the peaches: clear it perfectly from scum, and boil it briskly for five minutes; throw in the juice of one or two good lemons: continue the boiling for three minutes only, and pour out the marmalade. Two minutes after the sugar is stirred to the fruit add the blanched kernels of part of the peaches. This jam, like most others, is improved by pressing the fruit through a sieve after it has been partially boiled. Nothing can be finer than its flavor, which would be injured by adding the sugar first, and a large proportion renders it cloyingly sweet. Nectarines and peaches mixed make an admirable preserve. Mrs. Hale's New Cook Book.

Peach Meringue. Pare and quarter (remove stones) a quart of sound, ripe peaches; place them all in a dish that it will not injure to set in the oven and yet be suitable to put on the table. Sprinkle the peaches with sugar and cover them well with the beaten whites of three eggs. Stand the dish in the oven until the eggs have become a delicate brown, then remove, and, when cool enough, place the dish on ice or in a very cool place. Take the yolks of the eggs, add to them a pint of milk, sweeten and flavor, and boil some in a custard kettle, being careful to keep the eggs from curdling. When cool, pour into a glass pitcher and serve with the meringue when ready to use. "Economy" Cook Book.

Peaches for Tea. Pare ripe peaches, cut them in quarters, sprinkle well with layers of sugar, and let them stand an hour to extract the juice; then cover with rich sweet cream, and there is nothing better. "Kansas Home" Cook Book.

Pickled Peaches. For six pounds of fruit use three of sugar, about five dozen cloves, and a pint of vinegar. In each peach stick two cloves. Have the syrup hot and cook until tender. "Economy" Cook Book.

Peaches Pickled. To seven pounds of fruit take four pounds sugar, one quart vinegar, one ounce cloves, one ounce cinnamon, one ounce allspice. Put the spice in a bag, and boil it in the syrup three mornings in succession, and pour over the fruit; the fourth morning scald the fruit with the syrup, and it is ready for use. Seal up. "Kansas Home" Cook Book.

Peach Pie. Take mellow, juicy peaches; wash, slice, and put them into a tin pie plate lined with pie-crust; sprinkle a thick layer of sugar on each layer of peaches, put in about a tablespoon of water and sprinkle a little flour over the top, cover it with a thick crust, and bake from fifty to sixty minutes. Mrs. Hale's New Cook Book.

Peach Pie. Line a pie tin with puff paste: fill with pared peaches in halves or quarters, well covered with sugar, put on upper crust, and bake: or make as above without upper crust, bake until done, remove from the oven, and cover with a meringue made of the whites of two eggs, beaten to a stiff froth with two teaspoons of powdered sugar: return to oven and brown slightly. Canned peaches may be used instead of fresh in the same way. "Economy" Cook Book.

Peach Pie. Fill a pudding dish with pared peaches, stones left in: sweeten to taste, add a very little water, and cover with a puff paste. Delicious! "Kansas Home" Cook Book.

Preserved Peaches. Peaches for preserving may be ripe but not soft; cut them in halves, take out the stones, and pare neatly. Take as many pounds of white sugar as of fruit; put to each pound of sugar a teacup of water; stir it until it is dissolved; set it over a moderate fire. When it is boiling hot put in the peaches; let them boil gently until of a pure, clear, uniform color; turn those on the bottom to the top carefully with a skimmer several times; do not hurry them. When they are done take each half up with a spoon and spread the halves on flat dishes to become cold; when all are done let the syrup boil until it is quite thick, pour it into a large pitcher, and let set to cool and settle: when the peaches are cold place them carefully into jars and pour the syrup over them, leaving any sediment which has settled at the bottom, or strain the syrup. Some of the kernels from the peach-stones may be put in with the peaches while boiling. Let them remain open over night: then cover. "Economy" Cook Book.

Peach Pudding. Scald the fruit, peel, beat, and sweeten it: beat six yolks and two whites of eggs; mix all together, with a pint of cream; put it into a dish sheeted with cream paste; as the pudding puff requires a moderate oven, puff paste would not answer. A cook ought to attend to this, as either the paste or pudding will be spoiled unless she does. Mrs. Hale's New Cook Book.

Peach Sponge. One can of peaches (drained and beaten very fine), one-half cup Cox's gelatine, one cup sugar (scant), one cup of water, four eggs (whites only) well beaten. Dissolve the gelatine in half a cup of water, soaking two hours. Boil the sugar and water to a syrup; into it pour peaches and juice that was drained off the peaches, boiling all a few minutes. Add gelatine, and boil two or three minutes. Remove from the fire and let cool; then add whites of eggs, beating all together until the mixture will separate. Pour into molds, and serve with cream. Mrs. P. E. Emery, in "Sunflower" Cook Book.

Peach Cobbler. (An old Southern way of making.) Take one quart of flour, two tablespoonfuls of suet and two of lard: melt well together; half teaspoonful of salt, two teaspoonfuls of cream tartar, one of soda: mix all well with the flour, with sweet milk or cold water, and roll medium thick. Have ready a pan or deep crock buttered. Line the sides with the thin rolled dough, leaving the bottom of the vessel uncovered. Put in a thick layer of sliced peaches, over which sprinkle two tablespoonfuls of sugar. Over this put a layer of dough rolled very thin and cut in strips of an inch in width—in the form of dumplings, often used with stewed chicken: then a layer again of sliced peaches, and so on, until the vessel is nearly full. Over all sprinkle a cup of sugar (brown is preferable); add a lump of butter size of walnut and a half cup of hot water. Roll a top crust a little larger than the vessel, cut it in the center, put it on, folding the side edging over it, and crimping down tightly. Bake in a hot oven for half an hour and serve hot with a sauce of drawn butter and sugar worked to the consistency of paste. Canned fruit of any kind, particularly berries, may be served in this way.

Peach Marmalade. Peel ripe peaches, stone, and cut them small. Allow one-half pound sugar to one pound fruit: set sugar and water on fire: let boil: skim till clear; then put in the peaches: cook and mash until it is a jellied mass, quite thick. Put up and seal.

Cream Peach Pie. Line a pie pan with rich paste; pare and halve enough peaches to fill the pan: mix two tablespoonfuls of flour with one cup of sugar and sprinkle over the peaches; fill the pan with thick, sweet cream, and bake.

Peach Butter. Use a twenty-gallon kettle. Boil twenty gallons of apple cider down to ten gallons, skimming well while boiling. Dip out while hot into stone or wooden vessels; it must not cool in the kettle. Take five bushels of peaches, as ripe as can be handled; wash, but do not pare them; cut away the sun-cooked or black side; boil to a slush, stirring from first to last, using the boiled cider to keep it thin. The cider must be added hot, and the mass kept constantly boiling, and continued for five hours after the last of the cooked peaches and boiled cider are added. Five bushels of peaches cooked should use the ten gallons of boiled cider. A few minutes before removing from the fire add eight pounds of granulated sugar, four tablespoonfuls of ground cinnamon, two tablespoonfuls each of essence of lemon and essence of cinnamon. We find ready sale for this at one dollar a gallon, and it will keep for a year. The above quantity will stir off from thirteen to sixteen gallons of peach butter. A. R. Baxley, Humboldt.

A SHORT SUMMARY OF THE KANSAS PEACH.

BY THE SECRETARY.

The peach being a native of a milder climate than ours, we should employ every agency possible to protect it from the rigors of our winter weather.

No fruit we grow is more delicious, nor commands better returns.

Our energies should be applied to finding out how to grow it successfully and surely every year.

No fruit is more profitable when well grown.

Peach orchards should not be cropped after the third year, and if on sandy or light loam it is best not to plant anything under them at any time.

Stir the soil frequently from April to August.

Never seed down a peach orchard, and never plant it to grain of any kind—unless it be corn for first two or three years, on strong land.

Carelessness and neglect will constantly deteriorate and detract from the usefulness and value of a peach orchard, and bring only a crop of disgust and aggravation.

Barn-yard manure must be used very sparingly, as it tends too much to succulent woody growth and much leafage; ashes and bones will produce the best results in fruit.

In pruning, I should say no peach tree in Kansas ought to grow over twelve feet high; head back one-third of each year's growth, and when they get too large cut back to limb stubs and form a new top.

Peaches growing twelve feet from the earth can scarcely be gathered with profit, and if they fall, either by carelessness or accident, they are ruined, and thus the utility of the tree and its growth are neutralized.

Use the package demanded by your market, but be sure to pack closely, so that they may not roll about and chafe or bruise.

Advertise your business, your county and your state by a nice label on every package.

Haul to market or the shipping place in a spring vehicle piloted by a careful driver.

Finally, my brethren, I wish to add one thing of paramount importance: if you buy your peach trees, buy from your HOME NURSERY— from men who have a reputation to sustain, and who consider you as a fellow citizen and neighbor, and will treat you right. The "stranger's" greatest talent is his "gab," and his printed and painted material. And while in some cases these may be all right, yet in many cases when the trees come into bearing they produce more disappointment, chagrin, exasperation and condemnation than fruit; and many a Christian has felt the murderous instinct well up within him at the full exposure of the damnable trick perpetrated on him two, three or five years previous by some irresponsible agent of a foreign, and generally also irresponsible, nursery. This watchword will lead toward success:

"KANSAS TREES FOR KANSAS PLANTERS."

INDEX TO THE PEACH.

NOTE.—In tabulating this index I desire to call special attention to and study of the two frontispieces, the title-page, and the finis (page 154). Hoping that all between will be found suggestive, instructive, interesting, and profitable, I respectfully offer this little book for your consideration and commendation.—SECRETARY.

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W. Y. MORGAN,
STATE PRINTER,
TOPEKA.

THE PLUM

IN KANSAS,

WITH A CHAPTER ON THE PRUNE.

HOW TO GROW THEM.

EVERY LANDOWNER SHOULD GROW SOME.

WHY NOT?

THEY ARE EASILY GROWN.

THEY ARE PROFITABLE.

THEY ARE GOOD TO EAT.

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COMPILED AND REVISED FOR THE
KANSAS STATE HORTICULTURAL SOCIETY,

By WILLIAM H. BARNES, SECRETARY,
State Capitol, Topeka, Kan.

ISSUED BY THE STATE,

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THE PLUM.

INTRODUCTORY.

IT should rank fourth on our fruit-tree list. The improvements in this fruit during the last quarter of a century have been as wonderful and progressive as in any horticultural line. The introduction of the Japan plum marked a new era, and the crossing of it upon our natives has resulted in giving us some fine fruits as large as peaches, free from "pucker" or astringency, and of fine grain and flavor—elegant dessert fruits. California has made a great name and market for her plums—mainly hybrid Japan—and while our winters may occasionally play havoc with the plum tree, yet our state can grow as fine plums as any in the union.

Plum trees must be well cultivated and, if necessary, sprayed liberally. Their greatest enemy is the curculio; the jarring process, if persisted in, will conquer the "little Turk." Small plum orchards planted where poultry have a run are quite sure to produce abundant crops. Our horticulturists mostly plant the Wild Goose; this, to do well, should have a potent consort or fertilizer, like Robinson, Pottawatomie, or others. Our sixty or seventy correspondents differ in a few minor points. One declares that our native plums always grow in thickets; therefore he planted his plum orchard that way; another planted three trees in each hole; some plant only ten feet apart; others eighteen to twenty feet. We have inserted many articles showing profit in plums. We have also added quite a number of articles showing up one or more varieties in a special light, proving their particular value in favored localities. As we have inserted matter from many states in the far East, the South, the far West, and the North, our horticulturists should study all the special conditions of climate and location, and not plant blindly, thinking success lies entirely with the variety. Climate, soil, location, cultivation, thinning, each has a bearing as well as has variety.

This work is not issued as an infallible guide, or "how to get rich growing plums in Kansas," but to start a line of thought among a thinking people; although an occasional chance here and there may be unsuccessful, yet to our state as a whole it may and surely will be a grand success. Our state pays for this work in the hope that it may result in giving an impetus to the plum industry.

SECRETARY.

WHAT IS A PLUM?

DEFINITION IN THE STANDARD DICTIONARY: The edible drupaceous fruit of the *Prunus domestica*, and of several other species of *Prunus*; also, the tree itself, usually called plum tree. The Bullace, the Damson, and the numerous varieties of plum of our gardens, although growing into thornless trees, are believed to be varieties of the blackthorn, produced by long cultivation. Two or three hundred varieties of plums derived from the *P. domestica* are described; among them the Green Gage, the Orleans, the Damson, the Purple Gage or Reine Claude Violette and the German Prune are some of the best known.

Among true plums are the Beach plum (*P. maritima*) and its crimson or purple globular drupes. Bullace plum. Chickasaw plum, the American *P. chicasa* and its round-headed drupes. Orleans plum, a dark-reddish plum of medium size, much grown in England for sale in the markets. The wild plum of America (*P. americana*), with red or yellow fruit—the original of the Iowa plum—and several other varieties.

Among plants called plum, but of other genera than *Prunus*, are the Australian plum (*Cargillia arborea* and *C. australis*), of the same family with the persimmon. Blood plum, the West African *Hemastaphes barteri*. Cocoa plum, the Spanish nectarine. Date plum. Gingerbread plum, the West African *Parinarium macrophyllum*. Gopher plum, the Ogeechee lime. Gray plum. Guinea plum. Indian plum, several species of *Flacourtia*.

DEFINITION IN THE CENTURY ENCYCLOPÆDIC DICTIONARY: (1) A fruit of any of the trees called plums; specifically, the fruit of the tree of the genus *Prunus*, distinguished from the peach and apricot by its smooth surface, smaller size, and unwrinkled stone, and from the cherry by the bloom on its surface and commonly larger size. Plums are of use chiefly as a domestic fruit (the Green Gage being esteemed the best of all varieties), and as a dried fruit in the form of prunes. Locally a liquor is manufactured from them, and sometimes an oil is expressed from the kernels.

(2) One of several small fruits of the genus *Prunus*, forming the section *Prunus* proper. The numerous varieties of the common garden plum are often classed as *P. domestica*; but all these, together with the Bullace plum, known as *P. insititia*, are believed to be derived ultimately from *P. spinosa* (*P. communis*), the blackthorn or sloe of Europe and temperate Asia, in its truly wild state a much-

branched shrub, the branches often ending in a stout thorn. Plum wood is useful in cabinet-work and turnery. The plum is chiefly cultivated in France (in the valley of Loire), in Germany, and in Bosnia, Servia, and Croatia. In America the plum suffers greatly from the ravages of the curculio. The Japanese plum (*P. japonica*), though not insect proof, is a valued acquisition in California and the southern United States.

Cherry plum: A cherry-like form of the common plum, the variety *P. myrobalana*. Also called Myrobalan plum.

Wild plum: Any undomesticated plum. Specially (a) the *P. spinosa*. (b) In eastern North America, the wild yellow or red plum, or Canada plum, *P. americana*; it has a well-colored fruit, with a pleasant pulp, but tough acerb skin; is common along streams, and sometimes planted. (c) In western North America, *P. subcordata*, whose red fruit, which is large and edible, is often gathered. (d) In South America, *Pappea capensis*. (e) In New South Wales, a tree, *Sideroxylon australis*, with drupaceous fruit, some very tall, having a hard, pretty marked wood, available for cabinet purposes.

PLUMS IN GENERAL.

From Thomas's "American Fruit Culturist."

In no branch of pomology has greater progress been made the past twenty years than in the improvement and development of our native plums and in the introduction of foreign varieties. The bringing in of the Japanese plums marks an era in fruit culture in the United States.

PROPAGATION: *Seedlings*.—As with most fruits, plums rarely come true from seed, although some varieties vary but little from the parent stock. The stones should be selected from the choicest kinds, and treated in planting precisely as directed for the peach, but greater care must be exercised to prevent their drying, which occurs much in consequence of their smaller size and thinner skin. It is better to crack them, without which many will not vegetate the first year.—*Stocks*.—The stocks heretofore used for growing plums have generally been seedlings of the domestic type (especially the Myrobalan, or Cherry plum), which, when the varieties of the European plums do well, are usually satisfactory, although upon light or unfavorable soils they are apt to produce feeble and slow growing seedlings. For the Southern states the Chickasaw stock is preferable, and in the Northern states and throughout the country generally seedlings of the best of the *americana* group, in consequence of their greater hardiness, are

most desirable of all. Peach stocks, used in the past to some extent, are now seldom propagated upon. All trees grown on Chickasaw stock are inclined to sucker. Plums of the *domestica* group grafted upon native stocks are said to grow so poorly as to overtop the stock, and become liable to injury from strong winds.

GRAFTING AND BUDDING: Crown grafting is recommended by most of the experiment stations. The scions should be cut in the fall, three or four buds to each. Put in the scions early in the spring, before there are any signs of the buds starting. Budding must be done while the stocks are at the period of their most vigorous growth, provided sufficiently matured buds can be found, which is usually soon after midsummer. If deferred, the bark will not peel freely and the buds will not adhere.

CULTIVATION: The best soil, usually, is a strong, rich, clayey loam. On many light soils the tree grows with less vigor, independently of which the crop is more frequently destroyed by the curculio, a pervasive soil affording a more ready place of shelter for the young insects on their escape from the fallen fruit. A few varieties are well adapted to rather dry as well as light lands. Applications of potash and ground bone, as usual with other fruits, is of advantage in increasing the fruitfulness of the plum. In planting orchards a suitable distance is one rod apart, giving 160 trees to the acre. The ground should be manured and kept well cultivated, as the plum, especially when young, is sensitive to the effects of the weeds and grass of neglected culture.

IMPOTENCY: It is well known that some of the native varieties are so deficient in fertile pollen that they are almost incapable of fertilizing themselves. It is therefore advised that trees of the *domestica* class be planted with them, mixing them in the rows or groups.

CLASSIFICATION: With but comparatively few exceptions the varieties of plums grown in gardens and for commercial purposes may be included in five groups. As this work aims to be of a practical rather than scientific character, these only will be considered. They are:

1. The *americana* group (*P. americana*). Comprises a class of hardy, vigorous young trees, the wild forms of which are found growing throughout the Northern states. The fruits differ widely in all their characteristics.

2. The Wild Goose group (*P. hortulana*). This class has heretofore been included in the *americana*, but it has recently been separated by Professor Bailey into an independent group, and includes the Miner type.

3. The Chickasaw group (*P. angustifolia*). It is found growing wild in the Southern states.

4. The European group (*P. domestica*). Most of the finest plums which have been cultivated in the United States until quite recently belong to this class. They are all of European or Asiatic origin. Except in certain localities, they are invaluable. The Myrobalan and Marianna plums, which belong to this group, are largely used for stocks.

5. The Japanese plums (*P. triflora*). These fruits were imported into the United States about twenty-five years ago, and have grown steadily in popularity. They are generally of large size, brilliantly colored, and excellent in quality. Many seedlings and hybrids from this stock are being introduced. They are not all equally adapted for all sections of the country. Some are not hardy North, some bloom too early, and others do not do so well in the Southern states as farther north.

THE PLUM (*Prunus domestica*).

Rosaceæ, of botanists. *Prunier*, of the French; *Pflaumenbaum*, German; *Prugno*, Italian; *Ciuelo*, Spanish.

The original parent of most of the cultivated plums of our gardens is a native of Asia and the southern parts of Europe, but it has become naturalized in this country, and in many parts of it is produced in greatest abundance.* That the soil and climate of the Middle states are admirably suited to this fruit is sufficiently proved by the almost spontaneous production of such varieties as the Washington, Jefferson, Lawrence's Favorite, etc.; sorts which equal or surpass in beauty or flavor the most celebrated plums of France or England.

USES: The finer kinds of plums are beautiful dessert fruits, of rich and luscious flavor. They are not, perhaps, so entirely wholesome as

* There are three species of wild plum indigenous to this country of tolerable flavor, but seldom cultivated in our gardens. They are the following:

1. The Chickasaw plum (*P. chिकासа* Michaux). Fruit about three-fourths of an inch in diameter, round, and red or yellowish red, of a pleasant, subacid flavor, ripens pretty early. Skin thin. The branches are thorny, the head rather bushy, with narrow lanceolate, serrulate leaves, looking at a little distance somewhat like those of a peach tree. It usually grows about twelve or fourteen feet high: but on the prairies of Arkansas it is only three or four feet high, and in this form it is also common in Texas. The Dwarf Texas plum, described by Kenrick, is only this species. It is quite ornamental.

2. Wild red or yellow plum (*P. americana* Marshall). Fruit roundish oval, skin thick, reddish orange, with a juicy, yellow, subacid pulp. The leaves are ovate, coarsely serrate, and the old branches rough and somewhat thorny. Grows in hedges and by the banks of streams from Canada to the Gulf of Mexico. Tree from ten to fifteen feet high. Fruit ripens in July and August.

3. The Beach plum or Sand plum (*P. maritima* Wang). A low shrub, with stout straggling branches, found mostly on the sandy seacoast, from Massachusetts to Virginia, and seldom ripening well elsewhere. Fruit roundish, scarcely an inch in diameter, red or purple, covered with a bloom. Pleasant, but somewhat astringent. Leaves oval, finely serrate.

the peach and the pear, as, from their somewhat cloying and flatulent nature, unless when very perfectly ripe, they are more likely to disagree with weak stomachs. For the kitchen, the plum is also very highly esteemed, being prized for tarts, pies, canning, sweetmeats, etc. In the south of France an excellent spirit is made from this fruit fermented with honey. In the western part of New York, where they are very abundant, they are halved, stoned and dried in the sun or ovens in large quantities, and are then excellent for winter use. For eating, the plum should be allowed to hang on the tree till perfectly ripe, and the fruit will always be finer in proportion as the tree has a more sunny exposure. The size and quality of the fruit is always greatly improved by thinning the fruit when it is half grown. Indeed, to prevent rotting, and to have this fruit in its highest perfection, no two plums should be allowed to touch each other while growing, and those who thus thin them are amply repaid by the superior quality of the fruit.

One of the most important forms of the plum in common is that of prunes, as they are exported from France to every part of the world. We quote the following interesting account of the best mode of preparing prunes from the Arboretum Britannicum :

The best prunes are made near Tours, of the St. Catherine plum and the Prune d'Agen; and the best French plums (so called in England) are made in Provence, of the Perdrigon Blanc, the Brignole, and the Prune d'Ast; the Provence plums being the most fleshy and having always most bloom. Both kinds are, however, made of these and other kinds of plums in various parts of France. The plums are gathered when just ripe enough to fall from the trees on their being slightly shaken. They are then laid separately on forms or sieves made of wickerwork or lath, and exposed for several days to the sun, till they become as soft as ripe medlars. When this is the case they are put into a spent oven, shut quite close, and left there for twenty-four hours; they are then taken out and, the oven being slightly reheated, they are again put in when it is rather warmer than it was before. The next day they are taken out and turned by slightly shaking the sieves. The oven is again heated, and they are put in a third time when the oven is one-fourth degree hotter than it was the second time. After remaining twenty-four hours they are taken out and left to get quite cold. They are then rounded, an operation which is performed by turning the stone in the plum without breaking the skin and pressing the two ends together between the thumb and finger. They are again put upon the sieves, which are placed in an oven from which the bread has just been drawn. The doors of the oven are closed, and crevices are stopped around it with clay or dry grass. An

hour afterward the plums are taken out and the oven is again shut with a cup of water in it for about two hours. When the water is so warm as just to be able to bear the finger in it, the prunes are again placed in the oven and left there for twenty-four hours, when the operation is finished, and they are put loosely into small, long and rather deep boxes for sale. The common sorts are gathered by shaking the trees; but the finer kinds, for making French prunes, must be gathered in the morning, before the rising of the sun, by taking hold of the stalk between the finger and thumb, without touching the fruit, which is laid gently on a bed of vine leaves in a basket. When the baskets are filled without the plums touching each other, they are removed to the fruit room, where they are left for two or three days exposed to the sun and air, after which the same process is employed as for the others, and in that way the delicate bloom is retained on the fruit even when quite dry.

PROPAGATION AND CULTURE: The plum is usually propagated in this country by sowing the seeds of any free-growing variety (avoiding the Damsons, which are not readily worked), and budding them, when two years old, with finer sorts. The stones should be planted as soon as gathered, in broad drills (as in planting peas), but about an inch and a half deeper. In good soil the seedlings will reach eighteen inches or two feet in height the next season, and in the autumn or the ensuing spring they may be taken from the seed-bed, their tap-roots reduced, and all that are of suitable size planted at once in the nursery-rows, the smaller ones being thickly bedded until after another season's growth. The stocks planted out in the nursery will ordinarily be ready for working the ensuing midsummer, and, as the plum is quite difficult to bud in this dry climate if the exact season is not chosen, the budder must watch the condition of the trees and insert his buds as early as they are sufficiently firm, say, in this neighborhood, about the 10th of July. Insert the buds, if possible, on the north side of the stock, that being more protected from sun, and tie the bandage rather more tightly than for other trees. The English propagate very largely, by layers, three varieties of the common plum—the Muscle, the Brussels, and the Pear plum, which are almost exclusively employed for stocks with them. But we have not found these stocks superior to the seedlings raised from our common plums (the Blue Gage, Horse plum, etc.) so abundant in all our gardens. For dwarfing, the seedlings of the Mirabelle are chiefly employed. Open-standard culture is the universal mode in America, as the plum is one of the hardiest of fruit-trees. It requires little or no pruning beyond that of thinning out a crowded head or taking away decayed or broken branches, and this should be done before

midsummer, to prevent the flow of gum. Old trees that have become barren may be renovated by heading them in pretty severely, covering the wounds with a solution of gum shellac, and giving them a good top-dressing at the roots.

SOIL: The plum will grow vigorously in almost every part of this country, but it only bears its finest and most abundant crops in heavy loams or in soils in which there is a considerable mixture of clay. In sandy soil the tree blossoms and sets plentiful crops, but they are rarely perfected, falling a prey to the curculio, an insect that harbors in the soil and seems to find it difficult to penetrate or live in one of a heavy texture, while a warm, light, sandy soil is exceedingly favorable to its propagation. It is also undoubtedly true that a heavy soil is naturally the most favorable one. The surprising facility with which superior new varieties are raised merely by ordinary reproduction from seed in certain parts of the valley of the Hudson, as at Hudson or near Albany, where the soil is quite clayey, and also the delicious flavor and great productiveness and health of the plum tree there, almost without any care, while in adjacent districts on rich sandy land it is a very uncertain bearer, are very convincing proofs of the great importance of clayey soil for this fruit.* When the whole soil of a place is light and sandy, we would recommend the employment of pure yellow loam or yellow clay in place of manure when preparing the border or spaces for planting the plum. Very heavy clay, burned slowly by mixing in large heaps with brush or fagots, is, at once, an admirable manure and alterative for such soils. Swamp muck is also one of the best substances, and especially that from salt-water marshes. Common salt we have found one of the best fertilizers for the plum tree. It generally promotes its health and luxuriance.

INSECTS AND DISEASES: There are but two drawbacks to the cultivation of the plum in the United States, but they are in some districts so great as almost to destroy the value of this tree. These are the curculio and the knots. The curculio, or plum-weevil (*Rhynchænus nenuphar*), is the uncompromising foe of all smooth-stone fruits. The cultivator of the plum, the nectarine, and the apricot, in many parts of the country, after a flattering profusion of snowy blossoms and an abundant promise in the thickly set young crops of fruit, has the frequent mortification of seeing nearly all, or indeed, often, the whole crop, fall from the trees when half or two-thirds grown. If he examines these fallen fruits he will perceive on the surface of each, not far from the stalk, a small semicircular scar. This scar is the

* When this was written it was generally supposed that the curculio would not attack the fruit of plums growing on trees in clayey soil, but practical experience has shown that such is not the fact.—REVISER.

crescent-shaped insignia of that "little Turk," the curculio, an insect so small as, perhaps, to have escaped his observation for years, unless particularly drawn to it, but which, nevertheless, appropriates to himself the whole product of a tree, or an orchard of a thousand trees. The habits of this curculio, or plum-weevil, are not yet fully and entirely ascertained. But careful observation has resulted in establishing the following points in its history :

The plum-weevil is a small, dark-brown beetle, with spots of white, yellow, and black. Its length is scarcely one-fifth of an inch. On its back are two black humps, and it is furnished with a pretty long, curved throat and snout, which, when it is at rest, is bent between the fore legs. It is also provided with two wings, with which it flies through the air. How far this insect flies is yet a disputed point, some cultivators affirming that it scarcely goes farther than a single tree, and other believe that it flies over a whole neighborhood. Our own observation inclines us to the belief that this insect emigrates just in proportion as it finds in more or less abundance the tender fruit for depositing its eggs. Very rarely do we see more than one puncture in a plum, and, if the insects are abundant, the trees of a single spot will not afford a sufficient number for the purpose; then there is little doubt (as we have seen them flying through the air) that the insect flies farther in search of a larger supply. But usually, we think, it remains nearly in the same neighborhood, or migrates but slowly. About a week or two after the blossoms have fallen from the trees, if we examine the fruit of the plum in a district where this insect abounds, we shall find the small, newly formed fruit beginning to be punctured by the proboscis of the plum-weevil. The insect is so small and shy that, unless we watch closely, it is very likely to escape our notice. But if we strike or shake the tree suddenly, it will fall in considerably numbers on the ground, drawn up as if dead, and resembling a small raisin, or, perhaps more nearly, a ripe hempseed.

From the 1st of April until August this insect may be found, though we think its depredations on fruit, and indeed its appearance in any quantity, are confined to the months of May and June in this climate. In places where it is very abundant, it also attacks, to some extent, the cherry, the peach, and even the apple and pear. Early in July the punctured plums begin to fall rapidly from the tree. The egg deposited in each, at first invisible, has become a white grub or larva, which slowly eats its way toward the stone or pit. As soon as it reaches this point the fruit falls to the ground. Here, if left undisturbed, the grub soon finds its way into the soil. There, according to most cultivators of fruits, and to our own observation, the grubs or

larva remain till the ensuing spring, when in their perfect form they again emerge as beetles and renew their ravages on the fruit. It is true that Harris and some other naturalists have proved that the insect does sometimes undergo its final transformation and emerge from the ground in twenty days, but we are inclined to the opinion that this only takes place with a small portion of the brood which, perhaps, have penetrated but a very short distance below the surface of the soil. These, making their appearance in midsummer and finding no young fruit, deposit their eggs in the young branches of trees, etc. But it is undeniable that the season of the plum-weevil is early spring, and that most of the larvæ which produce the annual swarm remain in the soil during the whole period intervening since the fall of the previous year's fruit. Plum trees growing in hard-trodden court-yards usually bear plentiful crops.

The modes of destroying the plum-weevil are the following:

1. *Shaking the tree and killing the beetles.* Watch the young fruit, and you will perceive when the insect makes its appearance by its punctures upon them. Spread some sheets under the trees and strike the trunk pretty sharply several times with a wooden mallet. The insects will quickly fall, and should be killed immediately. This should be repeated daily for weeks, or so long as the insects continue to make their appearance. Repeated trials have proved beyond question that this rather tedious mode is a very effectual one if persisted in.*

Coops of chickens placed about under the trees at this season will assist in destroying the insects.

Dr. E. S. Hull, of Alton, Ill., has invented a machine for catching the curculio on a large scale for orchard culture, but not having seen it, we copy an extract from the *Hearth and Home*:

"This is nothing but a gigantic white umbrella turned bottom upward, mounted upon an immense wheelbarrow, and split in front to receive the trunk of the tree which is to be operated upon. At the interior end of the split in front is a padded bumper, which strikes against the trunk as the operator wheels the barrow, first against one

* Merely shaking the trees is not sufficient. The following memorandum, as additional proof, we quote from the *Genesee Farmer*: "Under a tree in a remote part of the fruit garden, having spread the sheets, I made the following experiment: On shaking the tree well I caught five curculios, on jarring it well with the hand I caught twelve more, and on striking the tree with a stone eight more dropped on the sheet. I was now convinced that I had been in error, and calling in assistance and using a hammer to jar the tree violently, we caught in less than an hour more than 260 of these insects." We will add to this, that to prevent injury to the tree a large wooden mallet should be substituted for a hammer, and it is better if a thick layer of cloth is bound over its head. A sharp, stunning blow is found necessary to readily dislodge the insect, and as such, when given directly upon the bark of the tree, often causes a bruise, it is found to be a good practice to saw off a small limb and strike the blow upon the stump.

tree and then against another, and with two or three sudden jars fetches all the insects off the boughs into the white umbrella, which gapes widely open to receive them. Really, it is a most magnificent institution, but for its practical success three things are necessary: (1) That the land should be decently clean, and not overgrown with rank weeds four or five feet high. (2) That the orchard be a sufficiently large one to pay the interest on the prime cost of the machine. (3) That the tree have a clean trunk of some three or four feet."

2. *Gathering the fruit and destroying the larvæ.* As the insect, in its larva or grub form, is yet within the plums when they fall prematurely from the tree, it is a very obvious mode of exterminating the next year's brood to gather these fallen fruits daily and feed them to swine, boil or otherwise destroy them. A simple and easy way of covering the difficulty, when there is a plum orchard or enclosure, is that of turning in swine and fowls during the whole season when the stung plums are dropping to the ground. The fruit, and the insects contained in it, will thus be devoured together. This is an excellent expedient for the farmer who bestows his time grudgingly on the cares of the garden.

THE KNOTS, OR BLACK GUM.

In some parts of the country this is a most troublesome disease, and it has, in neighborhoods where it has been suffered to take its course, even destroyed the whole race of plum trees. The knots is a disease attacking the bark and wood. The former at first becomes swollen, afterward bursts, and finally assumes the appearance of large, irregular, black lumps, with a hard, cracked, uneven surface, quite dry within. The passage of the sap upwards becomes stopped by the compression of the branch by the tumor, and finally the poison seems to disseminate itself by the downward flow of the sap through the whole trunk, breaking out in various parts of it. The sorts of plum most attacked by this disease are those with purple fruit, and we have never known the green- or yellow-fruited varieties infected until the other sorts had first become filled with the knots. The common Horse plum and Damson appear to be the first to fall a prey to it, and it is more difficult to eradicate it from them than from most other sorts. The common Morello cherry is also very often injured by the same disease, and in some districts the sweet cherry also. There is yet some doubt respecting the precise cause of these knotty excrescences, though there is every reason to think it is the work of an insect. Professor Peck and Doctor Harris believe that they are caused by the same curculio or plum-weevil that stings the fruit; the second brood of which, finding no fruit ready, choose the branches of this tree and the cherry. This observation would seem to be confirmed by the fact that the grubs or larvæ of the plum-weevil are frequently

found in these warts, and that the beetles have been seen stinging the branches. On the other hand, the following facts are worthy of attention: First, in some parts of the country where the curculio has been troublesome for many years the knots have never been known; second, in many cases the knots have been abundant on plum trees when the fruit was entirely fair and uninjured by the curculio, even upon the same branches.

These facts seem so irreconcilable with the opinion that the curculio produces both these effects, that we rather incline at present to the belief that, though the curculio deposits its eggs in the tumors on the branches while they are yet soft and tender, yet it is not to the curculio, but to some other insect or cause, that we owe this unsightly disease. Practically, however, this is of little account. The experience of many persons besides ourselves has proved most satisfactorily that it is easy to extirpate this malady, if it is taken in season and unremittingly pursued. As early as possible in the spring the whole of the infected trees should be examined, and every branch and twig that shows a tumor should be cut off and immediately burned. Whatever may be the insect, we thus destroy it, and, as experience has taught us that the malady spreads rapidly, we will thus effectually prevent its increase. If the trees are considerably attacked by it, it will probably be necessary to go over them again about the middle of May, but, usually, once a year will be sufficient. If any of the trees are very much covered with these knots, it is better to head back the shoots severely, or dig them up and burn them outright, and it will be necessary to prevail upon your neighbors, if there are near ones, to enter into the plan, or your own labors will be of little value. Pursue this simple and straightforward practice for two or three seasons (covering any large wounds made with a solution of gum shellac), and the knots will be found to disappear, the curculio to the contrary notwithstanding.

BOTANY OF THE PLUMS AND CHERRIES.

By CHARLES E. BESSEY, PH. D. (Nebraska Horticultural Report.)

Plums and cherries belong to the botanical genus *Prunus*, which in turn is a member of the family known to botanists under the name *Rosaceæ*. The genus contains, all told, nearly 100 species, widely distributed in temperate and tropical countries north of the equator. Few, if any, species occur in a wild state south of the equator, and none whatever occur in southern South America, tropical and southern Africa, and Australia and the Pacific islands. The genus may be briefly characterized as follows:

C. AMERICANA PLUMS (*Pseudoprunus*). Flowers single or umbellate, white or pale rose color; leaves in the bud folded lengthwise along the midrib.*

CANADA PLUM (*P. nigra* Aiton). A small tree, with broadly oblong-ovate to obovate leaves, the leafstalks bearing two glands; calyx lobes glandular-serrate; fruit oblong-oval, one to one and a quarter inches long, with a tough, thick, orange-red skin and yellow flesh; stone compressed. Original distribution: In Canada, from Newfoundland to the Assiniboin river, and probably in the northern portion of the United States. Since this species has been confused with the next one it is difficult to say what cultivated varieties have sprung from it. Professor Sargent says, in the *Silva of North America*: "Some attention has been paid in Canada to selecting the best wild varieties for cultivation. Varieties of this species are propagated and sold by nurserymen in some of the Western states, and to it can be referred the well-known Purple Yosemite, Quaker and Weaver plums."

COMMON WILD PLUM (*P. americana* Marsh.) A small tree, with oval or slightly obovate leaves, the leafstalks without glands; calyx lobes entire; fruit globose, one inch or less in diameter, with a tough, thick, red skin and yellow flesh; stone turgid. Original distribution: New York, New Jersey, and Florida, to Montana, Colorado, and New Mexico. In Nebraska it is found in a wild condition in every part of the state. This has been very prolific in cultivated varieties. Professor Sargent refers the following varieties to this species: De Soto, Itaska, Forest Garden, Louisa, Minnetonka, Cheney, Deep Creek, Kickapoo, Forest Rose, and Miner; but Professor Bailey refers the last named to *P. hortulana*.

WILD GOOSE PLUM (*P. hortulana* Bailey). A small tree, with ovate-lanceolate leaves, the leafstalk bearing glands; calyx lobes glandular-serrate; fruit globose, two-thirds of an inch in diameter, with a thick, red or yellow skin and hard, thin flesh; stone turgid. Original distribution: In the Mississippi valley, from central Illinois southward. The cultivated varieties referred to this species by Professor Bailey are Wild Goose, Golden Beauty, Missouri Apricot, Moreman, Reed, Roulette, Wayland, and Miner.

*All the American species of plums here indicated are more nearly related to the cherries (section B, *Cerasus*) than to the true plums (section E, *Prunophora*) of the old world; and they might quite properly bear the general name of "Cherry plums." Doctor Koehne, indeed, in his "*Deutsche Dendrologie*," goes so far as to include them all in the cherry section of the genus *Prunus*. I prefer, however, to follow Doctor Dippel (*Handbuch der Laubholzkunde*, pp. 622-629) in assigning them to a separate but closely allied section (*Pseudoprunus*), which translated means literally the "false plums."

CHISKASAW PLUM (*P. angustifolia* Marsh.) A small tree, with lanceolate to oblong-lanceolate leaves, the leafstalk bearing two glands; calyx lobes glandular-ciliate; fruit globose, half an inch in diameter, with a thin, red skin and a juicy, yellow flesh; stone turgid. Original distribution: Apparently a native of the western or southwestern portion of the Southern states, but it is not certainly known in a wild state. The cultivated varieties of this species are given by Professor Bailey as Newman, Arkansas, Lombard, Caddo Chief, Lone Star, Jennie Lucas, Pottawatomie, and Robinson.

BEACH PLUM (*P. maritima* Wang.) A low shrub, with ovate or oval leaves; fruit globular, one-half to one inch in diameter, with a thick, tough, purple or crimson skin; stone turgid. Original distribution: On the sands of the seacoast, from New Brunswick to Virginia. This species has given rise, under cultivation, to a variety known as Bassett's American.

SAND PLUM. (*P. watsoni* Sarg.) A shrub six to ten feet high; leaves ovate, acute, rounded or wedge-shaped at the base, finely crenulate-serrate, lustrous on the upper surface, pale on the lower; flowers pure white, in few-flowered clusters; fruit globose, or rarely oblong, orange-red, two-thirds of an inch in diameter, containing a yellow, juicy flesh (edible, but slightly austere), and a turgid, smooth, but porulose stone. Original distribution: Southern Nebraska to central Kansas.

Professor Sargent, whose description I have given slightly modified, says that "Its hardiness in regions of extreme cold, its compact, dwarf habit, abundant flowers and handsome fruit make it an ornamental fruit of first-rate value, and, as selection and good cultivation will doubtless improve the size and quality of the fruits, it will, perhaps, become a valuable inmate of small-fruit gardens."* This is the plant of which I wrote as follows in 1891:† "Occasionally I hear of a 'Sand plum,' said to grow in the southwestern and western parts of the state. No authentic specimens have been seen, although I have in my collection some twigs and leaves from plants cultivated under this name, and thought, by the growers, to have been taken up from wild patches in the state. Although lacking in flowers or fruits, these cultivated Sand plums appear to be *P. chicasa*, the Chickasaw plum. The leaves of these specimens are much smaller than those of the ordinary wild plums; they are also smoother and firmer, and the margins have smaller serrations." I was mistaken in supposing this to be the same as the Chickasaw plum, but, as Profes-

* "Garden and Forest," April 4, 1894.

† Preliminary Report on the Native Trees of Nebraska. Bull. Agr. Exp. Station, No. 18.

sor Bailey has pointed out, it is unquestionably closely related to that species. The Sand plum is of interest to us not only on account of its being a native of the plains, but also as having produced the "Utah Hybrid cherry" by hybridizing with the Nebraska Sand cherry.

SIMON'S PEACH (*P. simonii* Carr). A small tree, with dark green, oblong-elliptical, short-petioled, finely or irregularly serrated leaves, which are three to four or five inches long and three-fourths to one and a half inches wide; flowers small, rose-red; fruit globose, flattened on the ends, one and a quarter inches long by one and a half inches broad, dark red, with a hard, yellow flesh; stone furrowed and pitted, flattened, sharp-edged. Original distribution: China. This new fruit has attracted much attention under the name given above, as well as "Simon's plum" and "Apricot plum," but although a pretty fruit, with remarkable keeping qualities; it is said to lack one very essential quality, viz., palatability. Professor Bailey says: "The flavor in all the specimens I have tasted is very disagreeable, being mawkish, bitter, and leaving a pronounced bitter-almond taste in the mouth. I have never tried a specimen which I could say was edible, and this is an unwilling confession, because the fruit is exceedingly attractive to look upon." However, upon the Pacific coast it is considerably grown, and market quotations given by Professor Bailey indicate that it brings high prices.

MYROBALAN PLUM. (*P. myrobalana* Lois).—A shrub or small tree, bearing thin, elliptical or ovate-elliptical leaves, which are smooth and green above, light green below, and hairy on the ribs, finely and irregularly serrate, and one and a half to two inches long and about half as wide; flowers single or in twos, stalked, small, and white; fruit globose, about an inch in diameter, yellowish-red, its flesh somewhat soft, sweetish, enclosing a smooth, flat and sharp-pointed stone. Original distribution: Asia Minor, Transcaucasia, Turkestan, and southwestern Liberia. This species is used mainly as a stock upon which to bud other kinds of plums. Several varieties known as "Cherry plum" have been produced by long cultivation, but they do not appear to possess much merit. Recent studies of the plum have led Professor Bailey to conclusions that the De Caradeuc is of this species, and that the Marianna is of this species or a hybrid between it and some American plum, possibly the Wild Goose.

COMMON PLUM (*P. domestica* Lois). A moderate-sized tree, with thin, smooth, elliptical, or oblong-elliptical leaves, which are one and a half to three inches long and half as wide; flowers one to several in a cluster, greenish-white, appearing with the leaves; fruit blue-black, globose, elongated, an inch or more in diameter, with soft, yellowish,

sweet flesh, containing a flattened, sharp-edged stone. Original distribution: Not certainly known, but probably in Asia Minor. Among the many varieties of this species now grown in the eastern United States the following are given by Professor Bailey: Lombard, Bavay, Green Gage, Bradshaw or Niagara, Coe's Golden Drop or Silver Prune, French and Shropshire Damsons, German Prune, Fellenberg, Gueii, Moore's Arctic, Green Gage, Prune d'Agen, Hungarian Prune, Copper, Jefferson, Imperial Gage, Quackenbos, Yellow Egg, Washington, and French Prune.

JAPANESE PLUM (*P. triflora* Roxb.) A small tree, with smooth, oval or ovate leaves, one and a half to three inches long, and half as wide; flowers usually in threes, on short stalks; fruit globose, purple, with reddish-yellow flesh. Original distribution: Northern China. Of this species, which has but recently been introduced from Japan, Professor Bailey gives the following varieties: Kelsey, Burbank, Abundance, Satsuma, Chabot, Maru, Ogon, Red Nagate. Some of these may prove hardy in Kansas.

AMERICAN PLUMS FOR AMERICA.

Read before the American Pomological Society, in September, 1899, by E. S. GOFF, professor, University of Wisconsin, Madison, Wis.

It would be folly to claim, for the sake of argument, that the introduced plums have proven a failure in the United States. Our fruit markets during the plum season would belie such a proposition. The European plum, with proper culture, succeeds over a very considerable part of our country, and its choicer varieties are among the most delicious of fruits. The more recently introduced Japanese plums have doubtless gained ground faster in our culture and in our markets than any other exotic fruit that has been brought to our country. The remarkable vigor and prolificacy of this species will insure its permanence on our soil, and while the average quality of its fruit is very low, the excellence of a few of its varieties leaves no reason to doubt that it will yet furnish plums as delicious as the choicest European sorts. But both the European and Japanese plums have inherent defects that must forever prevent either of them from becoming the national plum of North America. The flower-buds of neither are reliable to endure the winters of the Mississippi valley much north of Mason and Dixon's line. The European plum is so susceptible to the curculio that its fruit can be secured only at the price of interminable warfare against this insect. The Japanese plums bloom so early in spring that they are comparatively unsafe, even in many localities where their flower-buds have passed the winter.

The European plum has been introduced nearly 300 years, yet it has not become a companion of the apple tree, the cherry tree, the raspberry and the currant in every thrifty farmer's or laborer's yard anywhere in our land, unless it be on the Pacific slope, for the reason that it cannot be depended upon to bear fruit without special treatment. The Japanese plums may become more of a family fruit than the European sorts have become, but their uncertainty of fruitage renders this improbable. We have, however, native species of the plum that, when grown in their proper areas, are capable of supplying plum trees for every farmer's and laborer's garden in our land that shall be as reliable for fruiting as the apple, with little, if any, more special knowledge or care than the apple requires; of which the fruit is excellent for all culinary purposes, and of which the choicest varieties are scarcely surpassed in delicacy and richness by any fruit of our country, and for which the market demand is rapidly increasing. The *americana* plum is hardy, both in tree and flower-bud, throughout the United States and far northward into Canada. The past winter its flower-buds endured fifty-two degrees below zero in Manitoba, where the Oldenburg (Duchess) apple, in the same locality, had its last year's growth frozen back three-fourths. Other species of the native plums succeed in the far South and Southwest.

It may be safely said that no other tree fruit of equal value has so wide a climatic range in North America as the native plums, and throughout the northern Mississippi valley no other tree fruit can be depended upon to yield more dollars per acre in ten-year periods than these native plums. The native plums, especially of the *americana* species, are exceedingly variable. At the risk of incurring the ridicule of this the most dignified association of fruit-growers in America, if not in the world, I make the unqualified statement that the richest and most delicious quality that I have ever tasted in plums has been found in native specimens. It is true that the average *americana* plum has a thick and often acerb skin, which is objectionable, but there are exceptions to this rule. A few of the choicer varieties, when fully ripe, have a skin nearly or quite as thin as that of the average European or Japanese plum.

In the *americana* plum we sometimes find varieties that are perfect freestones. It should be remembered that, while the European and Japanese plums have been in culture for many centuries, the most highly improved of our native plums are but two or three generations from the wild-plum thicket. When we consider this fact, their present value as a family and commercial fruit certainly offers remarkable promise. There is no reason to doubt that during the coming century the native plums will yield varieties that shall be

equal in all respects to the choicest plums of foreign species, with the advantage that they will be more hardy and more uniformly productive.

I would not prejudice any against the European or Japanese plums. Let all grow them who can. But I would remove the prejudice that exists in the minds of some, that the best natives are unworthy of culture where the foreign plums can be grown. The large market demand for the best native plums that have grown up in the West fully disproves such a proposition. Let us treat our native plums for what they unquestionably are—a most promising fruit, that is destined to play a most important part in American pomology; let us seek to improve them by every means known to horticulture, and their future will certainly take care of itself.

THE NATIVE SAND PLUM.

From Press Bulletin No. 6, Kansas Experiment Station, 1898.

Among the native fruits of Kansas there is none more interesting or valuable than the Sand plum (*P. watsoni*). Distributed abundantly over the western half of the state, it borders the streams and covers the adjacent sand-hills, sometimes extending into the clay uplands, but always at a loss of vigor in growth and quality of fruit.

In its natural habit it attains a height of from two to eight feet, having usually a tree-like form, though often branching and bearing fruit from ground to top. Branches horizontal, with a tendency to zigzag and tangled growth, and often terminating in sharp, spiny points. Twigs slender, of cherry-red color, and abundantly supplied with lenticels. Leaves thick, glabrous, very finely serrate, serrations sometimes so pointed as to be spiny. In shape leaves are usually acutely lanceolate, in length varying from one-half to two and one-half inches, and in habit conduplicate or trough-like when exposed to brilliant sunlight, but almost flat in dim light. Blossoms small, occurring in dense clusters in early spring. Fruit oblong to round, yellowish pink to dark red, one-half to one and one-fourth inches in diameter, ripening from July 1 to September 15. Stem one-fourth to three-fourths inch long, slender. Pit small, roundish to long, slender and pointed. The plant propagates most rapidly by sprouts from the roots. If a specimen is dug from a thicket, it will generally be observed to have but a single large root, eight or ten inches below the surface, which extends to it and passes on, supporting perhaps half a dozen other bushes.

The Sand plum has varied into many types. But it has not pro-

duced, as we might suppose, different types for different localities; it has crowded them close together, often in the same or adjacent thickets. Near the Arkansas river were found as many as six perfectly distinct types on a ten-acre lot. Profusion of varieties is to be noted in every favored location. It has been thought that the roots of this hardy plum might make valuable stock for the grafting of domesticated varieties, but experiments at the station tend to prove the reverse. Numerous varieties were grafted, using *P. watsoni* as the stock. Failure in almost every instance was the result. The tender, succulent roots do not unite readily with a foreign scion. Even if a union were secured, the propensity of the stock to sprout would at once exert itself, resulting soon in a dense thicket. The propagation of the species is easily accomplished by means of root cuttings or seeds, preferably the latter.

The following forms are the most valuable we have been able to find:

1. A common type growing in almost pure sand, four to ten feet above the water level. Bushes in scattering thickets, two to four feet high, branching, and bearing fruit from the ground up. Leaves small, one to two inches long; never open to a plain surface, thick, shining, finely serrate. Fruit three-fourths to one and one-eighth inches in diameter; globose. Color bright red, clouded over lemon-yellow ground. Flesh yellowish, tender, juicy, sweet, somewhat fibrous, and adhering firmly to the stone. Ripe in southern Kansas the first week in July.

2. A small group of bushes growing in a very large thicket on the Arkansas river. Bushes extremely dwarfish but tree-like, three to four feet high. Branches unusually stout, growing laterally more than upright. Leaves larger than on common types, dark, shining green. Fruit large, one inch to one and one-fourth inches in diameter, rounded or flattened. Color dull red, but somewhat hidden by the heavy bloom. Flavor excellent. Ripe in latter part of July. A variety surpassing many cultivated sorts.

3. A small clump of bushes found near the variety last described. Bushes small, two to three feet high. Foliage scant, leaves small. Fruit fine in appearance, one inch to one and one-fourth inches in diameter, roundish, bluish-pink color with delicate bloom. Skin thin. Flesh juicy, melting, rich. Flavor sweet and good. The most delicious Sand plum that has yet come under our observation and worthy of place in any orchard.

The hardiness of the Sand plum in its native state, its productiveness and the excellent quality of its fruit are among its most promising characteristics. By cultivation and proper breeding, the size,

keeping and shipping qualities of this plum will, it is thought, be strengthened. The experiment station has now in operation extensive experiments along these lines. During the past season a large collection of data and of pits for planting has been made from the Sand-plum districts of the state.

NOTES ON SEVERAL VARIETIES.

The American Pomological Society, which is now half a century old, may safely be counted the best authority in this country on fruits and fruit-raising, and we append here a list of plums recommended by it, in its report for 1899, for the district comprising that part of Kansas below 2000 feet elevation :

Prunus americana: As reliable—De Soto, Forest Garden, Hawk-eye, Ocheeda, Quaker, Rockford, and Rolling Stone. Extra, or double starred—Weaver, Wolf, and Wyant. Promising—Gaylord, New Ulm, Piper, and Stoddard.

P. angustifolia: Yellow Transparent. Double starred—Caddo Chief and Pottawatomie. Promising—Newman.

P. cerasifera: Marianna and its hybrids.

P. domestica: Albert (yellow), Bavay (Bavay Green Gage, Reine Claude de Bavay), Hudson River, Purple Egg, Huling's Superb, Imperial Gage, Italian Prune (Fellenberg), Smith Orleans, Wangenheim, Washington, and Yellow Egg. Double starred—Damson, Lombard, and Shropshire Damson.

P. hortulana: Miner group (double starred)—Miner. Wayland group—Cumberland and Golden Beauty. Wild Goose group—Downing (Charles) and Wild Goose, (both double starred).

P. triflora (Japan): Ogon, Red June, Red Negate, Satsuma, and Willard. Double starred—Abundance and Burbank.

At the twenty-sixth biennial meeting of the American Pomological Society, at Philadelphia, in September, 1899, a Wilder silver medal was given to C. L. Watrous, of Des Moines, Iowa, for a collective exhibit of the following new plums: Brittlewood, Bursota, New Ulm, and Silver.

THE RED-LEAVED PLUM.

Our first plant of this was set upwards of twenty years ago, as we now remember; at any rate it was just after its announcement in this country. The stock and scion were not congenial. The top grew luxuriantly enough, however for ten years or so, but the stock ceased to grow, so that the plant was strangled, so to say. Two years ago last fall we planted another Pissard plum. The tree is at present but eight feet high, yet it has borne freely. The plums are a full inch in diameter, either way, being round, and of a reddish-purple color. The

quality is inferior, and the fruit would be of value only for preserves. The plums ripen very early, before those of any other variety that we have ever tried—this year July 12. As a small, purple-leaved tree, Pissard's plum has no equal. The leaves, when they first unfold, are of a brilliant purple. This grows darker during the summer and remains so until the leaves fall.—*E. S. C., in Rural New Yorker.*

WILL PLUMS PAY?

Plums are growing in demand every year at the same ratio as any other fruit. More plums are used now than ever before. True, they don't bring the higher price they did twenty years ago, but relatively bring as much as other fruits and turn off as much money as other fruits. And now the season has been lengthened, both in early and late varieties.

Heretofore the Wild Goose has been the first to ripen; now the Milton leads it by two weeks. This is followed by the Red June, then Willard, Wild Goose, Charles Downing, Abundance, Burbank, Pottawatomie, the most prolific of all plums. This takes us through the midseason of plums. Of the late kinds are Forest Garden, Golden Beauty, De Soto, Wolf, Wickson, Arkansas Lombard, Hawkeye, Stoddard, and common Damson. The varieties suffering the most the past winter were Red June and Willard, both Japan sorts. The hardiest were Wild Goose, Miner, Pottawatomie, and Stoddard; also, Hawkeye and De Soto went through the winter unurt. The latest-blooming varieties are Hawkeye, De Soto, Stoddard, and Wolf.

To classify them, Red June, Willard, Abundance, Burbank, Hale and Wickson are of Japan origin; Wild Goose, Milton, Charles Downing, Pottawatomie and Arkansas Lombard are of the Chickasaw or red varieties; De Soto, Wolf, Forest Garden, Hawkeye, Stoddard and Wyant are of the American class. These are mostly natives of Iowa and other Northern states; hence their hardiness.—*G. F. E., in Western Fruit Grower.*

THE SATSUMA PLUM.

A correspondent of the *Rural New Yorker* says: "The criticisms that have been made by many, in relation to the Satsuma plum not fruiting freely, have seemed to apply to young trees, for we are all learning that as the trees of this variety grow older they are inclined to become very productive, in some cases so much so as to surpass nearly all others. It is a wonderful plum in its keeping and shipping qualities, and nothing can compare with it for canning purposes. I predict that within a few years Satsuma will take a much higher place in the opinion of orchardists than at the present time."

CHARACTERISTIC POINTS OF THE ABUNDANCE.

"Out of the great company of plums the public has sorted the two Japs, Abundance and Burbank," as some one neatly puts it. There may be nothing specially new to tell about these, yet there are two interesting items which a *Country Gentleman* correspondent says he has never seen in print concerning the Abundance plum, and these he gives as follows:

The first is that the crop does not all mature at once. In fact, in looking over the tree while the fruit is yet green, it will be found that the plums vary greatly in size. This seems to be a difference in age, because it is maintained to the full period of maturity. Hence, the crop of a single tree never ripens all at once, or anything like it. While some of the specimens are fully ripe, others will be hard, green, and not even grown out. While this may be an objection to it as a market variety, because of the increased labor of gathering, it certainly is a most valuable feature in the family orchard or garden, where the entire crop is not wanted at once.

Another point which, if it has been noted, has escaped my attention is, that in order to secure the best flavor and the highest coloring in the Abundance plum it must be picked early and ripened in the house, like a Bartlett pear. If allowed to become soft and fully colored on the tree half the flavor is gone, and the bees and wasps will often be found garnering the little which remains. It may be gathered while yet green, and, if placed in a dark drawer, it will color up beautifully, with a delicate bloom, and reward you with a flavor of surprising excellence. It is very juicy, sweet, and rich, and can be compared with nothing so well as the old genuine Green Gage, which I have always regarded as the standard in flavor and quality. While the flesh does not part so readily from the stone, which is very small, it does not cling to it as tenaciously as others of this species. Like the Green Gage, it is breaking and buttery in the mouth. And I have often seen specimens of that grand old variety, ripened in the full sun, that were colored much like the Abundance. In the Abundance, I think, we have its full cousin, at least as to flavor, while the brilliant coloring is more attractive, and its general vigor and productiveness make it more desirable. The little knight of the crescent calls around on time, of course, and leaves his well-known autograph. But that is the last of it for this thick-skinned Japanese member of the *Prunus* family. The plums grow right along and ripen up sound and perfect, without either eggs or larvæ of any foe. Why not plant the Abundance plum?

Replying to some questions of a correspondent, the *Rural New Yorker* says: "The Abundance trees are those that have an upright habit, and Burbank those that grow straggling and spreading in habit. The idea in pruning the Abundance trees should be to head them back from making tall, slim trees, and yet not have them too compact. To prevent the latter, some of the interior branches will probably need to be cut away. The heading in at the top should be done every year or two. The Burbank trees should be pruned so as to induce an upright growth, which may be done by cutting back the straggling and drooping branches."

The *Country Gentleman* has this to say: "One of our correspondents who is so greatly in love with the Abundance plum says some true, as well as good things, about it. It is well to remember, however, that there are many other favorites in the list of plums. Burbank succeeds beyond measure with some growers. A few think there's nothing like Satsuma. Still others say the old Lombard is most profitable of all. Some have made most money out of Wild Goose. And so it goes. The fact is there exists an endless diversity in the adaptation of special plums to particular localities; and these adaptations must be studied by the plum grower. No general recommendation of any one variety for all soils and all climates is safe. There are lots of good varieties, but the best of them fail in some localities. There is no variety which seems to succeed over a wide range of territory, like the Ben Davis apple or the Concord grape."

A Windham county, Vermont, fruit-grower relates his experience with the Japan varieties: "A Burbank plum tree was set out three years ago last spring. When planted it was what is known in the nursery as a small tree, one year old. I prefer these small trees to the larger ones, for I get better roots thereon; and while the tree is only a straight stalk I can, by cutting it back, get the low head which I so much desire. This particular tree measures eight and one-half feet in height, and the branches spread sixteen feet, while the trunk is only one foot from the ground to the first limbs. The past season in thinning the fruit I cut off seven-eighths of all the plums on the tree, and then picked about two and one-half bushels of the choicest fruit, that averaged six inches in circumference.

Some of the specimens measured six and three-fourths inches. The fruit was very evenly distributed over the tree. My method of trimming plum trees is to cut back at least two-thirds of each season's growth, and in the spring of 1897 I cut off from this tree many sprouts that measured six feet in length, leaving a stub three feet long. I believe that this tree, when the fruit was fully ripe, was the finest sight I ever saw in the fruit line."

PLUMS THAT SUCCEEDED.

People are becoming more interested in plums since the Japanese varieties were introduced. The introduction of this type has also increased the interest in varieties belonging to other classes. People are eagerly seeking information regarding varieties, and the experience of William Jenkins, of Knoxville, Tenn., as given below, will doubtless be of interest to those contemplating setting plums.

Of the Japanese plums, Abundance, Burbank and Wickson have given the best results. Abundance is the best known of this class. It is very productive, and the fruit should be thinned to secure large specimens. Burbank is also well known. It is considered by Prof. L. H. Bailey as the best Japanese plum yet tested in New York. The fruit of Wickson is very large, deep maroon-red, firm, and of good quality. Besides the Japanese varieties, Mr. Jenkins regards the following successful: Bradshaw, the fruit of which is large, dark purple, juicy, good, slightly acid; tree vigorous and productive. Lombard, medium size, violet red, flesh deep yellow, pleasant, fine quality; tree very prolific. Saratoga, oval, brownish red, flesh pale yellow; a late variety. Spaulding, medium size, yellow, green marbled, flesh pale yellow, very sweet. Peter's Yellow Gage, large, rich yellow, crimson dots next the sun, flesh greenish yellow, rich, sweet, very good. Archduke, large, black, prolific, late. Grand Duke, very large, good quality, productive, color of Bradshaw.—*Southern Florist and Gardener*.

FOUR VERY CHOICE VARIETIES.

Luther Burbank, of California, who began his work by originating the Burbank potato while living in his native state of Massachusetts, has made a lasting mark in American horticulture as the originator of new fruits and flowers. Professor Van Deman has recently given an interesting sketch in the *Rural New Yorker* of Mr. Burbank and some of his remarkable achievements, from which the following in regard to late work with plums is reproduced:

ROYAL is the result of a cross made by using pollen of Simon upon one of the Botans. It is about the largest plum I have ever seen, except Kelsey. The shape is oval and quite regular. In color it is a deep, reddish purple, very rich looking and attractive. The flesh is yellow and firm until fully ripe, when it becomes melting and juicy. It is almost a freestone. The flavor is a pleasant sub-acid, with a peculiar aroma that is deliciously refreshing. The quality is much better than that of any early plum I know, and is good compared with any kind. It ripens before Willard or Red June.

BARTLETT, another variety, is a cross of Simon upon Delaware. Its size is medium to large and the shape peculiar, being decidedly heart-shaped, with a distinct suture on one side. The color is a dull purplish red. The flesh is yellowish and soft when fully ripe. The stone is large and long. Its flavor is very peculiar, being like that of the Bartlett pear; hence the name. The quality is very good to best, which, with its earliness, productiveness, and vigor of tree, ought to place it well up in the scale.

CHALCO is a seedling of Burbank pollenized by Simon, and resembles the Simon in shape, which is flat, but is larger and very much better in quality. I would call it very good, and quite free from the peculiar bitterish flavor of the

Simon plum. The main objection that will be raised to it is the resemblance to the shape of that variety, which has become unpopular in market because of its flavor. The color is rich yellowish red. The texture of the flesh is about all one could desire. The stone is small in proportion to the flesh.

GARNET is my choice of all the new plums which I have tested. It is a cross between Wickson and Satsuma. It is large, being over two inches in diameter, and nearly round in shape. The surface is smooth, dark wine—red or garnet—being very handsome. The flesh is garnet color, too, and rich looking. This color suggested the name Garnet. In flavor it is excellent, being tart enough, yet not sour, but a delicious subacid. No plum that I have eaten is better, and when cooked it could scarcely be equaled. It has all the high flavor of Satsuma when cooked, which has heretofore been far above all other plums when in that condition. The season of Garnet is at least a month earlier, as it is fully ripe by August 1. The tree is very fruitful. I look for this plum to take a high place in public favor.

ANOTHER NEW ONE BY MR. BURBANK.

Among Mr. Burbank's latest creations in plums the Climax bids fair to take a high rank. The fruit is described as strongly heart-shaped, very large—as large as an ordinary peach—cavity deep and abrupt, stem short and strong, suture plainly marked, but not deep, apex rounded; color deep dark red, many yellow dots, large and small; skin thick, firm; flesh yellow, firm; stone large, somewhat turgid, roughened, free; flavor sweet, rich, fruity; quality fine; season earliest. Professor Waugh, of Vermont, says this is justly regarded by Mr. Burbank as one of his most valuable productions, and if upon extended test it proves hardy, fruitful, and otherwise reliable, it will be an advance in many respects upon any plum now known.

THE BRADSHAW PLUM.

A very large and fine early plum, dark violet red, juicy and good; valuable for market. The tree is erect, hardy, vigorous, and very productive. As regards productiveness, it is unequaled by any plum we have ever fruited. To produce the finest fruit, heavy thinning should be practiced. The quality is excellent, and it is destined to become one of the most popular of all plums for canning, while its attractive color, good quality and shipping qualities will cause it to be sought for as a market variety. It ripens ten days to two weeks later than Abundance. This plum resembles Niagara in size, color, and general good qualities. It is a grand variety and no collection is complete without it. It is becoming better known each year, and is a great favorite for home use on account of its fine quality and for market, for the reason that it is possessed of great beauty and large size and is enormously productive.

ANOTHER MAN'S IDEA ABOUT GOOD PLUMS.

The Reine Claude is generally counted as a short-lived tree. Its tendency is towards heavy bearing, and, unless the fruit is thinned, the tree soon exhausts itself. With proper thinning and good culture, care, and feeding, the Reine Claude may be made to live and produce profitably for a generation. The great plum grower of western New York, S. D. Willard, had, a few years ago, some Reine Claude trees which had been set twenty-two years and borne seventeen full crops. They had failed only one year after coming into bearing. When I saw them they gave indication of still being profitable for several years.

Among Japans, the Yellow Japan is superior in flavor, beauty, and quality. It is a late sort.

The Bradshaw is a very profitable sort. It is large, productive, and of good

color, and the tree is a vigorous, thrifty grower. The quality is not of the best, but it is a profitable market variety. Like all European sorts, it is liable to black knot badly.

The Japanese plums, as a class, have proved their ability to resist the black knot. While here and there a few knots have been found, they are scarce and not serious enough to make any count of. Still, they disprove the claim that the Japs are black knot proof. However free they may be from this trouble, they have a decided susceptibility to the rot. They also set fruit so thickly that it touches all along the limbs. But careful thinning and spraying with Bordeaux mixture will check the rot. Another bad fault is the early blooming of many varieties. A late frost will often catch them and destroy the entire crop.—*Green's Fruit Grower*.

JAPAN PLUMS IN COLORADO.

A correspondent of *Green's Fruit Grower* says: "I have many varieties of Japan plums growing and have found several that are of no use here, owing to lack of hardiness, both of tree and bud. Red June is all right and should be extensively planted; also Willard and Ogon. These are perfectly hardy and will please all who give them a trial. Burbank is also quite promising. Hale and Wickson no earthly use in Colorado; trees won't stand even zero weather. Satsuma badly killed this year, though they bore some fine fruit last year. I shall plant largely of Red June and Ogon." Commenting on the above, the editor says: "This report of Japan plums in Colorado will be interesting to people living in the far West, where the winters are far more severe and the changes of temperature more sudden than in the Eastern and Middle States. At Rochester, N. Y., and wherever the thermometer does not go below ten or twelve degrees below zero, we have found all of the Japan plums named by Mr. Jewett perfectly hardy. We consider the Japan plums as a class, and such varieties in particular as Hale, Wickson, Burbank, Abundance, and Red June, very valuable varieties, and worthy of extensive trial."

THE HALE JAPAN PLUM.

This is another one of the creations of Mr. Burbank, the California originator, who has made his name famous as an originator of superior fruits. This variety was purchased by Mr. Hale, a successful fruit-grower, known as the "Georgia peach king." Mr. Hale has great confidence in this variety of plum. He says the quality is superb. It ripens September 15; is of large size and possessed of great beauty. Mr. Hale has planted it largely for market and considers it a profitable market plum. Prof. L. H. Bailey has also tested this plum, and considers it of great value on account of its beauty, large size, and fine quality. He says it is delicious, slightly acid, and possessed of a peachy flavor. The color is yellowish red, very attractive. Professor Bailey thinks the quality the best of all Japan plums he has eaten. Luther Burbank places a high estimate on the Hale plum. He says no one who has ever tasted this variety when ripe will ever say any European plum is superior to the Hale.

A correspondent in Greene county, Missouri, says the Hale variety "seems to be perfectly hardy everywhere, so far as we can learn. It is a tremendous grower, and grows later in the season than most of the other Japan plums. Like the Satsuma and Wickson it blooms rather early, and therefore is likely to be caught occasionally by late spring frosts. Yet it is of such high quality that it is worth testing everywhere where any of the Japan plums can be grown."

SOMETHING ABOUT THE CHABOT.

The Chabot plum, also known as the Bailey, Chase, and Yellow Japan, is, according to Prof. L. H. Bailey, deserving of much praise. The tree is a strong,

upright grower, productive, and the fruit is handsome, very firm, and of good quality. In general appearance the fruit is much like Burbank, but it is more pointed and from one to three weeks later, and the tree, which is an upright grower, is very different. Last year it ripened at the Cornell (N. Y.) station from September 15 to 25. There seem to be two things passing as Chase, the other one being an earlier plum and perhaps identical with Douglas. Professor Bailey can detect no difference between Chabot, Bailey, Chase, and Yellow Japan, and the same also passes as Hattonkin; but Chabot, being the older name, must hold.

THE NEW OCTOBER PURPLE.

The October Purple is a splendid grower, ripens up its wood early to the tip, bears every season, and fruits all over the old wood on spurs, instead of away out on the branches, like many other kinds. Fruit very large and uniform in size. It is a superb variety. The fruit is described as measuring a trifle over seven inches in circumference, and shows long-keeping quality. The fruit is round in form: color a reddish purple—a little darker than the Bradshaw; flesh yellow, and in quality superb; stone small. The tree is a strong, erect grower, forming a nice, shapely head, something like Abundance in this respect, but more symmetrical and shapely. Its season of ripening is about a month later than Abundance or Burbank, or from the middle to last of September. Its large, even size and beautiful color, late season in ripening, long-keeping and superb quality will make it a very desirable variety for the garden or for the market.—*American Gardening*.

JAPANESE PLUMS IN NEW JERSEY.

That the advent of the Japanese plum has caused renewed interest in plum culture throughout the country there is no doubt. For many years previous, home-grown plums were a rarity. What with curculio, rot, and black knot, it was more than the average farmer cared to undertake to produce fruit. Not that these enemies need frighten the one determined to win. New York fruit-growers have been growing plums successfully for years, before and since the introduction of the Japanese sorts. But the average farmer who sets out a few trees for family use desires something that will take care of itself after being planted, which this plum will not do.

Those who were the first to set out Japanese plums soon came to believe that they had found a kind to resist the curculio, and this belief still exists. A successful orchardist in Atlantic county, New Jersey, told me that, though it appeared to him that the fruit was stung, the egg, if deposited, did not develop. Some fruit dropped, from other causes apparently, but with this there was more on the tree to ripen than good-sized fruit called for.

These Japanese sorts hereabouts have been bearing for two or three years. This year all growers report a very heavy crop. About four years ago, Edwin Lonsdale, of Chestnut Hill, set out a small orchard of Abundance and Burbank. It was my pleasure to see the trees full of ripe fruit toward the close of July, and they were a cheering sight. The trees were overloaded with fruit. Mr. Lonsdale had found, in previous seasons, a tendency to rot in the fruit when about to ripen, and had looked to this as a probable thinning. This, however, occurred to such a slight degree that it would have been better to thin them. Mr. Lonsdale thinks the rotting may have been prevented by the two sprayings which were given early in the season, which also kept off the curculio. While no doubt something is due to the spraying, there are other fruit-growers who have not sprayed who had fair crops of fruit. In conversation with a fruit-grower from near Lancaster, he informed me that orchards of Japanese plums there produced

good crops this season without being sprayed, and similar cases nearer home have come to my notice.

The Abundance and Burbank are often listed as "yellow, overspread with red," which, while strictly true, as seen here, is misleading, giving to many the idea that they are getting a yellow plum, while, in fact, the color is red. If described as red on a yellow ground, it would be better.—*J. M., in Practical Farmer.*

PLUMS HARDY IN NEW YORK.

A correspondent of the *Rural New Yorker* wanted a list of the early to medium late plums that would stand the climatic changes in Jefferson county, New York, and the editor prints the following: "A list of plums that are very hardy is easy to arrange, but most such kinds are of the native species and ripen within a rather short time, which latter is an objection. Wolf, Rockford, Stoddard, Forest Garden and Hawkeye are among the best of this class. Of the European type, Arctic, Lombard and German Prune are said to be the hardiest by those who have thoroughly tested them. It has been found that Burbank, which is one of the Japan type, is quite hardy and exceedingly productive."

THE UNCLE BEN AND DAMSON PLUMS.

The *California Fruit Grower* has (or did have) a sample of Uncle Ben plums, raised near Napa, Cal., and describes it as follows:

"The Uncle Ben was about two and one-half inches around in two directions, each at right angles to the other; in color it was a deep yellow spotted with red; the flavor was exquisite; the ripest among the samples was a golden, bloom-surfaced bag which was filled, grape-like, with a sweet, delicious juice: the stone was small and easily freed from the surrounding nectar. It should prove a valuable plum around Thanksgiving time."

The same authority, speaking of the Damson plum, says: "It is perhaps the hardiest and healthiest tree of the *P. domestica* family. It should prove a great aid when planted with self-sterile varieties that bloom with it. Used as a stock for double-working, it could scarcely be beaten. Moreover, the Damson as a source of profit is not to be despised."

A LIST OF SUCCESSFUL PLUMS.

H. E. Van Deman, in *Green's Fruit Grower*, says: "Plum growing for profit is becoming far more common than formerly in the East and South, because of the introduction of the Japanese and American types. They are but little affected by the curculio, which is the bane of the plum growers east of the Rocky mountains, where the European type is a most eminent success. The two former classes are very popular in the markets because of the bright red color of nearly all of their varieties, and their hardiness and fruitfulness make them satisfactory to the growers."

American.—Milton, Wooton, Whitaker, Rockford, Stoddard.

Japanese.—Red June, Abundance, Burbank, Wickson, Hale.

European.—Clyman, Bradshaw, German Prune, Grand Duke, Monarch.

A COMPARISON OF VARIETIES.

A "press bulletin" from the Ohio Experiment Station contains the following list of plums most desirable in the state of Ohio, and says:

"Those varieties which are denominated as American are natives of this country, and, as a rule, are hardier than either European or Japanese varieties. The American sorts are subdivided into several classes, but no classification is attempted here. Because of reliability most of them may be safely planted, but they are less salable than the European varieties; hence, as an orchard venture,

the planting of American sorts could be easily overdone. Successful orchard culture of plums must, in the future, depend very largely upon the selection of the best varieties for market. As a rule these must be those bearing the largest and most showy fruit, and must be so selected as to cover as long a period of ripening as possible. All of those named, and many more, have been grown at the Ohio Experiment Station, but the conclusions drawn are not merely from the station tests, but from observations elsewhere as well."

German Prune.—A reliable variety, especially valuable for market. Fruit medium to large; dark purple; of good quality; season medium to late. Rather a weak grower, and succeeds better if top-worked on some free-growing sort.

Pond's Seedling.—Fruit large to very large, of medium quality; bright red; tree vigorous and prolific, but fruit inclined to rot. Not regarded as a very profitable market sort and not high enough in quality for dessert. Season late.

Grand Duke.—A very fine, large late variety; dark blue in color, and very attractive in appearance. A slow grower and ought to be grafted on some other vigorous hardy variety.

Bradshaw.—Tree a fine grower and prolific, but rather long in coming into bearing. Fruit large, purple, and of good quality. The earliest of the large sorts and one of the best for all purposes.

Wolf.—One of the best American varieties, but inclined to overbear. The trees begin bearing early and need close pruning to thin the fruit.

Spaulding.—A yellowish-green plum of excellent quality. Choice for home use, but may not be sufficiently prolific for market. The claim of the introducer that it is curculio-proof is unfounded.

Coe's Golden Drop.—A large, late-ripening, yellow variety. Tree a slow grower and should be top-worked on some free-growing sort.

Tatge.—Said to be very hardy, but can hardly be distinguished from the Lombard.

Weaver.—One of the best of the midseason American sorts. Rather dull in color but excellent for culinary purposes.

American Eagle.—One of the best of the American sorts because of large size and good quality.

Imperial Gage.—A greenish-yellow plum of the best quality. Especially desirable for the home garden.

Richland.—A reliable midsummer variety, but too small for market purposes.

Missouri Green Gage.—A greenish-yellow plum similar to Green Gage, but a little larger. Of the very choicest quality. Season medium to late.

Reine Claude de Bavay.—Greenish-yellow, late in ripening; of the best quality and very prolific. One of the best, either for home use or market.

Archduke.—A large, dark purple, late-ripening sort, and very promising, but not fully tested.

Reed.—A wonderfully prolific American sort. Fruit of medium size, bright scarlet, very beautiful, and with very much of the Damson flavor when cooked. Very ornamental in foliage, flower, and fruit.

Prairie Flower.—A medium to large American sort, of good quality, with but little astringency. Does not drop as badly as some varieties of this class and appears to be very promising.

Hawkeye.—One of the largest and best of the American varieties, but with rather too much astringency next to skin and stone.

Forest Rose Improved.—A little later and larger than Forest Rose, and more attractive in color as well.

Chabot.—One of the best of the Japanese varieties. Medium to large, yellow,

nearly covered with scarlet, and of good quality. Later, hardier and less inclined to rot than Burbank.

Bailey.—Appears to be much like Chabot, but, as we have it, it seems to be much hardier.

Gold.—A prolific and early bearer; fruit a clear yellow, partly overspread with red; medium to large, but not of first-rate quality.

Lincoln.—Fruit large to very large, coppery red, and of good quality. Valuable for home use or market but slow in growth, and should be worked on some other variety.

Red June.—One of the hardiest and best of the Japanese sorts. Especially valuable because of earliness.

Abundance.—Tree upright in growth and prolific; fruit medium to large, and of excellent quality. Desirable.

Burbank.—Tree a vigorous grower, very prolific, and begins bearing when very young. Fruit medium to large, showy, and of good quality, but much inclined to rot.

Gueii.—A reliable dark purple variety. Although much inclined to rot, it should be included in the list of profitable orchard sorts.

Moore's Arctic.—Rather too small for market, but the fact that it is hardier than most other varieties of its class makes it valuable.

VALUE OF JAPAN PLUMS.—HARDINESS COMPARED WITH PEACHES.

They stand the cold.—I am growing Japan plums in orchards quite extensively in Connecticut and Georgia, and am convinced that many of the varieties have points of merit that will make them permanently valuable orchard fruits in these sections, but in the central Atlantic states, say from Philadelphia to South Carolina, they bloom so early that they are often liable to be caught by spring frosts. At the North they will stand a great deal more freezing than peaches. I think it is safe to plant them anywhere where the mercury does not go much below twenty-five degrees below zero. In my orchards in Connecticut, at this time, peach buds, even on the most hardy varieties, are all killed, and while the plum buds are somewhat hurt, there are more than enough left for abundant crops; probably very severe thinning will have to be resorted to to secure full-sized fruit.

In the South.—In Georgia, the middle of February, after weeks of warm weather, many of the plums coming out in bloom and peach trees just showing the pink, peach buds entirely killed and trees badly injured, yet enough buds were left alive on some of the varieties of Japan plums so that there will be quite a little crop of fruit. For two or three years, varieties like Red June, Abundance and Burbank have been shipped to the Northern markets from Georgia, and sold on an average twenty-five per cent. higher than peaches, with an increasing demand each year for the fruit. In New England they have been marketed for the last three years to a considerable extent, having sold fifty per cent. higher than peaches in the same markets—the demand always ahead of the supply. They have thick, tough skins, and are not seriously injured by the curculio. Trees will thrive on very light, thin soil, or on that quite heavy and moist. The quality of the fruit is good, and they can be kept in the market from one to two weeks after being picked from the tree, in fair eating condition.

The best sorts.—Red June, Abundance and Burbank are the most satisfactory of the well-tested varieties. Satsuma needs more maturity of tree before coming into full bearing; for, while the first three named will fruit freely two or three years after planting, Satsuma requires about five. Of the newer sorts Wickson is the largest and most attractive in appearance, while the Hale is best

in quality of all the Japans; but these two varieties and the Satsuma are extra early bloomers, and on this account more liable to be caught by late frosts in spring than some of the others. Of other well-tested sorts, Willard and Berckmans should be rejected as far too poor in quality to be worthy of propagation. Ogon and Normand, both yellow varieties, are vigorous and productive trees, but not very high in quality. Chabot, sometimes known as Yellow Japan, Chase, etc., is a late-ripening plum of fine appearance and good quality. The Gold is a small, weak-growing tree, with fruit somewhat like the Ogon, only not so good in quality.

Many new varieties are being tested; probably some of them will prove of greater value than those we already have, and an orchardist will not go astray in planting the best ones here mentioned. Every one who owns a family fruit garden in the central Northern states makes a big mistake if he does not have a good number of these trees on his grounds, for the best of the Japan plums can be grown almost as cheaply and abundantly as the most common apples.—*Rural New Yorker*.

SOME MISSOURI EXPERIENCES.

We extract the following discussion over plum varieties from volume 42 (1899) of the Missouri Horticultural Report:

“Mr. B. (Illinois): I lost 300 trees last winter. I want to know what to replace with.

“J. H. K.: My experience in Buchanan county [Missouri] is with the native plums. Eastern and Japan are not profitable. Wild Goose is always profitable. I have the Wolf, Miner, Marianna, Pottawatomie, Marion, and Newman. Wild Goose has paid best. Wolf is a freestone; it rots. Pottawatomie I cannot market at all; too small. Arkansas Lombard is not very good. Blue Damson is one of the best of the Europeans. Wickson stood the winter; has not fruited. My Blue Damsons are all on their own roots.

“Professor Whitten: We have about 150 varieties of American, European and Japan plums at the Missouri Experiment Station. No European is worth growing in this state. The best plums for us are the American. I would name Forest Rose, Miner, Wild Goose, Wolf, and Wyant. The latter, fruited only one year, is large and of good quality. Wayland is a good late kind, splendid keeper. Golden Beauty is yellow, small, good keeper. World Beater makes good jelly and jam. Abundance and Burbank are the best Japs. for Missouri. They rot, but not so bad as the Europeans.

“J. J. K.: I have twenty-five or thirty varieties of plums. I would name Forest Rose, Poole's Pride, Wild Goose, Pottawatomie, and Robinson, to make money. I sell Wild Goose for \$2 per bushel. The Abundance is very fine; as good as the cherries in the old country.

“Mr. B. (Illinois): I have 100 Burbank. They did not winter-kill. Abundance not so hardy. Shropshire Damson half killed. Other Europeans half killed. Wild Goose is the only native variety I grow. It gives a good crop almost every year. I have sprayed nine years for the curculio and rot; succeeded some years.”

es in bearing; the lower figures the plum trees not yet bearing.

290 ington 579	6,108 Marshall. 2,798	9,859 Nemaha. 3,723	14,656 Brown. 7,552	8,767 Donipha 5,536	
	3,502 Riley. 1,527	3,797 Pottawatomie. 2,153	5,774 Jackson. 2,911	7,026 Atchison. 2,528	
	2,510 Geary. 995	3,873 Wabaunsee. 2,247	8,456 Shawnee. 4,672	5,762 Jefferson. 3,899	12,910 Wyandotte. 10,451
	3,404 Morris. 2,369	13,734 Lyon. 3,160	7,569 Osage. 2,561	3,802 Leavenworth. 3,888	
	2,874 Chase. 1,065		9,754 Coffey. 3,827	8,057 Douglas. 2,611	6,160 Johnson. 5,239
	13,330 Butler. 2,434	10,619 Greenwood. 2,047	4,425 Woodson. 1,165	5,187 Franklin. 1,111	4,853 Miami. 3,096
		15,543 Elk. 1,391	11,541 Wilson. 1,887	5,331 Anderson. 1,920	4,928 Linn. 2,871
	20,795 Cowley. 6,301	9,268 Chautauqua. 1,975	12,605 Montgomery. 3,436	6,007 Allen. 2,175	11,395 Bourbon. 1,872
				12,171 Neosho. 3,135	9,793 Crawford. 1,850
				14,007 Labette 2,629	12,534 Cherokee. 2,555

bushes of wild or Sand plums indigenous to the soil.

PLUMS IN KANSAS.

Map of Kansas showing the number of plum trees growing in each county in 1900. The upper figures are plum trees in bearing; the lower figures the plum trees not yet bearing.

539 Cheyenne. 1,961	96 Rawlins. 389	142 Decatur. 2,229	1,097 Norton. 1,873	2,853 Phillips. 2,036	9,296 Smith. 3,163	9,451 Jewell. 5,594	5,349 Republic. 3,250	5,250 Washington. 3,579	6,108 Marshall. 2,798	9,859 Nemaha. 3,723	14,656 Brown. 7,532	8,787 Donipha. 3,639	12,910 Wyandotte.
712 Sherman. 2,934	2,187 Thomas. 832	471 Heridan. 1,919	950 Graham. 1,547	1,915 Rooks. 1,369	1,516 Osborne. 2,176	9,485 Mitchell. 3,983	3,140 Cloud. 3,364	8,830 Clay. 1,414	3,502 Riley. 1,827	9,797 Pottawatomie. 2,153	5,774 Jackson. 2,911	1,628 Atchison. 2,528	5,782 Jefferson. 3,899
476 Wallace. 883	1,117 Logan. 479	5,636 Gove. 4,000	6,422 Trego. 12,068	967 Ellis. 594	1,141 Russell. 793	2,976 Lincoln. 1,863	2,759 Ottawa. 955	6,506 Dickinson. 3,406	2,510 Geary. 696	3,873 Wabaunsee. 2,247	8,456 Shawnee. 4,672	5,057 Douglas. 2,611	6,160 Johnson. 5,239
60 Greeley. 405	395 Wichita. X	1,592 Scott. 1,210	849 Lane. 3,851	5,072 Ness. 5,924	4,090 Rush. 4,735	1,562 Barton. 3,473	2,518 Ellsworth. 2,346	4,928 Saline. 1,127	11,900 McPherson. 3,692	6,313 Marion. 4,817	3,404 Morris. 2,369	7,569 Osage. 2,561	4,853 Franklin. 1,111
901 Hamilton. 1,796	2,858 Kearny. 3,466	16,483 Finney. 7,806	2,337 Hodgeman. 2,073	9,394 Pawnee. 4,456	12,890 Stafford. 8,010	25,281 Reno. 8,665	8,628 Rice. 3,081	9,749 Harvey. 1,959	6,313 Marion. 4,817	2,874 Chase. 1,065	19,734 Lyon. 3,160	9,754 Coffey. 3,827	5,381 Anderson. 1,920
401 Stanton. 723	307 Grant. 302	2,651 Haskell. 267	790 Gray. 1,290	7,763 Ford. 3,758	2,068 Edwards. 2,346	4,450 Pratt. 1,983	8,308 Kingman. 4,396	21,197 Sedgwick. 5,014	13,330 Butler. 2,434	10,819 Greenwood. 2,017	4,425 Woodson. 1,165	6,007 Allen. 2,175	11,386 Bourbon. 1,872
422 Morton. X	232 Stevena. 50	773 Seward. 102	1,548 Meade. 1,164	419 Clark. 316	455 Comanche. 539	3,821 Barber. 1,710	4,653 Harper. 2,659	12,833 Sumner. 3,361	29,795 Cowley. 6,301	15,543 Elk. 1,391	12,605 Montgomery. 3,436	14,007 Labette. 2,629	9,783 Crawford. 1,850

Total plum trees growing in the state, 630,418 in bearing and 289,109 not yet bearing, besides innumerable trees or bushes of wild or Sand plums indigenous to the soil.

THE POLLINATION OF PLUMS.

By PROF. F. A. WAUGH, Horticulturist at Agricultural College Experiment Station,
Burlington, Vt.

I. SUMMARY.

Plums are very uncertain in setting fruit. A part of this uncertainty seems to be due to lack of proper cross-pollination. To secure cross-pollination, plums of different varieties should be closely planted, or scions of different varieties should be set into the tops of trees which do not bear satisfactory crops of fruit.

Cross-pollination in plums is provided for by several natural adaptations, especially by the defectiveness of flower parts and by the sterility of certain varieties toward their own pollen.

American varieties of cultivated plums have arisen from several distinct botanical species. These varieties retain more or less the characters of the parent species, and thus may be judged to some extent by their parentage. It is thought that the botanical relationships of varieties will prove to be the best guide to their affinities in cross-pollination.

The economic characters of these groups may be generalized as follows: European (*Prunus domestica*).—Hardy, best and most salable fruit; perfect pistils, not good pollen bearers. Myrobalan.—Used as stock, but losing in favor, being supplemented by Marianna and American varieties. Japanese.—Comparatively new; relative value uncertain; several varieties practically hardy. American group.—The Western wild plum, very hardy, fruit good but inferior to European; good stocks; very delicate sexually, usually requires cross-pollination. Eastern forms (var. *nigra*) are even more hardy than western forms, range further north; stronger pistils, weaker pollen bearers. Wild Goose group.—About as hardy as Japanese plums, thought to need cross-pollination and to be weak pollen bearers. Marianna.—Probably a hybrid; sexually weak; uncertain bearer, chiefly used as stock. Chickasaw.—Of southern origin; many prolific and desirable varieties.

Eminent horticulturists and botanists agree in the general desirability of cross-pollination in plums.

Although we have gained some knowledge as to the pollination of plums, there are yet many questions of practical importance and theoretical interest open to investigation. It is hoped that this bulletin will call attention to some of these unanswered questions and direct the reader to further observation and reflection.

II. COMMON ORCHARD OBSERVATIONS.

Among the multitudinous uncertainties of fruit-growing, the production of a crop of plums presents the greatest combination of obscure and unmanageable factors. Even if a heavy crop of fruit is set, the curculio, the gouger, and the brown rot—all peculiarly hard of suppression—remain between it and the market. But there are many uncertainties in the setting of the crop. At times plum trees are so greatly overloaded with fruit that the branches may be broken to the ground. Other varieties, or the same varieties in different localities, or the same trees in different years, may show hardly any fruit. Moreover this condition of varying fruitfulness is largely independent of the crop of blossoms which the trees may produce. Plums are notably prolific bloomers; yet many trees are loaded with blossoms year after year without the smallest result in fruit. A crop of plum blossoms is no satisfactory indication of a crop of plums.

These are matters of common remark. Observant orchardists have long ago learned to shun unproductive varieties and to destroy the more nearly sterile trees. More recently it has become customary to refer cases of total or partial sterility to lack of cross-pollination, and, proceeding on this theory, mixed planting and the intergrafting of different varieties have been frequently advised and practiced. Cases which lend support to this theory will occur to every horticulturist. Mr. L. M. Macomber, of North Ferrisburgh, Vt., has a tree of naturalized plum from Minnesota (the typical *P. americana*), which blossomed heavily each spring but did not bear a fruit for several years. Later a tree of Lawrence variety standing near it began to blossom. The first year after the blossoming of the Lawrence, and each succeeding year, the Minnesota plum bore heavy loads of fruit. Similar cases could be cited indefinitely.

III. CROSS-POLLINATION AND FRUITFULNESS.

The influence which cross-pollination is assumed to have in the increased number of plums set in certain cases is analogous to that which has been shown to exist with many other plants. Cross-pollination (or cross-fertilization) is associated in the popular mind with the production of wonderful new varieties of fruits, flowers, and vegetables—with hybrids and colored plates and fruit-tree agents. But in the light of more thoughtful study it seems doubtful whether this is the chief role which nature intended for cross-pollination, or whether, indeed, it is a natural role at all. It seems rather that cross-pollination has its best usefulness in its immediate effects in provoking certain flowers to bear fruit which otherwise would have been abortive, or in stimulating certain fruits to a more perfect development than they would attain through self-fecundation. Waite has

recently shown the importance of cross-pollination with certain varieties of pears; and the same author says: "Apples are more inclined to be sterile to their own pollen than pears. With the former, in the great majority of cases, no fruit resulted from self-pollination." Beach has shown that several varieties of grapes are more or less self-sterile, and Green has added some useful notes in the same line. Bailey asserts that our native plums "do not fertilize themselves"; and the experiments of Heideman with varieties of *P. americana* indicate not only frequent self-sterility but also a remarkably capricious selective affinity among certain varieties. It is in the A-B-C of strawberry culture that certain varieties normally bear pistillate blossoms which require pollination from other varieties, and that certain other sorts are particularly useful for the quantity and prepotency of their pollen. It seems possible, or even probable, that when we have gone a little deeper into the question of the pollination of apples, pears, and plums, we will designate their sexual capabilities and affinities as positively as we do now those of the strawberry. It is evident that when our knowledge of these fruits gains that degree of exactness we will have made a great advance in pomology. In the meantime we may regard it as the soundest practice to plant plum trees thickly together and to see that the varieties are well mixed.

IV. CROSS-POLLINATION IN PLUMS.

Cross-pollination is advantageous to many varieties of plums and necessary to at least a few. This preference for foreign pollen is not confined to the blossoms of cultivated varieties, but shows itself quite unmistakably in many wild plums. The aboriginal forms of *P. americana* seem to be especially delicate in their capabilities of fecundation. To meet this need plums do not naturally depend alone on the chance transfer of pollen by insects or wind, but cross-pollination is provided for and self-pollination is provided against by various interesting modifications of the typical flower.

The form of the flower may be changed. There are possible six distinct variations. In two of these the pollen and stigma mature at different times; in two forms the pistils are either much shorter or much longer than the stamens; and in two the flowers are sexually imperfect, one or the other of the essential organs being defective.

Any one of these arrangements in a blossom usually renders it incapable of self-fecundation. It is probable that each of these six forms occasionally appears in plum blossoms, particularly in varieties of the *americana* group, but aside from the one bearing imperfect pistils, I am inclined to believe that these diversities have little immediate significance. They may be of some slight interest to theoretical biology in throwing some light on questions of evolution, but

they are so infrequent as to have no perceptible influence on the fruit crops. The several special modifications would need to be much more uniform in their occurrence than I have found them before they could be considered a safe guide to the affinities of varieties for cross-pollination, as suggested by Mr. Heideman. The efficacy of these various forms in securing cross-pollination is yet awaiting demonstration.

Without reference to adaptations for cross-pollination, it is to be remarked that the species *P. americana* is exceedingly variable in all its characters, especially in its flower parts. Mr. Heideman mentions a tree in his orchard which uniformly bore flowers with twin ovaries, or even with three united ovaries in a single blossom; and a case of the same sort has come under my own observation in a scion of a Minnesota seedling in the orchard of Mr. L. M. Macomber.

The defectiveness of pistils in many blossoms, however, seems to me to be a more serious matter. It is of much more frequent occurrence, and appears to represent, in a majority of cases, a diseased or atrophied condition of the pistil, rather than a healthy modification of form. Professor Goff, who has given this question diligent study, is inclined to attribute many cases of defective pistils to inclemencies of climate, and an examination of the abortive organ itself would give that idea rather than the notion of a definite evolutionary modification. However, the theory of damage from cold weather is not supported by the notes which we have collected, as will appear later.

With a view to gaining some light on these questions, a large number of plum blossoms have been examined this spring. While the number of blossoms examined from any single sample was too small to warrant any dogmatic judgment of the variety represented, the total number of blossoms examined (about 2000), and the careful manner in which the work was done, under the microscope in the laboratory, will justify us in making some generalizations from the whole. The record of these laboratory examinations will be subsequently published in an annual report.

The term "defective pistils" in this bulletin includes all imperfections which evidently would make fecundation impossible. In very many cases no trace of style or ovary was found. In many other blossoms a small, rudimentary pistil was present, which had plainly ceased to have any vital significance. These several defects seem, for the most part, to be only degrees of the same weakness, whether that weakness be sexual invalidity, evolutionary adaptation, the result of severe weather, or something else. In the aggregate the defective pistils are numerous enough to be taken into serious consideration.

In the laboratory examinations several samples showed 100 per

cent. defective pistils. Obviously no crop can be expected from trees which these samples fairly represent. Cases in which trees fail to set fruit after being loaded with blossoms will be remembered by every horticulturist. Doubtless many such instances of sterility occur through lack of pistils. The Marianna is notably a shy bearer. Its record, as shown in table 1, seems to show a reason. Its evident sexual weakness may also be some confirmation of its hybrid origin.

The differences in the average percentages of defective pistils in the several groups cannot be regarded as purely accidental. The comparison may best be seen in table 1.

Table 1.—Comparison of Groups.

GROUP.	Samples.	Total blossoms.	Per cent. defective.
<i>Prunus americana</i> varieties.....	60	550	27.8
“ “ type, wild ^e	7	85	40.0
“ “ var. <i>nigra</i>	6	53	5.7
“ “ consolidated.....	73	688	27.6
<i>Prunus chicasa</i>	17	159	15.1
<i>Prunus hortulana</i> varieties.....	18	171	24.6
Marianna.....	4	46	50.0
<i>Prunus domestica</i> varieties.....	30	292	5.1
<i>Prunus triflora</i> varieties.....	9	72	15.9

From this it appears that about one-half of the pistils of the Marianna were defective, over one-fourth in *P. americana* (the common wild plum), only a little less in *P. hortulana* (the Wild Goose group), about one-sixth in the Chickasaws and Japanese plums, and only one-twentieth in the European varieties (*P. domestica*). The great discrepancy between the wild forms of the typical *P. americana* (mostly Western) and the variety *nigra* (mostly Eastern) is a point of considerable interest. Besides furnishing another character in justification of a division between the two forms, it gives a valuable hint to those who are looking for new garden varieties. It is worth remarking, however, in this connection that the variety *nigra* does not bear so much pollen as the type forms.

Some of the individual records in the laboratory examinations are open to more or less explanation. For example, Mr. Munson writes concerning a Wild Goose seedling (*P. hortulana*) which showed 87.5 per cent. defective pistils: "It is only two years old from seed, and is flowering for the first time. It is my experience that almost invariably varieties, when they begin to bloom, set little or no fruit. As they get age, some become very fruitful, while others always fruit scatteringly. The youth of this tree, I think, fully accounts for the defectiveness of the female parts." It seems impossible, however, with present data, to find any constant connection between defective-

ness of pistils and conditions of soil, cultivation, or climate. It should be noted that the same tree varies from year to year. The pistils may be all defective one year, and all sound the next.

Different varieties vary greatly in the amount of pollen produced. This variation seems also to follow somewhat the specific parentage of the varieties. Thus, plums of the *americana* group are generally more abundant pollen bearers. The Chickasaw plums are rather weaker pollen bearers, though they seldom show serious deficiency. The Japanese plums are still weaker, while the Marianna is distinctly lacking in the quantity and perhaps also in the quality of pollen produced. A comparison of the several groups as pollen bearers is made in table 2.

Table 2.—Comparison of Groups

In the matter of pollen bearing. Figures indicate the number of samples under each rating.

GROUP.	Scant.	Medium.	Abundant.	Very abundant.
<i>Prunus americana</i> (consolidated)....	7	23	20	10
<i>Prunus chicasa</i> varieties	5	6	3	0
<i>Prunus hortulana</i> varieties.....	2	11	3	2
Marianna.....	3	0	0	0
<i>Prunus domestica</i> varieties.....	6	7	7	0
<i>Prunus triflora</i> varieties.....	4	4	0	0

In connection with any estimates on the point of comparative pollinating efficiency several things have to be taken into account. In the first place, any estimate of the quantity of pollen borne must necessarily be very rough. In the second place, there may be a difference in the quality of the pollen. I have examined some samples in which many imperfect grains could be noted with a low-power lens. In other samples apparently well-formed grains would fail to respond to micro-chemical tests for protoplasm (Millon's reagent), leaving a strong presumption against their ability of fecundating the ovules. But above all this, the pistils of many varieties appear to have a pronounced selective ability, whereby they refuse certain pollen while receiving readily pollen from some other source. Our knowledge is very imperfect on all these points, but we know enough to make us very cautious how we dogmatize about this question. Much more careful field experimentation is needed along these lines.

In order to gain some evidence on the point raised by Professor Goff and others, that the severe northern climates are accountable for much of the defectiveness of plum pistils, table 3 has been prepared.

The different locations are arranged in the table, as far as practicable, in the order of their geographical latitude. The testimony of the table is not very emphatic, it is true, but it does not sustain the

conjecture. Aside from a uniformly high percentage of defective pistils at Madison, Wis.—Professor Goff's own location—the percentage rather decreases than increases northward.

Table 3.—Comparison of Localities.

Percentage of defective pistils.

LOCALITY AND DATE OF FLOWERING.	<i>Prunus americana.</i>					<i>Prunus chicensis.</i>		Wild Goose	Mariana
	Wild.....	De Soto....	Weaver.....	Wyatt.....	Wolf.....	Robinson...	Pottawa-tomie.....		
Denison, Tex., March 24.....	.....	.....	75	.....	.....	.....	.....	25	.....
Stillwater, Okla., March 31.....	50	.....	.....	.....	.....	.....	.....	10	.....
Manhattan, Kan., April 13.....	40	.....	0	0	.....	20	.....	.....	.....
St. Louis, Mo., April 14 and 21.....	56	.....	.....	.....	.....	.....	.....	0	.....
Morgantown, W. Va., April 22.....	0*	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania State College, April 25..	0*	.....	.....	.....	.....	.....	.....	.....	.....
Amherst, Mass., May 4.....	0	.....	0	.....	30	.....	0	.....	67
Michigan Agricultural College, May 1..	.....	10	.....	.....	22	.....	0	.....	.....
Geneva, N. Y., April 30.....	.....	0	.....	.....	.....	.....	.....	.....	.....
Madison, Wis., May 2.....	90	.....	.....	60	56	29	0	9	100
Minnesota City, Minn., May 1.....	.....	14	0	28	37	.....	.....	.....	.....
Burlington, Vt., May 8.....	0*	16	.....	.....	10	0	50	.....	0
Orono, Maine, May 19.....	.....	.....	.....	.....	0	.....	.....	.....	17
Ottawa, Canada, May 10.....	0	10	.....	10	.....	.....	.....	.....	.....

*Var. *nigra*.

The first, and perhaps the chief, practical question to be settled is: What varieties, under ordinary circumstances, are fertile with their own pollen, and which are self-sterile? A large number of blossoms in the orchards of Mr. L. M. Macomber, North Ferrisburg, Vt., were covered with paper sacks, in order to protect them from cross-pollination. The results from these are shown in table 4.

Table 4.—Record of Protected Blossoms.

VARIETY.	Approximate number of covered blossoms.	Fruits set.	Crop set on remainder of tree.
De Soto.....	25	0	Moderate.
De Soto, Wrong.....	75	0	“
Original Minnesota.....	100	0	“
Minnesota.....	100	10	“
Minnesota Seedling No. 2.....	250	6*	Full.
“ “ No. 3.....	80	4*	“
Pottawatomie.....	200	0	Light.
Robinson.....	60	8	Moderate.
Rollingstone.....	200	0	Full.
Wolf.....	200	9	Moderate.
Wolf Seedling No. 5.....	75	5*	Full.
“ “ No. 6.....	300	0	“
“ “ No. 7.....	125	6*	Moderate.
“ “ No. 2.....	100	4*	Full.

* Weak.

The range of varieties in this series of experiments is barely large enough to be suggestive, although the large number of blossoms covered and the relatively small number of fruits set give a satisfactorily clear-cut indication of a generally prevalent self-sterility. It seems clear that one could expect little fruit from De Soto, the Original Minnesota, Pottawatomie, Rollingstone, and the Wolf Seedling No. 6, unless the trees were favorably situated for cross-pollination. In fact, Robinson was the only variety in the experiment with which the fruit set by self-pollination seemed to be normal and vigorous. Our judgments, made in the orchard—and such judgments may properly go beyond the numbers in the tabulations—were that self-sterility was extremely doubtful in all cases except that of Robinson.

The question which naturally comes next in order is this: If a certain variety must have foreign pollen in order to set fruit, what other varieties are the most efficacious pollen bearers? This is a question requiring very many experiments in artificial pollination. Our own work for 1896 has been limited to twenty-one experiments among eleven varieties, and consisted of 319 artificial crosses. The record of these pollinations is seen in table 5.

Table 5.—Record of Crosses.

FEMALE PARENT.		MALE PARENT.		Number pollinated.	Number set.
Species.	Variety.	Species.	Variety.		
1	<i>P. americana</i> , Minnesota		Cherry	13	0
2	“ “	<i>P. americana</i> , <i>nigra</i>		35	16
3	“ “	“ “		9	*...
4	“ “	“ “		22	*...
5	“ “	“ “		26	19
6	“ “	“ “		20	2
7	“ “	“ “		12	9
8	<i>P. chicasa</i> Robinson	“	Minnesota	16	6
9	“ “	“	Rollingstone	22	*...
10	“ “	“	Wolf	14	1
11	<i>P. americana</i> , De Soto	“	“	12	†...
12	“ “	“	Marianna	14	†...
13	“ “	“	Rollingstone	14	†...
14	“ “	“	“	27	†...
15	“ “	“	<i>nigra</i>	6	†...
16	<i>P. chicasa</i> Robinson	“	“	9	0
17	<i>P. americana</i> , Wolf	<i>P. domestica</i> , Mc Niel		10	0
18	“ “ De Soto	<i>P. americana</i> , Wolf Seedl'g.		8	*...
19	“ “	<i>P. domestica</i> , Mc Niel		5	1
20	“ “ Wolf Seedl'g.	<i>P. americana</i> , Hawkeye		9	*...
21	“ “ De Soto	“ Wyant		16	6

* No record. † Tree died.

Beyond an indication that the typical Western forms of *P. americana* can be pollinated by the Eastern forms (var. *nigra*), these experiments show nothing. No one who has had experience in hand

pollinations will be surprised at the irregularity of results, nor at the comparatively small number of fruits set.

V. BOTANICAL RELATIONSHIPS OF CULTIVATED PLUMS.

Within the past few years it has become customary among nurserymen and fruit-growers to refer all cultivated plums to the botanical species from which they are severally supposed to have sprung. This method has many obvious advantages. The cultivated varieties of each group have many important characters in common, so that the fruit-grower soon finds himself able to form a very good and useful estimate of any new variety as soon as he knows its botanic origin. However, with the rapid introduction of new American varieties, the botany of cultivated plums has become much more complicated. Botanists have found it necessary to make new species of recently discovered forms, and as varieties of these forms have been introduced to cultivation horticulturists have had to keep pace with botanical study in order to maintain an acquaintance with the fruits in their gardens. In the foregoing tables the different varieties are referred to their botanical parentage as accurately as could be done at this time. For the most part the dispositions made of the several varieties are those generally accepted. A few are questionable, but it was thought better, in cases of doubt, still to place the doubtful variety in the group to which it seems to belong, rather than to throw such varieties into a mixture by themselves.

When Mr. Andrew J. Downing wrote his "Fruit and Fruit Trees of North America," he recognized only three species of plums as concerned in the parentage of our cultivated varieties, namely: *P. domestica*, the European plum; *P. americana*, the American red or yellow plum; and *P. chicasa*, the Chickasaw plum. Since then the classification has been so much complicated, both botanically and horticulturally, that it requires some critical attention to understand the subject. It is thought the more wise to take up here the botanical classification of plums, because the limits of cross-pollination and the lines of affinity among varieties may well be supposed to follow very closely the true botanical boundaries of the parent species. The natural relationships of the various groups are shown in the following:

Conspectus of Cultivated and Native Plums.

Family ROSACEÆ; genus *Prunus*.

FOREIGN SPECIES.

P. domestica L. COMMON EUROPEAN PLUM. Probably originally from Asia. Flowers showy, white, more or less fasciated; leaves large, ovate or obovate, usually firm and thick in texture, very rugose, usually pubescent beneath, coarsely serrate; shoots usually downy; fruit very various, of many shapes and flavors, but mostly globular-pointed or oblong; the stone large and slightly roughened or pitted.

P. cerasifera Ehrh. MYROBALAN OR CHERRY PLUM. Differs from the last in a more slender habit, often thorny; flowers mostly smaller; leaves smaller, thin, smooth, and finely and closely serrate; fruit globular and cherry-like, ranging from the size of a large cherry to over an inch in diameter, with a depression about the stem, in various shades of red or yellow.

P. triflora Roxb. JAPANESE PLUM. A strong growing tree, perhaps native to China, numerous varieties of which have recently been disseminated in the United States. Flowers usually densely fasciated; leaves and shoots smooth and hard, the former obovate or oblong-obovate, prominently pointed, and finely and evenly serrate; fruit usually conspicuously pointed, red, yellow, or purple, with a very firm flesh and commonly a small stone.

NATIVE SPECIES. (TREES.)

P. americana Marsh. COMMON WILD PLUM. The type distinguished by entire calyx lobes, which are pubescent on the inner surface; stone turgid; leaves oval or slightly obovate; petioles mostly without glands. Tree spreading, ragged, thorny, 8-20 feet high; flowers large, white, on slender pedicels; leaves very coarsely veined, never glossy or shining; fruit more or less flattened upon the sides, firm and meaty, the skin tough and glaucous and never glossy, ripening through yellow to red. Occurs wild from New Jersey and New York to Montana and Colorado. It varies southward, in Texas and New Mexico represented mostly by the variety *mollis*.

Var. *mollis* Torr. & Gray. Has the leaves and pedicels pubescent, especially when young.

Var. *nigra*. CANADA PLUM; RED PLUM. [*P. nigra* Ait.; *P. americana* T. & G. and 6th ed. Gray's Manual.] In its extreme forms easily distinguished by the glandular-serrate calyx lobes, glabrous on the inner surface: compressed stone; broadly oblong-ovate to obovate leaves, with petioles bearing two glands. Flowers large, white, with short, thick peduncles conspicuously marked by the scars left by the falling of the bud scales; pedicels dark red, slender, glabrous; calyx tube broadly obconic, dark red on the outer and bright red on the inner surface; fruit oblong-oval, orange-red; stone nearly oval, compressed. Occurs wild from Newfoundland west to Rainy and Assiniboin rivers, in Canada, and commonly in the New England states, where it is found along roadsides and in waste places.

P. hortulana Bailey. WILD GOOSE PLUM. A strong, wide-spreading, small tree, with smooth, straight twigs, and a peach-like habit; flowers rather small, often very short-stalked; leaves narrow ovate or ovate-lanceolate, thin and firm, flat, more or less peach-like, smooth and usually shining, closely and obtusely glandular-serrate; fruit spherical, bright colored and glossy, lemon yellow or brilliant red, the bloom very thin, juicy, with a clinging, turgid and roughish, small, pointed stone. Occurs wild in the Mississippi valley in the neighborhood of St. Louis.

Var. *mineri* Bailey. Differing more or less from the species by the dull and comparatively thick leaves, which are conspicuously veiny below and irregularly closely toothed and more or less obovate in outline, and by a smoother and more *americana*-like stone.

Hyb. *marianna*. This plum is thought to be a hybrid between the Myrobalan and the Wild Goose. (L. H. Bailey, Cornell Exp. Sta. Bull. 38, p. 32.) Perhaps one or two other varieties have a similar origin.

P. chicasa Michx. [Properly *P. angustifolia* Marsh.] CHICKASAW PLUM. Slender tree, 12-20 feet high; slender, zigzagged twigs; smaller, lanceolate or

oblong-lanceolate leaves, which are very closely and finely serrate, shining, and trough-like; fruit small, very early, red or rarely yellow, the skin thin and shining and covered with many small, light dots and a very thin bloom; the flesh soft and juicy, often stringy, closely clinging to the small, broad, roughish stone. Wild from Delaware south and west to east Kansas and Texas.

P. alleghaniensis Porter. SLOE. A small, slender tree or shrub 3-15 feet high; leaves lanceolate or oblong-ovate, often long acuminate, finely and sharply serrate, softly pubescent when young; fruit dark purple, with a bloom. Alleghany mountains, in Pennsylvania.

P. subcordata Benth. A small tree 20-25 feet high; leaves broadly ovate or orbicular, usually cordate, sharply and often doubly serrate, slightly coriaceous, dark green on the upper and pale on the lower surface; flowers in 2-4-flowered umbels on slender pedicels; calyx lobes oblong-obovate, rounded at the apex, half as long as the white petals; fruit oblong, dark red or purple or sometimes yellow. Pacific coast species.

P. umbellata Ell. BLACK SLOE; HOG PLUM. A small, bushy tree; flowers on slender pedicels nearly an inch long, rather large, white; leaves smallish, ovate or slightly obovate, or sometimes short oblong, thin and dull, closely and evenly serrate; fruit about three-fourths inch in diameter, yellow or reddish, flesh firm and austere; stone short and turgid, cherry-like. Seashore from South Carolina to Florida, and westward to Mississippi, Louisiana, and Arkansas.

NATIVE SPECIES. (SHRUBS.)

P. watsoni Sargent. SAND PLUM. A shrub 6-10 feet high; leaves ovate, acute, rounded or wedge-shaped at the base, finely crenulate, serrate, lustrous on the upper and pale on the lower surface; petioles slender, grooved, biglandular at the apex; flowers in crowded, few-flowered fascicles; calyx cup-shaped, the lobes acute, rounded at the apex, without glands, ciliate on the margins, pubescent on the inner face; petals inserted remotely on the glandular disk, narrowly obovate, rounded and more or less erose above, contracted below into short claws, pure white; fruit globose or rarely oblong, orange-red. Sandy streams and hills, south and southeast Nebraska and central and western Kansas.

P. gracilis Engelm. & Gray. A small shrub, 1-4 feet high; soft pubescent leaves, oblong-lanceolate to ovate, acute, sharply serrate, becoming nearly glabrous above, 1-2 inches long; pedicels and calyx pubescent; fruit less than one-half inch in diameter; stone rather turgid, suborbicular. Prairies and sandy places, south Kansas to Texas and Tennessee.

P. maritima Wang. BEACH PLUM. Low straggling shrub, 1-5 feet high; leaves ovate or oval, finely serrate, softly pubescent underneath; pedicels short, pubescent; fruit globular, purple or crimson, with a bloom, one-half inch in diameter; stone very turgid, acute on one edge. Sea beaches, New Brunswick to Virginia. Some distance from the coast has leaves smoother and thinner, and fruit smaller.

Remarks upon Botanical Groups.

EUROPEAN [*domestica*] GROUP. The cultivated varieties of the European plum bear the best and most salable fruit. They are generally hardy in most sections of Vermont, though most of the 1896 crop was killed by the severe winter weather. The pistils in varieties of this species are uniformly larger and stronger than in other species, and are practically never defective. These varieties are usually deficient pollen bearers, but their need of cross-pollination has not yet been clearly shown, nor their best pollenizers pointed out. Pistils and anthers

appear to mature at the same time, and heterostyled or bisexual forms are seldom or never found.

MYROBALAN. This plum has been extensively used as a stock, but has been rapidly losing favor, the Marianna or seedlings of *P. americana* being generally substituted.

JAPANESE PLUMS have not yet been long enough known [1896] in the United States to have found their final position in our estimation. They are an important and desirable acquisition. Several varieties have been planted in Vermont, and, for the most part, are sufficiently hardy to justify their planting. Abundance usually fruits here, bearing heavy crops. All blossoms of Japanese varieties, however, were killed by cold weather during the winter of 1895-'96. They seem to be considerably weaker in their pistils than varieties of the *domestica* group, but this does not interfere with their fruitfulness.

AMERICANA GROUP. The plums of the *americana* group resist cold much better than any others. They are the hardiest we have. *Americana* varieties now hang loaded with fruit beside the Japanese, *domestica* and Chickasaw varieties, which are entirely bare. They are to be especially recommended for planting in cold and exposed localities, where the *domestica* varieties are uncertain. In general the fruit is inferior to that of the *domestica* varieties, although many of the best sorts are very acceptable on the table and quite salable in the market. *Americana* seedlings seem to make good stocks for working varieties of the *domestica* and other groups. Wild and cultivated forms of this group are peculiarly delicate in sexual organization, to an extent which sometimes interferes materially with the crop. Most varieties probably require cross-pollination. The blossoms themselves make provision for this by numerous contrivances, the most efficient of which are proterogyny, the suppression of pistils, and the selective power of the pistils in receiving pollen.

The variety *mollis* of *P. americana* is represented in cultivation by several horticultural forms: although the origin of the horticultural forms from the botanical variety does not seem to be necessary, but rather doubtful in some cases. The leaves and pedicels, especially in cultivated varieties, are found to be pubescent in all degrees, and it is quite possible for a distinctive degree of pubescence to appear as a garden character, although the variety might be genetically referable to the smooth type. Several varieties not usually put in this section of the *americana* group are quite pubescent enough to be so classified. The southern distribution of this botanical variety might raise a question as to whether or not it is as hardy as the type when planted northward.

The variety *nigra* of *P. americana* is here proposed in place of Aiton's *P. nigra*, and in order to satisfy the necessities of horticultural and botanical intercourse. Gray's Manual of Botany combines all these diverse forms under one name. Professor Bailey's recent revision of "Field, Forest and Garden Botany" does the same, and in his paper on "The Cultivated Native Plums and Cherries" Professor Bailey says, speaking of the characters used to distinguish *P. nigra* from *P. americana*: "I am unable to find any constancy in these characters. . . . I am obliged, therefore, . . . to unite *P. nigra* with *P. americana*. This I regret the more because it is undoubtedly true that there are two well-marked wild varieties—possibly species—passing as *P. americana*." It is evident that we must have some way of conveniently designating such an important difference, and the application of the name *P. americana*, var. *nigra*, seems to me to dispose of the case in best accord with the natural relationships on the one hand and with our acquired habits of nomenclature on the other.

The variety *nigra* is even more hardy than the species, ranging much further northward; its pistils are much stronger and more regular in their development; it bears pollen somewhat less abundantly, and whereas the species has a tendency to be proterogynous, Professor Sargent characterizes the variety (which he calls *P. nigra*) as proteranderous. This point was not satisfactorily verified in our own examinations this spring. This is the common wild plum of Vermont and neighboring states.

WILD GOOSE GROUP. The plums of the Wild Goose group do not seem to have been generally tried in Vermont. They are usually quite as hardy as the Japanese varieties, and are well worth a trial. The Wild Goose and its most closely related varieties are commonly said to need cross-pollination, and to be themselves weak pollen bearers. Weaver and other *americana* varieties have usually been recommended as pollenizers, but it would be worth while to determine whether or not certain other varieties of *P. hortulana* which bear abundant pollen are not better for this purpose.

MARIANNA PLUM. Sexually weak to a marked degree, it is always regarded as an uncertain bearer, and large crops from it are quite exceptional. Its affinities in pollination are extremely problematical. At the present time it is most useful as a stock. It grows readily and vigorously from cuttings set in the open ground; it buds or grafts easily; the unions form readily, and are apparently lasting. To a great extent it has superseded the Myrobalan as a stock. Although of Texas origin, it seems to be perfectly hardy in this state.

CHICKASAW. The name *P. chicasa* is retained in place of *P. angustifolia*, which is technically the correct one for the Chickasaw plum, on account of its familiarity to horticulturists and botanists, and because it is used in Gray's Manual and in "Field, Forest and Garden Botany." These plums form an attractive group, some of the varieties being very prolific and excellent for the table. Although some varieties are sufficiently hardy to make them desirable in Vermont plantings, they are, as a group, better adapted to warmer localities. They do not show, so far as our own study has gone, any special adaptations for cross-pollination.

The *P. alleghaniensis* has not been introduced to cultivation, and is quite restricted in its range. *P. subcordata* is not known east of the Cascade mountains. "In Oregon and northern California the fruit is collected and consumed in large quantities, both fresh and dried, and is used for preserves and jellies." It is also used as a stock for European plums. *P. umbellata*, locally known as the Hog plum, is known only wild. "The fruit is gathered in large quantities, and is used in making jellies and jams."

THE DWARF SAND PLUM, until recently, has been put into the Chickasaw group, which it most nearly resembles. It is, however, quite distinct; and in 1894 Professor Sargent set these peculiar forms off from *P. chicasa* with the name *P. watsoni*. The points of distinction are given in the description, on a preceding page. The wild bushes of this species bear abundant crops of superior fruit. The plums are eagerly gathered and used in preserves or jellies. Some few varieties have been propagated and introduced, as the Bluemont, by Prof. E. Gale, of Manhattan, Kan., but they have thus far received only local notice. This species, as it grows wild along the Republican and Arkansas rivers in Kansas, is attractive in so many particulars that it would seem very strange did it not eventually achieve some horticultural distinction. Some experiments have been made with these plums as dwarf stocks, but no definite results have been reported. *P. gracilis* bears fruit rather sparsely, and of small size and comparatively in-

ferior quality. However, it is sometimes gathered, as I have known it to be in Oklahoma; and made up into jellies.

THE BEACH PLUM, *P. maritima*, is cultivated both as an ornamental plant and for its fruit. In the former capacity it is quite desirable; in the latter it is of little importance.

THREE OTHER SPECIES of plums, namely, *P. rivularis* Scheele, *P. glandulosa* Torr. & Gray, and *P. minutiflora* Engelm., are listed by Coulter as appearing wild in the United States; but although the fruit of the first is said to be excellent they are practically unknown to us.

With this wonderful array of native plums before us, many of which, though bearing excellent fruit in nature, have never been tried in cultivation, we may well believe that we have seen hardly the beginning of the cultivated plums in America.

POLLINATION.

By GEORGE COTTE, Horticulturist at the Oregon Experiment Station.

The first step toward successful fruit culture is an orchard wisely planted. The several varieties must be so located that they may assist in the pollination of one another. This can only be done by a careful study as to the time of blooming of different varieties and the amount of pollen produced by each variety. Very careful observations and notes were taken on all varieties on the college farm. It will be understood that all varieties of fruit-trees do not have the same power of producing pollen. If a large number of trees of a single variety be planted which are shy pollen producers, the lack of pollen will undoubtedly cause a failure in the crop of fruit; and this danger of failure will be greatly increased if the weather is damp at the time of blooming.

The pollen is conveyed from flower to flower by bees and other insects. Their object is the discovery of honey; and while searching the recesses of the flower they unintentionally cover their bodies with pollen, which they convey to the next flower and unavoidably deposit on its stigma. If the amount of pollen produced is small, there will be but a small amount to distribute, and the fertilization would be either a failure or imperfect. This shows the necessity of planting trees which are shy producers of pollen along with those rich in pollen. Hence, to arrange the trees in an orchard, we ought to know the pollen-producing power of each variety. But this is but a beginning of work which must be continued through a series of years. We have many varieties on the college grounds which have not yet come into bearing, and hence are not reported.

SOME NOTES ON POLLINATION.

Col. T. W. Harrison, of Topeka, set out carefully, some years ago, an orchard of choice plum trees. When they came into bearing, he found near the center of them a tree of the sloe—said to be the original plum. At blossoming time this sloe was always a perfect bouquet. It was a vigorous, well-grown tree at all times, and the plum grove bore splendid crops. As the trees became older they began to crowd, and the colonel concluded that it was necessary to thin them out. The sloe seemed to take up more room than any other, and the fruit was very small and practically worthless, so he naturally grubbed it out first and dragged it to the wood-pile, and he declares that the entire orchard never in any one year thereafter yielded as much as a peck of plums. Do not get sentimental and imagine the trees were in mourning for their fallen consort; they simply could not bear without the potent pollen of the vigorous sloe. Thus the apparently profitless sloe was as valuable as all the others together. Twentieth century science and horticultural education will teach us how to propagate, how to plant along sure lines, whereby we can literally “count our chickens [fruits] before they are hatched.”—SECRETARY.

FERTILIZING BARREN PLUM TREES.

Mr. J. L. Irwin, a Kansas fruit-grower, says that an uncle of his “had a clump of plum trees which were, to all appearances, healthy, mature trees. They blossomed freely each spring, but never had fruit, until upon investigation it was found that the blossoms lacked fertilizing pollen. As an experiment, a wild plum tree that was just in blossom was cut and brought to the orchard, where it was set up in a barrel of water in the midst of the heretofore barren trees. The experiment resulted in an abundance of fruit. The wild tree furnished the fertilizing pollen which the other trees did not supply.”

PLUMS THAT BLOOM BUT DO NOT BEAR.

Plum growers in many localities, and under widely varying circumstances, have found that a heavy showing of blossoms is sometimes strangely followed by no plums at all. In many cases where all other conditions have seemed to be favorable, this has been thought to be due to the self-sterility of the blossoms and the lack of cross-pollination. Repeated experiments made by the Vermont station and by various plum growers, and a great number of field observations, have shown that this is indeed the fact, and that plums are often quite incapable of developing any fruit unless the blossoms are cross-pollinated. Mixed planting and intergrafting are the remedies for this difficulty.—*Montana Fruit Grower*.

STERILE BLOSSOMING PLUMS.

I notice in the *New York Tribune*, September 13 [1899], that the agricultural department claims that all plums except Robinson have sterile blossoms; also that the different varieties bloom in the same order everywhere, though the time

of bloom varies in different sections. According to the department, different sorts which blossom at the same time must be planted near one another in order to get a full crop of fruit.

Some forty years ago, when I was a boy, the old Blue Damsons bore abundantly where no other sorts were within half a mile. I frequently see isolated trees of the Lombard and Moore's Arctic overloaded with fruit. To show that the order of bloom is not the same everywhere, I have only to compare the plum-blossom chart of J. W. Kerr, recorded at Delon, Md., with my record here in eastern Maine. Burbank, April 9; Ogon, April 12; Chabot, April 13; Willard, April 17. This is from Mr. Kerr's chart, and gives the time when the first blossoms of the sorts mentioned open.

The following is from my record of 1898: Willard, May 13; Ogon, May 14; Burbank, May 15; Chabot, May 21. The order of bloom varies throughout the long lists from which I have selected.

I do not think growers will always find results satisfactory when the self-sterile sorts are planted with other varieties blooming at the same time. I have the Ogon, which is self-sterile, within eight feet of the Red June, and near other sorts that bloom at the same time, and yet they have never produced half a crop. During the past six years, these Ogons have never failed to give a heavy bloom. In some instances where nearly the whole top is Red June, the remaining Ogon branches fruit fairly well. I have several Burbanks near the Ogon and Red June, some of which bore well the past season, and some failed apparently without any reason. The past season, on my grounds, the Chabot (Bailey) blossomed about a week later than any other sort, and yet these trees are loaded, which indicates they are not self-sterile.

In my humble judgment, based on years of experience and observation, our unfavorable winters have half as much to do with these plum failures as self-sterility.—*Chas. A. Miller, East Union, Me.*

SOME NOTES ON THINNING.

Here are three sensible items about thinning fruit on the trees:

THINNING FRUIT.

I wonder how many of you practice the thinning of fruit on your apple trees. Now, apple trees will do a good deal if you do nothing for them. But the man who wants good apples—apples that will pay—in the future will practice thinning his fruit. I should take a young tree which attempted to produce 100 apples and remove at least fifty of them, leaving not more than fifty to ripen. The next year, if it attempted to produce 200, I should leave 100 or less, and the next, if it had 1000 apples I should leave 300 or 400 only. By this method I should get that tree into the habit of annual bearing. The man who will make fruit-growing a profitable business will thin all his fruit. A peach tree that will set 1000 peaches needs to have 600 or 700 thinned off. The commercial side of fruit-growing demands thinning of nearly all your fruits. You will get more bushels to the tree; within reasonable bounds, the more you throw away the more pounds or bushels you will have left; increased size more than makes up loss in number. In thinning Japanese plums I should leave the fruit four inches apart, and peaches from five to six inches. If you will make a practice of thinning your fruit from the trees, you will usually get four dollars for one. I have often had it increase the crop fifty per cent., and the selling price 500 per cent.—*J. H. Hale, Massachusetts.*

RESULTS IN CANADA.

The practicability of thinning fruit, and its feasibility from a commercial standpoint, have been pretty well demonstrated in the last few years. In western New York, it has generally proved profitable wherever tried. Mr. John Craig reports, in the publications of the Canadian Central experiment farm, some results in thinning peaches and plums which corroborate the notes given from Mr. Beach and others. He concludes that, when a large crop is set, thinning peaches is highly remunerative, for the following reasons: (1) It increases the weight of the yield. (2) It largely increases the size of the fruit. (3) It reduces the number of matured seeds, thereby considerably lessening the drain on the vitality of the tree. (4) It renders the crop less liable to rot. Thinning plums likewise proved altogether worth while.—*Country Gentleman*.

VALUE OF THINNING PLUMS ON TREES.

In September, in one of the best plum-growing sections, I saw an orchard of 400 trees, each of which yielded ten baskets of Lombard plums, or 4000 baskets in all, which sold at twenty-five cents, making a gross return of \$1000 for these 400 trees. I saw another orchard, not five miles away, that carried probably as large a number of baskets, but I am sure they would not realize more than fifty per cent. of the gross return of the first. The high prices scored by the first lot may be attributed to the fact that they were thinned, and the second was not. The Lombard is one of those trees which will kill itself by overbearing if it is not thinned. The fruit will, under these conditions, become small and very poorly colored, so that the smaller price for the largest number of baskets will not equal in gross return that secured from the smaller quantity of better quality obtained by thinning. Some varieties of American plums are very prolific; if allowed to bear to their full extent will in a few years destroy themselves. In the case of the Weaver plum, two trees which were not thinned for three years died at the end of that period, and two other trees, which were thinned each year, are in good health and give fair returns each year. It is, therefore, not only possible by thinning to increase the quality of the fruit, but to keep your trees in health.—*From a Quebec Pomological Society Report*.

GRAFTING THE PLUM AND CHERRY.

By PROF. N. E. HANSEN, Ames, Iowa, in Nebraska Horticultural Society report.

Root-grafting of the cherry and plum in the house during winter is considered difficult by many, but it has been practiced at the Iowa Agricultural College, at Ames, every winter for many years, with good success. For plums, one-year seedlings of our native northern plum, *Prunus americana*, are used, which are grown from pits of the best cultivated varieties of the same species, such as Wyant, De Soto, and Wolf. Seedlings should not be grown from seeds gathered indiscriminately in the woods, but only from trees growing good-sized fruit. It has been found such seedlings are better and more uniform, and there is less liability to injurious influence of stock on scion. In the last two or three winters we have also used Marianna stocks, grown

from cuttings, for root-grafting, and secured a good stand. For cherries, imported Mazzard stocks are used. Both plum and cherry stocks are packed away in thin layers, with earth between the layers, in a cool cellar. Only one scion is used to each root; piece-root grafting does not give a good stand with the plum and cherry.

The method used is that known as "side-grafting" or "wedge-grafting," and the scion is inserted at the collar. By collar, is meant the neck or line of junction between the stem and root. The scion is cut wedge shaped at the lower end with a perfectly true and straight cut, so it will fit snugly into the incision in the stock. The length of this wedge cut, one and one-half to two inches, depends on the size of the scion, a large scion requiring a long cut. The scion should contain about four buds besides the bud at the base or beginning of the wedge cut. The stock should have a ring of bark left above the incision. No wood is removed from the incision—simply a lateral cut long enough to receive the scion, cutting about two-thirds through the stock; and care is exercised to cut across the grain slightly, so as to avoid splitting the wood. Use a sharp, thin-bladed knife; a common shoe knife does as good work as any. If the incision in the stock is properly made, the scion will be held very firmly by the natural spring or elasticity of the wood. In cutting the scion, make the inside of the wedge cut thinner than the outside, so that the scion will fit neatly; but this is often overdone, so that there is too great pressure on the cambium layer (layer between the wood and bark) for proper union. So, make the inside of the wedge cut *very slightly*, if at all, thinner than the outside. The vital point to be noticed is that the inner barks of the scion and stock must be brought together, so the union can be made when growth begins.

Some device must be used to hold the seedling firmly while making the incision. The most convenient one for the grafting bench is simply half of a barrel stave fastened at the further end with a leather hinge. At the end next the grafter a strong wire is fastened around and passed through a hole in the grafting bench and fastened to a treadle below. In this manner the seedling is held very firmly. To prevent injury to the seedling, put a strip of leather on points of contact on inner edges of the stave and on top edge of grafting bench.

Three men work best together—two to graft, and one to wind, wax, and pack. After grafting, the point of union is wound three or four times at top and bottom with waxed thread, and alcoholic plastic applied with the thumb and finger. The plastic must also be applied to the tip of the scion to prevent drying out. The grafts as waxed are run through sand so they will not stick together, and then packed away in a mixture of about one-half sand and one-half earth, in boxes,

in the cellar or cave, same as apple-root grafts, keeping the temperature as near freezing as possible, to prevent injury from the graft-box fungus. Even if frozen in the boxes no harm is done. The waxed thread is made of No. 18 knitting cotton run through melted wax onto an open drum, or hollow cylinder of wood, with a crank handle attached. The wax is softened with a little linseed oil.

Recipe for alcoholic plastic: One pound white resin, one ounce beef tallow, one tablespoonful turpentine, five or six ounces alcohol. Melt resin slowly; take from fire and add tallow, stirring constantly. When still cooler add turpentine slowly, then alcohol. Wood or methyl alcohol is cheaper than common alcohol, and, as tried at the college, seems to answer the purpose equally well. It is poisonous, and should be so labeled. If the plastic becomes too stiff to work well, put vessel in a vessel of hot water and add more alcohol. The plastic should be of the consistency of thin syrup in order to work well.

The scions are kept in boxes of dry forest leaves in the cellar; the leaves contain sufficient moisture to keep the scions in good condition. The scions must be watched and not allowed to get either too plump or too shriveled, but better a little shriveled than too plump.

With all stone fruits side-grafting is much preferable to whip-grafting. By comparing the two methods it will be seen that the side-graft has two surfaces on the scion to unite by, while the whip-graft has but one. In the nursery the side-graft can be used in the spring in crown-grafting seedlings, where the bud failed the preceding autumn. Side-grafting is also the best for all top-grafting of plum and cherry. For outdoor work, the vessel containing the alcohol plastic is set in the top of a large lantern-shaped tin box with a lamp inside. The terms "top-grafting" and "top-working" are the same, the latter being more generally used in nursery work. It is most convenient for two men to work together — one to graft and the other to apply the plastic.

Plums and cherries should be grafted before there is the least sign of starting of the buds; hence, pleasant days in March should be improved in this manner. However, they may be grafted after the buds have started, provided that the scions have started equally as much. But in general it is best to graft the stone fruits early, before the buds have started. No waxed thread is used in top-grafting. After inserting the scion, apply the alcoholic plastic to the point of union and wrap with a strip of old, thin, white muslin. The muslin will adhere to the slightly warm plastic and no thread is needed for tying. The exposed tip of the scion must be touched with the plastic to prevent drying out. The "robbers" or sprouts appearing on the stem below

the graft must be removed from time to time as they appear, so the scion will have a fair chance for vigorous growth. If this is not done the scion will make but a feeble growth, or perish altogether, from lack of nutriment.

In top-grafting young trees in the nursery it will not do to strip all the leaves appearing on the stem below the graft. All the buds for a short distance just below the point of union should be allowed to expand, in order to "draw up the sap" and cause vigorous growth. If these buds push too strongly, keep in check by pinching. As the graft grows these leaves on the stock can be gradually removed, beginning with the buds next to the graft. In top-working plums and cherries, the outer bark often becomes tough and dry, so it will not expand to make room for the deposit of new wood in June. The graft is then in danger of perishing from tight lacing, and the corset strings must be cut. Do this by slitting the bark lengthwise in several places, taking care not to cut into the wood, as this is apt to cause gumming.

The general experience in top-grafting plum trees in the nursery is not favorable. Especially is it a poor plan to top-work European varieties on natives stocks; the top outgrows the stock and is injured or blown off in strong winds. But a row of unfruitful Miner plums may be made productive by top-grafting some limbs in each tree with good varieties of *Prunus americana*, such as Wyant, De Soto, and Wolf, whose blossoms have an abundant supply of pollen to fertilize the Miner. Mr. B. A. Mathews, of Knoxville, Iowa, grows large crops of Miner and Wild Goose by planting them alternately in the row, and top-grafting some limbs in each tree with productive varieties of *Prunus americana*. At the Iowa Agricultural College good results and more abundant fruiting have been attained by top-grafting native plums.

PLUMS.

By B. B. SMYTH. Read before Shawnee County Horticultural Society March, 1900.

Native fruits are always adapted to the places where they grow. The plum is one of the most desirable native American fruits. There are only three species of plum native in Kansas, though there are a good many varieties of these species. The American Red plum is found in the timbered portions of the eastern part of the state, and is not here in its greatest perfection, this being its western limit and nearly its southern limit. The Chickasaw plum is a small tree of the southeastern and southern portions of the state. The Sand-hill plum is a shrub of the desert region, and is found in its greatest perfection in the sand-hills along the rivers of the central part of the state.

All plum trees require moisture that must be nearly equal all the year around. Stagnant water is not conducive to the health of the plum tree, neither is much water of any kind, but moist earth the year around seems to be essential. The Sand-hill plum seems to be well adapted to the climate of Kansas. It is a small, scraggly tree or shrub, often not more than two feet high, but often bears a very delicious variety of fruit. The varieties of Sand-hill plums are very numerous, perhaps equal to any other species. They are all sizes, from the size of the egg of the prairie-chicken down to that of a large bean, and their colors vary from yellow through all shades of orange to nearly a bright red, and even a purple or bluish. The pits are smooth or furry, nearly globular or flattish, and with or without a distinct crease running down one edge of the pit. They vary from sour to a delicious sweet, and it often happens that a very desirable variety may be found in abundance on certain bushes, while others near by and growing in precisely similar situations, bear only undesirable fruit.

Many experiments have been made, both at the Kansas Agricultural College and other places, to graft desirable varieties of European and Japanese plums upon our Sand-hill plum as stock, but such experiments have almost invariably proven failures. The tendency of the Sand-hill plum to sprout at the root would prevent the success of any such experiment, even though the graft succeeded, as one would soon have more of the native fruit than of the grafted variety. Experiments in grafting scions of the Sand-hill plum on stocks of the more rapid-growing kinds have not been largely tried, but would, no doubt, be desirable for many purposes. It has not been thought desirable to graft Sand-hill plums on rapid-growing stocks for the reason that the fruit of the rapid-growing kinds is usually considered superior to that of the Sand-hill plum; but the advantage to be derived from the grafts is that the flowers and fruit of the Sand-hill plum are almost always liable to develop, while the introduced varieties will only develop when the season is exceptionally favorable for that variety.

There are many enemies of the introduced species of plums in Kansas; among them may be mentioned, first, climate, second, insects. Introduced plums are natives of climates moister and less changeable than this during blossoming time. Then, too, particular species of insects that aid in the fertilization of the Japan plum or European plum, for instance, have not been introduced into this state; and the foreign plum trees not being grown here in great abundance, such insects cannot be relied upon if introduced. Foreign trees depend largely upon bees for their perfection, and we do not raise many bees.

Curculio and other insects, such as we have, do not aid in developing perfect plums, but rather have a tendency to destroy the plum. The characteristics of the Sand-hill plums are such as to ward against destruction by insects and fungi. The skin is very thick, which protects against enemies and results to a greater degree in the perfect ripening of that species of fruit.

Let some of our experiment stations try grafting some of our Sand-hill plums on the more rapidly growing plum stocks and see if the tree will not be better adapted to bearing through every season than it otherwise would. The young grafts in that case would not die for lack of sustenance; while, with the contrary method of grafting the rapidly growing plum, it does not receive sustenance enough from the Sand-hill plum stock to keep it alive.

I have a great deal of faith in the Sand-hill plum as being the best adapted to this climate of any plum in existence, and believe that experiments should be made toward finding out what kind of stock will best nourish it. If a plum tree that is not disposed to cast sprouts should be top-grafted all through its head with the Sand-hill plum, the chances are that it would bear fruit every year, as the Sand-hill plum very seldom fails to bear a crop; and, so far as my observation goes, it is not affected by the curculio as the American plum and other plums are.

NOTE.—The paper was discussed by Messrs. Barnes, Lux, Harrison, and others. The general result of the discussion was to the effect that a plum tree that is a vigorous grower but a shy bearer should not be cut down, but left to grow for the benefit to be derived from it in the pollen that will be carried from it to the other trees in the orchard, as trees which are excellent bearers are often deficient in pollen, and need to have pollen carried to them from some other tree that bears plenty of it.—SECRETARY.

MISCELLANEOUS NOTES.

We gathered the following short articles from various sources. In most cases they record actual experiences, and the plum grower will find something worth remembering in every one of them:

PLANTING TREE SEEDS.

Apple seed and plum and cherry pits can be kept in the cellar in condition to grow, with proper attention to watering. But in any ordinary dry cellar the sand gets too dry to prepare the seeds for germinating the first season. It is much safer to bury outside where they will have regular moisture and more or less freezing and thawing. It is also safe to plant these seeds and pits in the fall, if properly managed. Cover the seed at least three inches deep, in drills, by mounding two inches above the surface. Early in spring rake off the mound, leaving the seed one inch deep, with a mellow surface for a seed-bed. In this way the surface is not packed, and the plants will make larger growth the first season than we secure with spring planting.—*Prof. J. L. Budd.*

A NEW METHOD OF GRAFTING.

A friend in Oregon tells me that he has succeeded perfectly in grafting apples and plums as early in the spring as possible, when they are in a dormant condition, by the following novel method: Supposing the seedlings were planted this spring. Next spring he removes the earth to the depth of two to four inches about the crown, and having a number of scions cut the proper length and slit, makes a slit in the crown of the stock as it stands in the ground, and slips the scion in place. Then, without tying or waxing the graft, he draws the earth carefully about the graft, packing it in firmly, leaving only the top of the graft above the ground. He does not cut off the seedling stock which he has thus grafted until the graft has grown several inches, thinking that the graft would succeed better not to remove the top of the seedling thus grafted. He tells me that he scarcely lost any grafts by this method. I see no reason why this plan should not succeed as well here, and in other places, as in Oregon, providing the soil is not too stiff and clayey. In order to succeed the soil should be in fine till, and in the cultivation given later care must be taken not to disturb the graft.—*Green's Fruit Grower.*

PLUMS A PROFITABLE FRUIT.

A fruit-grower in northern Missouri related the following experience before the Missouri State Horticultural Society:

"In the spring of 1896 I planted about 500 plum trees. They are planted on very high ground, sloping sharply to the north, with West Big creek on the west less than forty rods, and East Big creek on the east less than eighty rods. The land was originally what we call oak-opening land, but the oaks had been cut many years ago, and it had grown up a second growth, which was cleared off the winter before planting. But few trees were lost, and these were reset in 1897 and again filled in in 1898, so that now there are 520 plum trees. The ground has been kept clean and well cultivated. The trees have made a good growth, and some of them will bear a few plums this year. I planted very largely of the *Prunus domestica* type, the Damson preponderating very largely, with a few of the Japans and a very few of the *americana*. I am now satisfied that if a mistake has been made at all in varieties it is in not planting enough Japans. The reason for planting so few (only about thirty) was that at the time they were planted none of the Japans, to my knowledge, had borne fruit in this county, but since that some Abundance trees have borne fine fruit at an early age. At this time the Abundance and Burbank are full of fruit, while the Satsuma, Willard and the Yellow Japan have none, although the Sutsuma bloomed full. I planted but few of the *americana*—only two or three of a kind and only a few varieties. The reason was that I do not consider them profitable here, for, while they bear abundantly, they do not command ready sale, the surplus from the scattered trees almost supplying the local demand. They do not seem solid enough to stand long shipments; they are not so rich or so good when cooked as the *domestica*, and the trees do not seem to grow or bear any better.

"From observation, I believe that the Damson will be the best *domestica* plum here for profit, and for that reason have planted more of them than of any other variety. After them are those of similar habits, and that seemingly have Damson blood in them, such as the Richland; also the Lombard, Bradshaw and similar strains have all grown and borne well here. Of the Damsons I have fifty Shropshires—fine growers, and bid fair to bear young; also fifty common Damsons. Then I have 100 of a variety of the Damson for which no distinct name is known, and never saw them anywhere except in this county. I could not find them in any of the nurseries and had to plant sprouts. They are fine growers,

prolific bearers, and seem particularly suited to our soil and climate. I believe them to be a seedling that has not yet been described; have been unable to trace them back to their origin, but still hope to succeed in doing so. Some of the trees not over six feet high bloomed this spring. I have Lombard, Bradshaw, Spaulding, Shippers' Pride, Moore's Arctic and German Prune in quantity, with a few of many other varieties on trial. . . . I prune these trees somewhat after Hale's rule for pruning the peach—that is, by cutting back in March about half of last year's growth—but shall cut less as the trees get more age."

SAVED HIS TREES BY MULCHING.

A correspondent of *Popular Gardening* tells how he saved his plum crop in the summer of 1890: July and August were very dry, and I began to have fears that I would lose my plums from this cause, as the leaves began to droop and the plums to shrink. To counteract the effects of the drought, I covered the ground under the trees, so far as the branches extended, with coarse manure to the depth of six or eight inches, and then thoroughly soaked it with water. The watering was repeated after a few days, and I was agreeably surprised to see the trees revive, the plums swell out plump and nice, so that, as a result, I harvested a magnificent crop of choice plums which readily brought four dollars a bushel.

HOW TO PLANT A PLUM ORCHARD.

There is a tendency toward too close planting and sometimes this is carried to extremes. I have seen several plum orchards planted 10x10 feet that, even now, when only five years old, have much the appearance of thickets. Cultivation is impossible, the fruit is small and difficult to get at, insects find a safe harbor, and the whole arrangement is unsatisfactory and unprofitable. The condition grows worse with each year. In most cases the suggested remedy, removing alternate trees, will not be followed until too late, if at all, and within a very few years the whole must of necessity be destroyed and the labor of planting lost. The most common practice is to plant 15x15 feet, but this is too close for fully developed trees of spreading habit. A better plan is to plant 15x20 feet, or to adopt the accepted California practice and allow 20x20 feet.

There seems to be a decided preference for low-headed trees, on the ground that they are less subject to injury from winds, and that less trunk is exposed to the action of the sun. With low-headed trees the disadvantages of close planting are more quickly apparent. The best formed trees are those headed at from thirty to thirty-six inches from the ground, and this is the distance preferred. Young trees are frequently injured by what are known as frost cracks, a longitudinal splitting of bark and wood on the south side of the trunk, occurring in late winter or early spring, and attributable to the extreme daily range of temperature, which often occurs at this season. To guard against this injury, the trunk should be protected in some way.

Various devices have been used, but we have found wrapping with burlap the most effective and least expensive. Burlap that had been used for baling was purchased at dry-goods stores for two cents a pound, and cut into four-inch strips, three and four feet long, one pound giving, as an average, nine strips. These are wound spirally on the trunks, being held at the top by a lap and by tying with cord at the bottom. One man can cover from fifty to sixty trees an hour, with the material prepared and ready at hand. The covering is applied in November and removed in April or May. The same bands will serve two or three seasons. The whole cost is less than one cent a tree, and well repays the trouble.—C. S. C., in *Denver Field and Farm*.

A COMMERCIAL PLUM ORCHARD.

In planting a commercial plum orchard, location, varieties and management must be well considered. While the plum is not so sensitive to location as the peach, it will not bear the neglect which so frequently falls to the apple. A good elevation is desirable, but not absolutely essential to success, provided other conditions are favorable, such as a good soil and thorough drainage. There should be but few varieties in a commercial orchard, but those selected should combine size, quality, and a fine appearance. As a rule, blue and purple plums sell best, as the yellow varieties are frequently placed on the market before they are ripe.

A good general list will include the following: Of the dark kinds, Bradshaw, Duane, Purple, German Prune, Lombard, Englebert, Quackenboss; of the yellow sorts, Coe's Golden Drop, General Hand, Jefferson, Yellow Egg. There are many other excellent varieties, but the above is a good general list. Of the Japanese plums, Abundance, Burbank, Bailey, Satsuma and Willard have been highly recommended.

Thorough cultivation, early and frequent spraying, and the jarring sheet for curculio, are necessary to success. Before the leaves start, go over the orchard and carefully cut out and burn all black knot. This is imperative. The trees should receive what pruning they require before the buds start, and the first spraying should be just as the buds are opening. Corn and potatoes may be planted in young orchards, but when the trees come into bearing they should receive the full use of the land. Never sow wheat or oats among trees, as they are sure to rob the orchard of more than they return the owner.—*G. L. P., in American Agriculturist.*

RAISING PLUMS IN NEW YORK.

For years the culture of the plum in New York was largely confined to the region adjacent to the Hudson river. Indeed, commercially considered, the business may be said to have had its inception there, from which it has moved westward, and to-day has become one of the largest of the fruit-growing industries. The European sorts, comprising a few varieties only, are principally grown, and will be for years to come, while the advent of those of the Japan type has given a fresh impulse to the business that is likely to continue. The Abundance was first introduced, followed by the Burbank, which, by reason of its superior shipping qualities, great productiveness, and acknowledged value as a canning fruit, heads the list as a favorite orchard sort. Satsuma is gradually growing into favor, with sentiment divided as to productiveness and quality, while its color is against it as a market sort. Of more recent introduction, the Red June has shown itself to be wonderfully hardy in fruit-bud, very early in ripening, its fruit of good quality, and so attractive in color as to command the markets on which it is placed, while Wickson, October Purple and Hale complete the list of those seedlings of foreign parentage destined to work a revolution in American plum growing. The Wickson, while of excellent quality and great beauty, has up to the present time failed to show sufficient productiveness to entitle it to a place in the commercial orchard. The trees make a strong growth and, at this season of the year, as usual, are loaded with fruit-buds that give an enormous bloom but fail to set the fruit. It is possible that with increasing age this fault may be changed. To my own taste the Hale excels all others in quality, while the October Purple, maturing its fruit quite late and being so attractive in color, will without doubt supply the requirements and great demand for a late plum. It may be picked green, and in the course of ten days or two weeks will be found to color and mature perfectly for market.—*S. D. W., in American Agriculturist.*

ONE WHO DOES NOT FEAR THE CURCULIO.

Plums are a desirable attraction to any home. I can remember the plum trees which furnished such delectable fruit on the old farm homestead, where I was born fifty years ago. I remember to-day how those fat, yellow, juicy plums tasted to me as a boy. Remembering this, and remembering that children enjoy such fruits far more than older people, I have ever placed an abundance of fruit in their reach.

About twenty years ago plum culture was almost abandoned, owing to the depredations of the curculio, which stung the plums early in the season, and seriously injured the crop. Currant culture was also abandoned, owing to the currant worm, and potato culture was almost abandoned, owing to the potato bug, but later it was learned that these insects could easily be destroyed, and that, where large orchards of plum trees were grown, curculio was often a blessing in thinning out surplus fruit, since plum trees, more than any other fruit-trees, are liable to overbear; therefore, where plums are grown in orchards, often no attention is paid to curculio; indeed, the curculio is not dreaded by any one in these days who understands its habits. I grow the plum in my city yard, pay no attention to the curculio, and get an abundant crop. The plum comes into bearing at an early date, often two or three years after planting. The trees can be planted more closely together than the apple, pear or cherry, the branches not being so wide-spread. Do not fail to plant at least a few plum trees.—*G. W., in Green's Fruit Grower.*

THE BANNER PLUM ORCHARD IN MICHIGAN.

According to *Green's Fruit Grower*, Prof. W. J. Green thought the finest crops of plums ever grown in Michigan had been produced at Grand Rapids last year in an orchard of 1200 trees occupying four acres of ground. It was owned by a commercial traveler, and the man in charge had orders to cultivate after every rain and at other times when there was nothing else to do. The orchard was cultivated forty-two times. Plum rot was very bad last year, but only thirty-three per cent. dropped from sprayed trees, while eighty-four per cent. dropped from those not sprayed. Leaving every third tree unsprayed each year contaminated those sprayed, and the percentage of rot was greater than it would have been could all of the trees have been treated. He thought Abundance and Burbank plums would be a permanent addition to the fruit list, and probably some others of the Japan list; but it would be useless to plant any Japan variety in localities where early bloom was liable to be destroyed by the late frosts, all the species being early bloomers, some blooming two weeks earlier than native and European sorts. The foregoing forms an elegant tribute to the practices of thorough cultivation and thinning.

SATSUMA AS A PLUM STOCK.

The Marianna plum is very generally used as a stock for the plum. The stocks are grown in the South from the cuttings, as they root there very rapidly, and will not do so in the North. The seeds of the Myrobalan (which is a species of plum from Europe, and of which the Marianna is a variety) are also grown for plum stocks. I have lately heard that the Satsuma plum, which is one of the Japan varieties, makes a most excellent stock for the plum and peach, too. If this is true, and it will grow from cuttings, then we have a very valuable thing that we did not suppose we had. I do not see why the seedlings of any of the Japan plums might not be good for plum and, perhaps, peach stocks, too. The trouble would be to get the seeds out of the fruit without losing the pulp; for they are nearly all clings, except Ogon. Cherry stocks must be of two kinds.

The sour cherries should be budded on Mahaleb seedlings. The Hearts and other rank-growing kinds of the sweet class should be worked on Mazzard stocks. This is necessary because of the diverse natures of the two classes. The stock and scion or bud must be reasonably congenial if the best results are to follow.—*Professor Van Deman, in Rural New Yorker.*

ANOTHER PROFITABLE PLUM ORCHARD.

While living in the village I planted some seventy-five plum trees on a portion of my lot, built a fence around them and kept hens among the trees. Most of the trees were Lombards, and by close pruning and thinning of the fruit I got very good results. Many of the trees commenced to bear the second season after planting. I remember one tree in particular that gave me a half bushel of beautiful plums the next season after it was set out. It was a Geuii, but it nearly killed the tree. Another tree (a Lombard) produced four bushels of plums. At four years old I got four dollars a bushel for my plums, so it will be seen that there was money in plums. The last season I lived on the place I got about seventy-five bushels of plums from the seventy-five trees and several of the trees were not old enough to bear. The next season it was estimated that there was 100 bushels, and now after six years the orchard, owing to neglect of its present owner, is well covered with black knot, and worthless. This orchard, if properly cared for, would have given an annual income of at least ten per cent. on the money paid me for the place, and three days' work each year, aside from picking, would have been all the time required to have kept the trees in first-class shape.

On my present place I have 200 plum trees that have been bearing one to six years, and this spring [1900] I will set out 300 more trees.—*A. A. H., in Green's Fruit Grower.*

HAS ABSOLUTE FAITH IN JAPAN VARIETIES.

A large number of my plum trees are of the Japan varieties, such as Abundance, Burbank, and a few each of Wickson, Red June, Hale, Chabot, and Satsuma (the latter is worthless here), and my this spring's order will call for Lombard, Red June, Wickson, Abundance, and Chabot (Yellow Japan). This will give me an orchard of 500 plum trees, which, of course, is not a large one, as compared with some of the large commercial orchards of the country, but if rightly cared for should give quite a lot of plums after three or four years.

I have great faith in the varieties of Japans named in this list, and would not hesitate to plant large orchards of them. I also have great expectations for the newer varieties of Mr. Burbank's creations, samples of which he sent me last season. Climax is especially fine; also America, Chalco, and Apple. I also have Giant Prune top-grafted, which produced beautiful fruit the second year from the graft.

Of the older varieties of plums Lombard stands at the head of the list here. We already have quite a large per cent. of this variety, and shall plant 100 more this spring. When we first commenced planting trees on this place we put red raspberries in between the rows of trees on a part of the lot, but I would not do it again, or advise any one else to do so. Trees planted the next spring with no raspberries among them are certainly twice as large, and have given me ten times more fruit than those where there were berry bushes.

We ran the cultivator in them as long as we could, and have manured the land well, yet the bushes seem to get the best of it. We will root out the raspberries after this season and give the land up to the trees and hens. I believe it is better to get one good crop of fruit from the land than two poor ones, although we should not complain much, for we have got each year a fine crop of berries that have brought good prices.

GROWING PLUMS IN KANSAS.

EXPERIENCE, CONCLUSIONS AND ADVICE FROM SIXTY-FOUR KANSAS
FRUIT-GROWERS.

H. M. Rice, MUSCOTAH, Atchison county. I have fifteen plum trees in bearing which have been planted four years; they are Wild Goose, Pottawatomie, and Blue Damson. Of these, the best bearer is Wild Goose. I have tried most of the Japanese varieties and found them worthless. My soil is a sandy loam, sloping to the south. Plant fifteen feet apart. Usually receive \$1.50 [per bushel] for the fruit. Have never grown, budded or grafted my own trees. If planting all over again, I would set out the Wild Goose. Would plant in the chicken yard. My neighbors do not grow plums. Do not consider them a good paying crop in this locality.

W. H. Tucker, EFFINGHAM, Atchison county. I have thirty plum trees in bearing which have been planted from eight to fifteen years. There are fifteen Wild Goose, six wild Kansas, five Abundance, and four of Shippers' Favorite. The best bearer is the wild variety. My land is a high prairie composed of black, sandy loam. Have never grown, budded or grafted my own trees. My neighbors grow but few plums.

C. A. Blackmore, SHARON, Barber county. This is my seventh year in Barber county. I have a plum orchard of about 400 trees; I have several varieties of the Chickasaw type that bear heavily every year, and are of good size and quality. Wild Goose is of but little value: it bears but little, and is subject to leaf rust and other diseases: I would not plant it. Forest Rose is a good plum: tree hardy and a good bearer. Marianna is worthless. Damson, Shropshire, Green Gage and German prune do well. German sometimes fall off on account of curculio. Of the Japanese varieties, the Red June bore a heavy crop last year: not a plum fell off; they are the size and shape of guinea eggs; dark red in color: pit small. Wickson is a very rapid, upright grower; it bloomed heavily last year, but all blossoms fell off. Abundance is a very beautiful, upright tree, which promises to do well. Burbank is a rank, spreading grower, and promises well here. Hale is a rapid grower, too young with me to fruit. Gold is a hardy tree, and hung full of golden fruit last year; it blooms very early: think the frost will usually get it. *Prunus simonii*, Satsuma, Wolf, Shippers' Pride, Pond's Seedling, Kelsey and some others I have not yet fruited. Weaver does not bear at all. Ohio Beauty, a September plum, does well when the autumn is not dry. My soil is sandy and from three to ten feet to the water. Blooming time of different varieties [in Barber county]: Gold, Red June, and Satsuma, first blooms appear April 12: are in full bloom by the 15th, and have fallen by the 23d. Wickson and Burbank, first blooms appear April 12: in full bloom by the 16th, and have fallen by the 23d. Chickasaw, first blooms appear April 14; in full blossom by the 18th, and have fallen by the 27th. Poole's Pride, first blooms appear April 15: is in full blossom by the 18th, and have fallen by the 26th. Wild Goose, first blooms appear April 15; is in full blossom by the 20th, and have fallen by the 25th. Ohio Beauty, first blooms appear April 20; is in full bloom by the 27th, and have fallen by the 30th. German, first blooms appear April 22; is in full bloom by the 27th, and have fallen by the 30th. Damson, first blossoms appear April 22: full bloom by the 28th, and have fallen by the 30th.

A. S. Huff, ENON, Barber county. Plums are a success in this part of the state, especially the Wild Goose. I consider the plum a successful crop, one that we can always rely upon. My plum orchard has borne good crops for nine years, or ever since old enough to bear, and a crop I could not well get along without. Other varieties that I have are not as successful.

E. T. Daniels, KIOWA, Barber county. I have twenty plum trees in bearing, planted from five to twenty years; they are Wild Goose, Lombard, De Soto, Wolf, Lambert, Abundance, Burbank, and Satsuma. Of these I find the Wild Goose, Lombard, De Soto, Abundance and Burbank to be the best bearers. Those doing best are Abundance and Burbank. My Satsuma tree died; do n't think much of it; but the other two are No. 1. Will have Red June and Wickson in bearing next year. I plant twelve feet apart. I have grown, budded and grafted my own trees. If planting over, I would set out Abundance, Burbank, Wild Goose, De Soto, and a few Lombard, close to the house, so I could keep the birds out of them; otherwise they get most of the fruit.

J. R. Dunkin, SHARON, Barber county. Here in Barber county plums of all varieties, as a rule, do well unless they get frosted about blooming season; I do not remember their being killed while dormant. Of the Americans, I prefer Lombard, Forest Rose, Chickasaw, Wild Goose, and Wolf. The Marianna is a poor plum here. Of Japan varieties, Abundance, Burbank, Kelsey, *Prunus simonii*, Wickson, Hale, Chabot, Red June and Willard do well here; there are many others not yet tested sufficiently, but I think this the land of and for the plum. Plums are in good demand, and sell readily at fifty cents to one dollar per bushel. It surely must pay to plant the plum liberally here in Barber county. I would recommend planting more of them.

C. L. Gunn, HEIZER, Barton county. I have twenty plum trees in bearing, planted from ten to fifteen years. They are the Wild Goose and three varieties that I do not know the names of. One is a very large, purple plum; the other two resemble the Wild Goose somewhat. They are all good bearers, excepting the purple one, which blooms so early it generally gets caught by frost. They are planted among apple trees, on a level, sandy creek bottom. I generally get from seventy-five cents to one dollar per bushel. Have never grown, budded or grafted my own trees. The hardy varieties pay reasonably well here.

George Ettridge, ROBERTS, Barton county. I have eighteen plum trees: Ten Pottawatomie, two Wild Goose, six I do n't know the names of. I have a lot of wild plums I got off the Smoky river; some are as good as Wild Goose. Those that are bearing are the two Wild Goose, and one other I do n't know the name of. It is no good, no matter what the name is. The Wild Goose does very well here. I set out, cultivate and care for them the same as for cherries. Plant in rows ten feet apart each way. Do not prune much. My Pottawatomie had a few plums on last season, at two years old; I think they are too small. The only thing that seems to bother my plums, both wild and tame, is the curculio. Some years they are bad; other years they do not bother. I never spray.

L. C. Clark, HIAWATHA, Brown county. In the planting of a plum orchard several important facts should be kept in view. (1) Plant thickly or close together, not farther than twelve to fourteen feet apart, and mix varieties in, planting a row of one kind and then a row of some other kind; there are many varieties of plums that but imperfectly fertilize their own flowers; hence the necessity of other kinds in the vicinity. (2) Plant enough trees to make it worth while to cultivate and give them attention, and furnish enough fruit for the

curculio and the family also. We see isolated trees nearly always bare of plums, partly for lack of fertilization, and because there are about so many insects on a given area of earth, and if you have a few trees they will concentrate on these few, and the crop is entirely destroyed. While if twenty to fifty trees had been planted the curculio does an equal or greater amount of destruction, but there are plenty of plums left for family use or market. This same rule works with cherries and the birds: one or two trees, birds get the majority; a long row, birds get about the same number, but there are plenty left for market. We plant plums twelve feet each way, but this can be changed to ten by fourteen feet, and give a wider space one way for cultivation. In an orchard of 275 trees we planted the following varieties, which ripen nearly in the order named: Ten Earliest of All, 10 American Eagle, 10 Poole's Pride, 31 Red June, 16 Abundance, 16 Burbank, 16 Wild Goose, 17 Moore's Arctic, 34 Gold, 35 Wickson, 20' Orient, 6 Clingstone Damson, 10 Freestone Damson, 10 Grand Duke, 10 Monarch, 7 Coe's Golden Drop. We planted in the fall and mulched with stable litter, to prevent severe freezing of roots; to favor the formation of callouses on cut and bruised roots, scatter the litter in the spring. Plant from three to four inches deeper than the tree stood in the nursery, and cultivate shallow, not over two or three inches—probably less would be better. After the orchard is four to six years old seed it down to clover and pasture with hogs, or make a chicken-yard of it. In the absence of hogs or chickens, pick up all fallen fruit and destroy it, as here is the breeding-place of many insects that injure the plum. Head plum trees low, and they need very little pruning; as far as practical, in pruning favor the growth of a leading stem, and let all other branches be secondary. If two branches grow out equally, forming a fork, cut one back severely and encourage the growth of the other by leaving growth full length; this will prevent crotches, which split down when heavily loaded with plums. Most varieties can be shaken upon sheets in gathering for home market, thus getting the ripest fruit, but for shipping to a distant market they should be carefully picked by hand.

J. H. Moyer, HIAWATHA, BROWN county. The first plums that I planted here on my farm were the Chickasaw. They were sent to me by my father from northern Illinois. They were sprouts from the roots of old trees and did not bear where I planted them. I think that the curculio was the cause of them not bearing, and having read that plums ought to be planted close to the hen-house so that the chickens could get at the curculio and destroy them, which they certainly would do, I took up my trees and planted them in the chicken-yard, but did not succeed much better: still I had one or two good crops, but I would not plant any more Chickasaws if the trees were given to me. It is the poorest plum for eating and canning I have ever raised. Next I planted the De Soto; these we grafted (spliced) on Chickasaw roots. These came in bearing in three years from grafting. The De Soto was a good plum and was well liked by all of my customers. The only fault with this plum is that they bear too full; the trees could not hold up under the load of fruit, and when so full the plums are small. For this plum I found ready sale in the orchard at \$1 per bushel. At the time of grafting the De Soto, we also grafted a large purple and a green plum. The names of these I did not get. The purple plum bore several crops, and I found ready sale for them at three dollars per bushel. This was a better plum than some of the California plums sold in our towns here. The green plum is also a very fine plum, but rots badly on the trees when nearly ripe.

On the 20th of September, 1894, when these trees were eleven years old, we had a severe hail-storm, which caused nearly all of them to die. I had, however, planted in the spring of 1893, 200 so-called Pottawatomie plums. They were

badly mixed, being no less than four different kinds, with two or three wild ones among them. There were a number of a variety that looks and grows so near like the Wild Goose that almost any one would say it was the same; but not so. A few Wild Goose mixed in ripen nearly a week earlier than this other kind. This is a better plum than the Wild Goose, is more round, good size, and fine looking. It generally brings twenty-five cents a bushel more than the Pottawatomie. I was told by a fruit man that they were the Moore's Arctic; another tree salesman called them Charles Downing. It is a good bearer and fine seller. In this lot of trees I also found several which reminded me of a picture I used to see in my boyhood days, where the artist tried to show us what the tree with the forbidden fruit looked like; the foliage looks as green as any I ever saw, and the plums are as red and glossy as paint or varnish could make them, and this a month before they are ripe. The plums look very tempting when red and still as sour as a wild crab. I at first thought them worthless. Some of my customers thought I should have a name for each, and rather insisted on it; so I named it "Devil's Choice." Not a very nice name, is it? But I think you will understand why I gave it that name. It is rather dry and mealy-like, a very dark red, drops easily when ripe, and will lie under the trees and wilt, but seldom rots, while the others named will not keep long after ripening. The Pottawatomie is an enormous bearer, and on that account rather small. It is very thin-skinned and very sweet; would be a poor shipper on account of thin skin, and its sweetness attracts the bees—they like to work on them. They are so full of juice it often runs out of the boxes that I haul them around in.

After the hail-storm I spoke of I had to cut fully ninety per cent. of the tops off of my young trees. Only a very few limbs were left on them. I have done no trimming since; I am not satisfied, in my mind, that it would pay. I believe it would increase the size of the plums some, but I doubt very much whether it would increase the number of bushels sufficiently to pay me, as I am always too busy, and I would not hire it done unless I knew that I had a hand who thoroughly understood his business. While my trees were small and not in bearing I planted potatoes between them; as soon as they began to bear, I made a pig-tight fence around the orchard and turned my spring pigs in after they were old enough to wean. As soon as the plums began to ripen I turned the pigs out and commenced to pick the fruit, always shaking the trees lightly, so as to get just the ripe plums each day. The bad plums were carefully picked up each day and carried to the hogs as the good plums were gathered. I have quit turning the pigs in the orchard, as some of the trees are so low that the limbs often touch the ground; but when my plums begin to ripen, I go through the orchard and pick up all the plums, even down to the dry pits, and feed them to the hogs, and always, after that, when we gather the plums, each picker has two vessels, one for the good and one for the bad plums. In this way I know that many of the insects are destroyed, and it makes it much nicer picking when the bad plums are cleaned out from under the trees. We never pick off the trees, but always shake them lightly before beginning to pick up. I do n't spray any, and my plums, as a rule, are as free from marks of insects as any fruit I ever saw grow; and I firmly believe that the surest way to success in plum raising is: First, to plant your trees all in one place; second, plant a sufficient number of trees, so that the enemy of the plum within reach of your grove cannot destroy all of your fruit; third, when your trees begin to bear, look after the refuse plums just as carefully as the good, and you will succeed.

I have 400 trees—200 not yet in bearing; they are twelve feet apart in the rows, but if I would start another grove I would plant far enough apart so as to

drive through with a mowing-machine. I cannot cultivate my older trees any more. I have to mow the weeds with a scythe, and I always have a good crop of them. I mow but once in a season, when we want to commence to pick the plums. My opinion of the profitableness of plum raising is good. I had 130 bushels last year, which sold for \$1.25 per bushel; could have sold as many more if I had had them. Many people will not plant trees because they have planted a few and cannot raise any, and think to plant—say fifty trees—is too costly an investment with nothing in sight. And again, many of our “hogs-and-corn” Kansans would not be willing to humble themselves; get down on their knees and crawl around under the trees and pick the fruit off the ground, like we have to, but let them go to waste even after having raised them.

Geo. A. Wise, RESERVE, Brown county. I have twenty plum trees in bearing which have been planted five years: they are Wild Goose, Golden Beauty, and Miner; Wild Goose is the best bearer. My soil is black loam, on a high level. I plant from ten to fifteen feet apart, but think it too close. Have no regular system of gathering the fruit; have never sold any. They usually bring from one to three dollars per bushel. Have never grown, budded or grafted my own trees. If planting over, I would set out Wild Goose, and some other varieties, twenty feet apart each way, and set them deeply. My neighbors grow plums, but not extensively. I consider them a good paying crop in this locality.

J. B. Saxe, FORT SCOTT, Bourbon county. I have 100 plum trees in bearing, planted from eight to ten years; they are Wild Goose, Miner, Bradshaw, Weaver, etc. The best bearer is Wild Goose. Of the Japanese varieties I have tried Abundance. Those doing best for me are Wild Goose and Miner. My soil is clay, nearly level. I have grown, budded and grafted my own trees. If planting over, I would put out only a half-dozen Wild Goose for my own use. My neighbors grow plums, but not extensively. Do not consider them a good paying crop in this locality.

S. F. Garrison, EL DORADO, Butler county. I have twenty plum trees in bearing, planted twelve and fourteen years. They are Wild Goose, Seedling Goose, Miner, several wild varieties, Wyandotte, Damson, and Marianna. The wild varieties are the best bearers. My soil is upland, sloping to the east. Plant the trees 10 x 15 feet. Gather the fruit from July to September; sell at El Dorado, receiving \$1.50 per bushel. If planting over, I would set out Wild Goose, Miner, and Damson. My neighbors are not growing plums. I do not consider them a good paying crop in this locality. The insects are very troublesome.

Dick May, ELK, Chase county. I have Wild Goose and Sand-hill plum trees, eight years planted; the Sand-hill is the best bearer in this locality. My soil is sandy bottom, sloping to the east. Plant eight feet apart; use the fruit at home. I have tried several wild varieties, and found them excellent. Have never grown, budded or grafted my own trees. If planting over, I would put out the varieties I am now growing. My neighbors grow plums. I consider it a good paying fruit in this locality.

Jere. Ellexson, CHAUTAUQUA, Chautauqua county. I have twenty-five plum trees in bearing, planted from fifteen to twenty years; they are Wild Goose, Washington, and Chickasaw. The best bearer is the Wild Goose, but the Washington is a close second. Washington is best for market. My soil is sandy, with clay subsoil, sloping to the south; plant 16½ feet apart, and gather the fruit when it begins to turn red. Sell in the orchard, at one dollar per bushel. Have tried one wild variety, and found it worthless. Have never grown, budded or grafted

my own trees. If planting over, I would put out the varieties I now have, and some other good ones. My neighbors grow very limited quantities of plums. Do not consider them a good paying crop in this locality.

S. H. Domony, AURORA, Cloud county. Have no plum trees in bearing. My soil is limestone. Would plant twelve feet apart, in blocks. Have tried some wild plums, but find them no good for bearing. Have never grown, budded or grafted my own trees. If I were planting, I would put out Abundance, Burbank, Red June, and Wickson. My neighbors grow a few plums. I consider them a good paying crop in this locality.

Mrs. E. O. Beavers, OTTUMWA, Coffey county. Have twelve plum trees in bearing; they are mostly Wild Goose. Have tried other varieties; they were not a success. I find Wild Goose to be the best bearer. My soil is a black loam, sloping to the south. Plant twenty feet apart. Market the fruit in baskets; sell at home, receiving from fifty cents to one dollar. Have never grown, budded or grafted my own trees. I did not plant for market, but find ready sale for surplus. I would consider them a fairly good paying crop in this locality. Neighbors grow a few.

J. H. Bilsing, UDALL, Cowley county. I have forty plum trees in bearing, planted five years. I have not heretofore grown many plums, as I feared the curculio, but as the Japs. were said to be curculio proof, I have tried them. I planted Burbank, Botan, Ogan, Satsuma, Chabot, Wickson, and Kelsey. The first year they came into bearing the curculio did not attack them but little, and I thought "now I am all right and can grow plums," but, alas for bright prospects and pleasant anticipations, I find the Japs. succumb as well as all others. During the past two seasons I jarred the trees, but in spite of that they got in their work, and a large per cent. were worthless. I have picked up the fallen fruit above the size of cherries once or twice per week. The Burbank, I find, rots badly on the tree, caused, I presume, by the worm inside, but when the rot starts, it takes the entire cluster. I find the best bearers are Burbank, Botan, Ogan, Chabot, and Satsuma. My soil is loam, intermixed with sand, and is level. Planted my trees twelve feet apart. I have tried one wild variety, and found it excellent. Have never grown, budded or grafted my own trees. If planting over, I would set out the varieties I am now growing, and also Moore's Arctic and Blue Damson. Neighbors are growing only a few plums. I think they would pay if we could rout the curculio.

J. H. Sayles, NORCATUR, Decatur county. I have twelve plum trees in bearing which were planted in 1890; all are dying. I am discouraged with plums. Of the Japanese varieties, I have tried Abundance, Botan, *Prunus simonii*, and a few others; leaf-rollers destroy the leaves every year. My soil is prairie land sloping to the northeast. Planted my trees 16 x 20 feet. Have tried some wild varieties and found them excellent. Have never grown, budded or grafted my own trees. I am a novice with plums. My neighbors do not grow plums, and I do not consider them a good paying crop in this locality.

P. Wagner, DRESDEN, Decatur county. I have 200 wild plum trees, planted this year. [This shows faith.]

James Dunlap, DETROIT, Dickinson county. I have about thirty plum trees in bearing which have been planted ten years; they are very similar to the Wild Goose, but later; got the sprouts from a neighbor who called them Peach plum, but do not know where he obtained them. I also have a grove of the common wild creek plum, all of which do well. My soil is a black loam sloping

toward the east. I plant twelve feet apart. Usually get one dollar per bushel; last year buyers gathered them themselves. I have never grown, grafted or budded my own trees. If I had it to do all over again, I would plant the same as I have now and the Wild Goose and Marianna. My neighbors do not grow plums. I consider them a good paying crop in this locality.

A. H. Griesa, LAWRENCE, Douglas county. The plum for the whole Mississippi Valley is one of the minor fruits of commerce, but comparatively few kinds are successfully grown there, while in most of Europe it is of large importance; besides for home consumption, it is largely grown for export and drying. The varieties there are the *domestica* or European type. Most all the kinds there grown are the same as have been for many years. In the eastern and northern parts of the United States it is grown to a considerable extent. But the greatest success lies to the west of us. West of a line drawn north and south near Hutchinson, Kan., you may begin the planting of any of the *domestica* class with reasonable hope of success; as you proceed to the higher and dry regions of the valley success is sure every year. I have never seen better plums grow in any place than in Garden City, Kan. They are comparatively near the markets and have the climate to dry them the same as in Arizona and California. This may lead some one to ask, Why can they be grown there and not east? The trees grow in both sections, blossom, and set fruit, but in the east it rots, caused by a fungus disease that seems to develop best in the hot and moist climate of the Mississippi valley, and does not develop at all in the higher and dryer regions of the western half of this state and the country beyond, nor in the high lands of Texas, where plums are now largely grown.

The trees are hardy and well adapted to most any part of the country; they will blossom and set fruit, but during the hot, moist days of the summer, before they ripen, this fungus destroys them. Most of the European kinds are not suited to this great valley; only the Damson and Lombard seem to be fairly reliable. Here our main reliance should be on the American and Japan kinds. The best varieties of these classes are often grown anywhere in a small way to a good profit. The American kinds are the most hardy in tree for this region. Of these, the Wild Goose is the standard, and, with the Pottawatomie, Stoddard, Whittaker, and many others, are the more largely grown. These kinds are not regular bearers; the seasons, insects and other causes prevent or make the crop. The trees are not often planted for orchards, but are more generally grown in the yard, fence corners, or chicken lots, and the product is as so much gain for the family use, or market, if in surplus. No fruit will retain the natural flavor better than the plum when canned; its richest qualities are then brought forth; for this reason it is advisable that every man with room enough should plant at least one plum tree as a duty to his family. The trees are very productive, with a great limit in season of ripening. Before this nation began the expansion policy the horticulturists began to expand, and brought new types of fruit from the ends of the earth, as from Russia, China, Japan, Persia, and other countries. Apropos to this, we had great things in plums from Japan, China, and Turkey; not that the kinds from there seemed adapted to our wants alone, but those kinds seemed especially good as a parent, with our more hardy native sorts, to produce a race of cross-breeds or hybrids that promise more than we as yet have recognized possible.

The *Prunus simonii*, from Turkey and Persia, is of no value to the Mississippi valley, but is one of the parents of several promising kinds. So many of the pure Japans, with unspeakable names, have [caused] more new crosses or hybrids than all those imported, not one-fourth of which are yet known among

fruit-growers. Among them are the best improved kinds for dried prunes from the Pacific; so much better than the old foreign kinds; a result of crossing. The Abundance and Burbank are the best known of that large and new class; their large size, great productiveness, bright color and good quality make them a favorite with the public.

A few words as to culture. They can be planted closely in the back yard, where the soil is packed firmly, and in places where the poultry have free range to destroy the insects. The trees can be jarred after the blossoms fall, to let the insects, the curculio, drop on a sheet, which should be previously spread under the tree; then they can be destroyed. In doing this you not only destroy them, but their [prospective] increase, and if persevered in you will capture all in a few efforts. This applies more to how they are grown than how they ought to be. Where they are grown extensively they should receive good culture and correct care. These lines are not to instruct such cultivators, as they are able to give us pointers on that topic. But plums can be grown, of the best American and Japan kinds and their hybrids, in a paying way in all this Mississippi valley. In favored localities some of the European kinds do well. Every one with even a small lot can have a few trees of select kinds and enjoy the blessings of this choice fruit, with many chances for yet better kinds in the future. As a help to determine the classes, I will give a list of the more prominent kinds of each, beginning with the oldest in our cultivation.

Domesticas.—Lombard (cling and free), Damson, Red and Yellow Gage, Red and Yellow Egg, Quakenboss, General Hand, Washington, Coe's Golden Drop, Fellenburg, Niagara, Moore's Arctic, German or French Prunes. These are the leading kinds grown East and West.

Americans.—Wild Goose, Miner, Pottawatomie, Newman, Caddo Chief, Stoddard, Whitaker, Hawkeye, and Forest Garden. These are familiar kinds in cultivation in the Mississippi valley.

Japans.—Abundance, Burbank, Kelsey, Satsuma, Botan, Red June, Red Negate, Chabot, and Norman. These are the best known Japans.

Hybrids.—Wickson, Climax, Gold, Gonzales, America, Apple, Bartlett, Chalco, Juicy, Ruby and Shiro are some of this interesting class.

This divides them into but four groups, which is enough for our consideration. The hybrids are mostly from Luther Burbank, of California, but there are also some from Texas, North Carolina, Maryland, and other states; so the possibility of growing acclimated kinds here is within our reach and privilege. Hybridizing is largely done by natural process; when trees of two races are planted near each other, nature, by insects or wind, carries the pollen from one to the other, and from the resultant seed is possible the new kind you are looking for, to make plum culture in this valley, and elsewhere, a success. Of course there is a way of transferring the pollen by hand, but it requires patience, skill, and perseverance, while in the former way it is done just as well and effectually.

J. W. Somer, WILSON, Ellsworth county. I have several plum trees in bearing, planted five years. The varieties are Wild Goose and Marianna. The Wild Goose is the best bearer. My soil is a loamy clay, with a northwest aspect. I plant eight feet apart. If I were doing it all over again, I would plant the two varieties mentioned above, and would plant the Wild Goose in clusters. Plums have not received much attention in this county, but I believe, if they did, they would be a paying crop.

William Cutter, JUNCTION CITY, Geary county. There is no fruit-tree that is so universally neglected as the plum, and the fact that poultry will de-

stroy so many of the worst insect enemies of the plum is one of the principal causes of this neglect. For, in order to avail themselves of their valuable assistance, nine-tenths of the farmers and fruit-growers plant their plums in the back yard, in zig-zag rows, and the *now* recommended clumps and clusters, as near as possible to the chicken-house and other buildings, so that to cultivate with a horse is seldom attempted, and the hoe and scythe are about the only tools that can be used in their cultivation, and in a very few years the sprouts take full possession and defy the use of even the hoe and scythe, and the promising young orchard becomes one of the familiar plum thickets seen upon nearly every farm. These trees soon become so thick that they bear little fruit and that only upon the very tops of the trees, and in unfavorable years they bear nothing. The only way to prevent this sprouting is to plant trees budded upon peach, apricot or Marianna stocks, and then, if you plant them deeper than where the bud was inserted, you will have the sprouts about the same as if they had been grown from sprouts themselves. I believe that frequent cultivation will produce better crops than chickens; but, where possible, by all means use both. My most successful trees are in an enclosed chicken yard, and they are budded upon the peach. The most suitable soil, from my experience and observations, I would say is a sandy soil for our native or American varieties, with a clay subsoil for our old European sorts, and if there is any soil suitable for the Japanese and their offspring in *this latitude* I have never seen it tried. Of varieties, the natives are the most profitable, and the De Soto we desire above all others. The Pottawatomie is the best bearer, but too small. The Wild Goose and Robinson are all reliable and good. The Lombard is as reliable as any of the European sorts, excepting the Damson, and that is so easily affected by a dry spell that it is often a failure.

J. P. Emery, CIMARRON, Gray county. I have fifteen plum trees in bearing: been planted four years; they are Wild Goose, Lombard, and Damson. Wild Goose has been the best bearer; the others are just coming into bearing this year. My soil is a black loam, sloping to the south; I plant fifteen feet apart. Have never grown, budded or grafted my own trees. If planting over again, would put out the varieties I am now growing. My neighbors grow plums; I think them a good paying crop in this locality.

D. D. White, ENON, Harper county. I have ten plum trees in bearing, which have been planted twelve years: they are Wild Goose and Chickasaw; of these, Wild Goose is the best bearer. My soil is level, sandy loam. Gather the fruit when ripe. Use most of it at home, but what little I have sold I received fifty cents a bushel for. Have never grown, budded or grafted my own trees. My neighbors grow plums; they [wild] are too plentiful to pay in this locality.

John Bailey, HARPER, Harper county. I have 100 plum trees in bearing planted six years; they are Wild Goose and Miner; one is as good a bearer as the other. Have never tried Japanese varieties. My soil is a level, black, sandy loam. Have planted some ten feet and some twenty-five feet apart. Market the fruit in bulk in Harper. They bring from 50 cents to \$2.25 per bushel. Have never tried any wild varieties. I consider it a good paying crop; my neighbors are growing several varieties.

F. W. Dixon, HOLTON, Jackson county. We have 500 plum trees, and can say from experience that they are the poorest paying fruit crop we have. In ten years we have not had a full crop on any but the Abundance. Wild Goose is very uncertain; even if a good crop of plums set, a heavy wind-storm before ripening puts your plums all on the ground. Miner seems to be a shy bearer, but an excellent tree, and fruit is prime for butters, etc. De Soto is the best

bearer of any native sort, but the tree is a poor grower, but it is probable our soil is not adapted to it. Marianna sometimes bears a full crop of small, poor-flavored plums; it is a rampant grower, but short lived, and is troubled with borers. Weaver is a very good plum, but shy bearer. Saratoga fruits for first time this year, and promises well at this time; we have several others, but as they are so unprofitable we take no pains to keep up with their names. Of the Japan varieties, Abundance has paid us; fruit large, but must be picked before it colors, as it rots badly; is ripe when a faint blush appears on it, and is far superior to any native plum for canning, preserving, etc. Burbank rots much worse than Abundance, and the fruit is of poor flavor. Plum trees generally were much damaged by the cold of February, 1899, and we think most trees will soon die.

F. L. Osborne, SOLDIER, Jackson county. I have eight plum trees in bearing, planted five years ago. They are Wild Goose and Marianna; the latter bears best for me. My soil is a black loam with a northern slope. Plant trees fifteen feet apart. Have never grown, budded or grafted my own trees. My neighbors grow plums on a small scale.

J. W. Williams, HOLTON, Jackson county. I have five plum trees in bearing, planted from two to ten years, four of which are Blue Damson, and one Japanese planted two years ago. It has plums on this year and they are fine. The Blue Damson does best for me. My soil is upland prairie, underlaid with hardpan, sloping towards the southwest. I plant from twenty-five to thirty feet apart. Never sell in the market. Have tried several wild varieties; only one ever fruited, but it sprouted so badly I dug them all up. Have never grafted or budded my own trees. Some of my neighbors grow plums successfully.

H. S. Cutter, SOUTH CEDAR, Jackson county. In the spring of 1889 I set out sixty plum trees of the following varieties: Thirty-five Wild Goose, ten Pottawatomie, five Lombard, five *Prunus simonii*. The ground was plowed in the fall of 1888, and the trees set in the spring of 1889, sixteen feet apart each way. Holes were dug for the trees just large enough and deep enough to set them in about the same depth they had grown in the nursery. The trees were "plum on plum," as the nurseries style it, and I find them more durable than those grafted on peach roots, as they are not so liable to be broken off by the wind. The plum on peach grows so vigorously that they are very brittle, and in a high wind are apt to break off just above the ground. I lost about one-half of one plum orchard in that way, while of those grafted on plum roots not one was blown off. The first crop of fruit gathered from the plum orchard set in 1889 was in 1894. The trees were white with bloom in the spring of 1893, but they did not set any fruit until 1894, when a fair crop was gathered from the Wild Goose, Lombard, and Pottawatomie. These three varieties have born crops of fruit every year since. During the year 1897 they yielded the finest lot of fruit I ever beheld. From two of the finest Wild Goose trees we picked twelve bushels of fine fruit. The fruit was picked and sold in the common half bushel baskets. The first picking brought one dollar per basket, later seventy-five cents, and the last sixty-five cents a basket. Of the above three varieties, the Wild Goose stands first in productiveness and market value, Lombard second, and Pottawatomie third. Of the other varieties, the *Prunus simonii* never bore a plum, and the trees are now all dead. Kelsey's Japan has born a very few plums, and the trees are nearly all dead. I intend to set out several plum trees this spring, and they will be "plum on plum"—Wild Goose, Lombard, and Damson. I have seen the Blue Damson bearing heavy crops of choice fruit in this county, and I will try what they will do for me. I never sprayed the trees,

and have not had wormy fruit. The poultry-house and yard was near the orchard, and that may be the reason why the fruit was free from worms.

E. M. Gray, PERRY, Jefferson county. In 1890 I planted an orchard of 300 plum trees, consisting of Wild Goose, Burbank, Abundance, Wickson, Red June, Weaver, Green Gage, and Blue Damson. The three first named did best for me on high, dry or well drained upland. I got no plums unless by clean cultivation. I found when I did not keep the ground clean of weeds or grass, my plums, just before ripening, rotted on the trees. I spray with Paris green and lime. I sell in berry crates at \$1.50 per crate for choice, and \$1 per crate for No. 2.

E. P. Diehl, OLATHE, Johnson county. I have thirty plum trees in bearing, planted from ten to thirty years. The varieties are Washington, Damson, Blue Gage, Wild Goose, Miner, and Chickasaw. Of these, the best bearers are Wild Goose, Miner, and Chickasaw. My soil is a black loam, sloping towards the north. Plant my trees sixteen feet apart, gather when ripe, and market in one-third-bushel baskets; sell in Olathe. They usually bring from sixty cents to one dollar per bushel. The Chickasaw is the only wild variety I have tried. I have grown, budded and grafted my own trees. If I were beginning again, I would plant Wild Goose, Miner, Damson, and Chickasaw. My neighbors grow very few plums. I consider them a good paying crop in this locality.

J. C. Beckley, SPRING HILL, Johnson county. I have fifteen plum trees in bearing, which have been planted from eight to ten years. They are Wild Goose, Weaver, and German Prune. The Weaver and German Prune are the best bearers. Of the Japanese varieties I have tried Abundance, which does very well, but is a little tender. It froze during the winter of 1898-'99. My soil is dark mulatto, sloping to the west. I plant two-year-old trees, fourteen feet apart. Gather in [grape?] baskets; sell at Spring Hill, receiving twenty-five cents per basket for them. I have tried several wild varieties and found them excellent, and do n't know but that they are as good as domesticated varieties. Have grown, budded and grafted my own trees. If planting over, I would set out Wild Goose, Weaver, Miner, Lombard and Damson sixteen feet apart in an orchard, giving good cultivation for four or five years; then keep clean surface under the trees to prevent insects from harboring there. Would treat about the same as cherry trees. My neighbors grow a few plums. I consider them a good paying crop in this locality.

J. C. Beckley, SPRING HILL, Johnson county. This desirable fruit has not been as extensively planted in the state as it ought to have been, because of the damaging attacks of both the curculio and gouger (worms in the fruit), yet some facts have been gathered from the observations and experience of planters which encourage the hope that reasonable success may attend future efforts in their culture. Two classes have been used, viz.: Those of foreign origin and their offspring, and those of native origin, which differ much in character. The trees of the foreign class are not so hardy, productive or long-lived as our natives, and, while the fruit is vastly superior, their planting cannot be advised for extensive orchards. There are some of the native class which are quite successful, and of which it is quite safe to plant; the trees are hardy and produce crops of good fruit, which is less injured by the curculio and plum-gouger. Spring is undoubtedly the best time for planting, and those planters who live within reasonable distance of a reliable nursery had better obtain the trees in the spring, as there is too much loss in most cases, when procured in the autumn and heeled in, by mice, rabbits, dry freezing, and shriveling from becoming too dry during winter. The plum tree does best where planted closely; twelve to fifteen feet is usually

recommended; but my experience and observation teach me that they should be planted closer than that, say eight to ten feet. Why? Because we almost invariably find our native wild plums growing in clumps, in order that those weak in the fertilizing elements [pollen] will be benefited by the stronger [more potent] ones. I am satisfied that is the reason why some plum trees which are set too far apart bear little, if at all.

Elevation is not a very important point in the culture of the plum, only as it often furnishes the most desirable soil, which I think is more generally found in the bottom lands. The plum likes a northern slope best, for the reason that it loves damp, cool, moist, not wet, ground to grow in; the foreign class requires a rich, moist soil, underlaid with a stiff clay, and does better on upland; therefore they are short-lived, as are all plum trees planted on high prairie land. The native class thrives best on a sandy soil, which is largely found on bottom land, and such locations generally produce abundant crops. Good drainage is a very important factor in regard to the health of a plum tree. Where there is no natural windbreak one should be provided, as by nature it is almost invariably required. In all cases the plum does best when worked on its own roots, although they can be worked on the peach, but should be set deep to secure rooting from the scion or bud, as the case may be; in planting, the roots should be wet. Some foreign sorts that I budded on the peach are doing fine. I would not recommend mulching, as it makes a harbor for injurious insects. Close planting is preferable, as it keeps the ground shaded, and therefore cool and moist, beneficial both to the tree and to retard, to some extent at least, the development of insects. Cultivation should be shallow at all times, and none after they shade the ground thoroughly. Pick before fully ripe, and, as they ripen unevenly, the trees will have to be gone over several times. Pack in small baskets (I use small grape baskets), which are more suitable than boxes, and will not bruise the fruit as much; put only good, sound fruit in the baskets, and feed all that is wormy and faulty to the hogs. There has never been enough grown for the home market in Kansas yet. They should be handled about the same as cherries and peaches.

C. H. Longstreth, LAKIN, Kearny county. I have 200 plum trees in bearing, which have been planted ten years. The varieties are Wild Goose, Robinson, Pottawatomie, Forest Rose, Weaver, Miner, Coe's Golden Drop, Newman, Abundance, Burbank, Bailey, and a few others. Of these, the best bearers are Wild Goose and Robinson. Pottawatomie is nearly as good. Of the Japanese varieties, I have tried Abundance, Burbank, Bailey, Munson, and Satsuma. The Japanese varieties have not given me satisfaction so far; Wild Goose and Robinson are preferred to all others. My soil is a deep, sandy loam, nearly level. I plant one-year-old trees in early spring, twelve feet apart, mixing varieties all together, in order to pollenize well. Gather by hand, picking before too ripe, while still hard; market in one-third-bushel peach crates, packed solid and firm; sell a few at home, but in Denver as a rule, selling from 60 cents to \$1.25 per crate, netting us on the average, one dollar per bushel. Have tried a few wild varieties, but found only few good; most of them are worthless and unsatisfactory. Have grown, grafted and budded my own trees. If planting over, I would put out Wild Goose and Robinson for commercial purposes and no others, excepting a few Japanese and other varieties for experiment. My neighbors are growing plums. I consider them a good paying crop in this locality when properly grown and handled.

R. DeGarmo, OSWEGO, Labette county. The plum is one of the most valuable and perhaps one of the most salable of the stone fruits raised in this county, seldom failing to make a paying crop, although raised mostly for home consump-

tion, and not planted in commercial orchards. The most valuable of the kinds raised here are of the native variety, such as the Wild Goose, Miner, Weaver, and all of the Chickasaw varieties, while the foreign varieties that have been grown here do not seem adapted to this climate and soil, and have not so far paid for planting and cultivation. I will here give some of my own experience in raising plums, and then I will speak by the book. Some eight years ago I planted here, for family use, the following list of plum and apricot trees: Of Japanese varieties, the Abundance, Satsuma, Burbank, *Prunus simonii*, and Botan: of the native varieties, the Draper, Wild Goose, Wolf, and Blue Damson, and two varieties of the White Chickasaw. Now for the results: Of the Japanese, all are dead but the Abundance, which, in the eight years, have had one full crop, and they were badly injured last winter, two being killed outright—the others recovered, and are now full of buds in good condition. The plum we think the most of is the small White Chickasaw, which has so far never failed to bear a good crop since large enough to bear. This plum is rather small, yellowish-white, very sweet, with small pit, skin hard and solid, and troubled but little with the curculio. The Abundance is a fine, large plum, bears when young very freely; the skin is rather soft and much more liable to the attack of the curculio than the Wild Goose and Chickasaw.

Geo. Hildreth, ALTAMONT, Labette county. I have twenty plum trees in bearing, planted ten and twenty-five years. They are Wild Goose, Chickasaw, and common wild. Of these, the wild and Wild Goose are the best bearers. Have tried Japanese varieties, but found them unsuccessful. My soil is black limestone, sloping towards the west. I plant from twelve to twenty feet apart. Gather as soon as ripe and generally use the crop at home. I have tried several wild varieties and find them excellent for butter and canning. Have never grown, grafted or budded my own trees. If I were doing it all over again, I would plant the Wild Goose and some wild varieties. There are some other varieties that have done well for a while, but they perished soon. My neighbors grow some plums for home use and a few to sell. I consider them a good paying crop in this locality.

N. Sanford, OSWEGO, Labette county. I have ten plum trees in bearing, some planted less than a year and some fifteen years. They are Small Damson, Wild Goose, and Red Chickasaw. Small Damsons have been the most profitable and the best bearers, but are not likely to last over twelve to fifteen years. I am of the opinion the plums will not do on our black limestone soil, which is almost level. I market my fruit, which usually brings \$1.50 per bushel, at home. I have never tried wild varieties. Have never grown, budded or grafted my own trees. If I were planting over again, I would plant only the Small Damson. My neighbors do not grow plums successfully. I do not consider it a good paying crop in this locality.

D. E. Bradstreet, DIGHTON, Lane county. I have twelve plum trees. They are Marianna, Wild Goose, and Damson. The best bearer is the Marianna. My land is a dark loam bottom land, level. I plant three in a cluster, clusters seven feet apart [a new idea]. Gather the fruit when ripe. Have never grown, grafted or budded my own trees. If planting over, I would set the trees [clusters?] ten feet apart. My neighbors grow a few. I do not consider them a good paying crop in this locality.

Dr. J. Stayman, LEAVENWORTH, Leavenworth county. It is with some degree of reluctance that I offer a paper upon the plum and prune for your forthcoming pamphlet, not from want of experience, but that I have little to offer of

benefit to the public. Forty years ago I planted out twenty-five plum trees here, including Quackenboss, Blue Gage, Bavay, Green Gage, Bingham, McLaughlin, Lombard, Purple Egg, Richmond, Washington, and German Prune; a few years later I set out eighty-five more, including Purple Gage, Jefferson, Smith's Orleans, Imperial Gage, St. Lawrence, Green Gage, and Shropshire Damson. These have all proven unsatisfactory. My best success has been with the American species and varieties, and some of these have been failures; of about twenty-five varieties, the following have proven valuable: Miner, Quaker, Wild Goose, Godard, and Damson; I am now trying De Soto, Wolf, Wyant, Foster, Ross, and Klondike; these are all natives of Iowa or seedlings of such. The Forest Garden, of Iowa, is worthless here, and the Kickapoo, of Kansas, where it can be grown, is the largest and the best; perhaps no other native plum is so good, but it rots badly. Our only hope, in this climate, of growing varieties equal to the European, is by crossing the best American varieties with the Japanese. Seedlings from such crosses ought to succeed here.

W. M. Fleharty, LA CYGNE, Linn county. Have twenty-five plum trees in bearing, planted four years; they are Pottawatomie, Abundance, Wild Goose, and Burbank. The Pottawatomie and Abundance I find to be the bearers. My soil is black alluvial, sloping to the east. Plant trees twenty feet apart. Have never grown, budded or grafted my own trees. My neighbors grow plums, and I consider them a good paying crop in this locality.

D. C. Overly, HARTFORD, Lyon county. I have 1100 plum trees in bearing which have been planted four years; they are Gold, Red June, Lombard, Orient, Blue Damson, Abundance, Spaulding, Marianna, and Wild Goose. They were frozen three nights in succession this spring while in blossom. My soil is black loam, sloping to the east. Planted my trees twelve by eighteen feet. Have never grown, budded or grafted my own trees. My neighbors do not grow plums. I consider them a good paying crop in this locality.

James McNicol, LOST SPRINGS, Marion county. I have 100 plum trees, planted in 1886 and later. They are Wild Goose, Miner, Wolf, Lombard, German Prune, Marianna, Pottawatomie, Abundance, Burbank, Willard, and Satsuma. Of these, the Burbank, Abundance, Marianna, Pottawatomie and Wild Goose are best bearers. Of Japanese, those doing best for me are the Abundance. The Burbank is more prolific, but rots on the tree. My soil is a black clay loam, sloping to the north and west. I plant eighteen and twenty feet apart. Market in ten-pound baskets. Sell at home, receiving from thirty to forty cents per basket. I have tried several varieties of wild plums, but found none to be as good as Wild Goose or Abundance. If I were beginning over, would plant Abundance and Burbank. I consider them well worth planting and taking care of.

W. G. Stockard, BELOIT, Mitchell county. I have fifty plum trees in bearing, planted in 1881 and 1888. They are Wild Goose, Marianna, Imperial Gage, Burbank, Weaver, Ogon, Miner, and Sand plum. Those doing best for me are the Imperial Gage and Marianna. My soil is upland prairie, sloping to the north. Plant from sixteen to twenty feet. Sell the fruit in Beloit at one dollar per bushel. Have grown, budded and grafted my own trees. If planting again, would put out the Imperial Gage and Marianna. My neighbors grow plums, but I hardly consider them a paying crop in this locality.

J. T. Barnes, BELOIT, Mitchell county. I have 100 plum trees which have been planted from four to ten years. They are Wild Goose, Marianna, Pottawatomie, Robinson, Miner, Golden Beauty, Weaver, Wolf, Mito, Vanity, and two

unknown varieties. Of these, the best bearers are Wild Goose, Marianna, Pottawatomie, Robinson, Weaver, Mito, Vanity, and both of the unknown varieties. Of the Japanese varieties, I have tried Abundance, Burbank, Chabot, Kelsey, Red June, Willard, Wickson, Satsuma, Beekman, and Normand. Those doing best are Burbank, Abundance, Chabot, and Red June. The Kelseys were killed by the cold winter of 1898-'99: the Beekman, Normand and Wickson were frozen to the ground; the Satsuma never lives over one year. My soil is a sandy loam, river bottom, sloping towards the southeast. I plant my trees in rows from fifteen to twenty feet apart and fifteen feet in the row. Gather the fruit by hand a few days before fully ripe, and market at home; in Beloit they usually bring from \$1.50 to \$2.50 per bushel. Have tried one kind of wild plums; this spring I put out a few Sand plums sent me from the West; have grafted the Weaver plum. If I had it to do all over again, I would plant the Wild Goose, Pottawatomie, Marianna, the wild variety, and Abundance, Burbank, Chabot, and Red June, in rows twenty feet apart and trees from sixteen to twenty feet apart in the row. My neighbors grow but few plums.

P. C. Bowen, CHERRYVALE, Montgomery county. I have forty plum trees in bearing, planted from six to ten years; they are Wild Goose exclusively. Have tried several Japanese varieties, but they were a failure. Have also tried Blue Damson, Yellow Egg, and German Prune, which bore a few light crops and then died. Have discarded all except native varieties. My soil is a dark, sandy loam, sloping to the north and west. Planted my trees from eight to fifteen feet apart. Pick the fruit when partially ripe, in baskets, and sell by the peck, both at home and in Cherryvale, receiving about one dollar per bushel. I find Wild Goose is the only kind worth planting here. Have grown, budded and grafted my own trees. I use Marianna stock and graft scions in the winter, and plant in nursery rows in spring, cultivate, and set in orchard when one and two years old. Have used peach stock, but Marianna is best. Would always propagate my own plum trees for orchard setting. Some of my neighbors are growing plums. I consider native varieties a good paying crop.

J. C. Ross, HAVANA, Montgomery county. I have 400 plum trees in bearing, planted eight years; they are Miner and Wild Goose; the Miner is the best bearer. My soil is sandy, having a southern slope. Plant in the spring. Gather in July; market in peach baskets, in town. Receive from one to two dollars per bushel. Have never grown, budded or grafted my own trees. My neighbors grow plums. I consider them a paying crop.

John E. Sample, BEMAN, Morris county. I have thirty plum trees in bearing which have been planted ten years; they are Wild Goose and Marianna. The Wild Goose I find is the best bearer. My soil is black loam, sloping to the south. Planted my trees twenty feet apart. Use the fruit at home. I have tried several wild varieties, but find them to be no good. Have grown, budded and grafted my own trees. If I had to do it all over again, I would set out Wild Goose and German Prune; would graft all stone fruits on seedling apricots so the graft would be above ground; this would make them long-lived. Would graft in the winter and grow in nursery. My neighbors are growing a few plums. I do not consider them a good paying crop in this locality.

James Sharp, PARKERVILLE, Morris county. I have 300 plum trees in bearing, planted ten years; they are Wild Goose, Lombard, Wolf, Pottawatomie, Damson, Marianna, Abundance, Satsuma, Burbank, Wickson, Red June, German Prune, Washington, Golden Beauty, Robinson, etc. Of Japanese varieties, I have tried Satsuma, Burbank, Abundance, Wild Goose, Red June, and Wickson;

the Burbank does best for me. My surface soil is a black loam, part with red clay subsoil and part with hard, wet subsoil, sloping in all directions. Plant ten and twenty feet. Gather in boxes and baskets and market in baskets and berry boxes in the local towns, receiving from one to two dollars per bushel. I have grown, budded and grafted my own trees. If planting over again, I would put out Wild Goose, Lombard, Burbank, and Damson. My neighbors are growing the same varieties as I. Do not consider it a good paying fruit in this locality. Plums should be planted in the chicken yard, or the curculio will take the crop every year.

V. E. Hathaway, COUNCIL GROVE, Morris county. I have tried the Abundance, Satsuma and Botan plums, none of which are doing well. My soil is a black bottom, about level. I plant fifteen feet apart. The price is so small they do not pay. Have tried a good many varieties, and found but one that paid. If planting over, I would put out the Wild Goose. My neighbors grow plums in a small way. They are not a paying crop in this locality.

F. B. Harris, WHITE CITY, Morris county. I have fifty plum trees in bearing, planted twelve years. They are Washington and Jefferson. The Washington is the best bearer. My soil is a high, level prairie. I plant twenty feet apart. Gather the fruit by hand, and market by the peck or bushel, at Herington, usually receiving two dollars per bushel for them. I have tried wild plums, but find them poor. If I had it to do over again, I would plant Washington and Marianna. My neighbors grow but few plums. I do not consider them a good paying crop on account of the curculio.

C. D. Martindale, SCRANTON, Osage county. I have thirty plum trees in bearing, planted five years ago; they are Wild Goose, Marianna, and Abundance. Of these, the Wild Goose is the best bearer; the Marianna is full this year, Abundance is fairly full. My soil is black loam, with about one foot of gravel, then yellow paint clay and gravel, sloping toward the east. I plant fifteen feet apart. I gather them before quite ripe, and market in grape baskets; sell at Scranton, receiving, usually, two dollars per bushel. I have tried several wild varieties and found them excellent; have an early and a late variety that I got out of the timber and find they improve the grafted sorts. Have never grown, budded or grafted my own trees. If just beginning, I would plant the Wild Goose, Abundance, and some good wild sorts among them, perhaps every fifth or sixth tree. My neighbors grow plums, but not enough for their own use. I do not consider them a good paying crop in this locality.

Howard Morton, TESCOTT, Ottawa county. I have no plum trees in bearing. I had thirteen Weaver planted in a circle with one in the center, close together, about eight feet apart; on a light soil, sloping towards the north: for several years they bore abundantly. I would recommend our native varieties with a few Japanese mixed in; I consider them a good paying crop in this locality, with proper care. My neighbors are growing Wild Goose.

F. T. M. Dutcher, PHILLIPSBURG, Phillips county. I have twelve plum trees in bearing, planted from two to six years; they are Wild Goose, Burbank, and German Prune. Of these, the Wild Goose is the best bearer. My soil is a sandy loam which is nearly level; I plant sixteen feet apart; gather them when ripe; market at home. Have never tried any wild varieties. Have never grown, budded or grafted my own trees. My neighbors do not grow plums: I do not consider them a good paying crop in this locality.

John Hinds, OLCOTT, Reno county. The plum doing best for me is the Miner. My soil is a black, sandy loam, with an eastern slope. I plant twelve feet apart. Gather them the last of August. Sell at home at one dollar per bushel. Have grown, budded and grafted my own trees.

F. A. Smith, BELLEVILLE, Republic county. I have fifty plum trees in bearing, planted from eight to ten years. They are Forest Rose, Marianna, Weaver, and a wild plum from Mitchell county. Of these, the Marianna, Weaver and the wild variety are the best bearers. My soil is a limestone ridge, sloping northwest. I plant the trees eight feet apart. I sell at Belleville, Cuba, and Narka, receiving from fifty cents to one dollar per bushel for them—usually one dollar. I have tried a wild variety, and find it an excellent, free bearer, vigorous, hardy; fruit medium and of good quality. Have never grown, budded or grafted my own trees. My neighbors grow but few plums, mostly for home use. I consider them a good paying crop in this vicinity.

H. C. Hodgson, LITTLE RIVER, Rice county. I have eight plum trees in bearing, planted twelve years. They are the Wild Goose and Miner. The Wild Goose is the best bearer. Of the Japanese varieties, I have Abundance, Burbank, Willard, and Wickson; cannot say which is best, as they have not commenced to bear; they blossomed this spring, but were killed by frost in April. My soil is both upland and bottom. Plant ten feet apart. Have never grown, budded or grafted my own trees. Neighbors do not grow many plums. I do not consider them a good paying crop in this locality.

T. C. Wells, MANHATTAN, Riley county. To raise good plums you need good soil, deeply plowed, free from lumps and well drained, either naturally or artificially. Plums may be divided into three general classes; the European or Golden plum, the Japanese, and the American. It is generally thought that the European plum does best on a clay loam, while the American varieties succeed better on a more sandy soil, but, from my experience, I have learned that plums of each class will thrive in the common black limestone soil of our Kansas prairies. In getting trees for planting, get those with a single main stem; avoid those with forks, as, when loaded with fruit, they are almost sure to split down in heavy winds and be ruined. Get thrifty, stocky trees, with low heads, not more than two or three feet high. On such trees the fruit is more easily gathered and they are in less danger of injury from winds. Plant deep, especially if grafted on peach roots. About sixteen feet apart each way is a good distance. Keep the soil loose and free from weeds, cultivating as deeply as you can without injury to the roots. Keep down all sprouts. Many varieties are not self-fertilizing; therefore different varieties blooming at the same time should be planted near each other. Prune but little, except to shape the tree at first, and afterward to remove dead or interfering branches.

If black knot appears, cut it out and burn it, covering the wound with thick paint. For other diseases, such as leaf rust, shot-hole fungus, and fruit rot, I know of nothing better than thorough spraying with Bordeaux mixture, though this is not always entirely successful. I would spray before the buds swell in spring, again after the blossoms fall, and again still later in the season, if there are any signs of fungus disease. For fruit rot, it is best, besides spraying, to thin the fruit so that no two plums touch each other when full grown. This is important. Thinning should also be practiced on varieties that do not rot, when they set very full; pick off half or two-thirds of the fruit when half grown. What is left will be larger and better flavored, and worth more in the market, and the trees will live longer. For curculio and gouger, the surest way is to jar the trees early in

the morning [which causes them to fall], catching them on sheets and destroying them. Begin this work as soon as the blossoms fall, and continue as long as you catch any. If this is too much trouble and you think it will not pay, the best thing to do is to plant your trees where the chickens will run under them and pick up the "little Turks"; also plant plenty of trees, so that there will be fruit enough for both the insects and yourself. It is also a very good plan to pick up and burn, boil, or otherwise destroy, all wormy and rotten fruit, leaving no insects or fungus spores alive. For canker-worms and other leaf-eating insects add Paris green to the Bordeaux mixture, and spray. If that does not do the work thoroughly, spray again in a day or two. Be sure you get a pure article of Paris green. There are different grades; some of it is adulterated. The best is cheapest in the end. One reason why people do not always succeed in killing canker-worms is that they do not begin spraying early enough. The young worms are much more susceptible to poison than when they are nearly or quite full grown.

Most varieties of plums are of better flavor if they remain on the trees until fully ripe. For market, however, they must be gathered before they get soft, but they should be full grown and pretty well colored. As to varieties suitable to the climate and soil of Kansas, I can only judge from my limited experience and observation. Of the European varieties, the Lombard and Spaulding are the only ones that I have had in bearing. They set plenty of fruit, which is of fair quality when ripe, but they are not curculio or rot proof, and in some seasons, in spite of spraying or anything that I have done, the amount of sound, ripe fruit has been very small. Of the Japan plums, the Burbank has proved most worthy of cultivation. It is of large size and good quality, especially for cooking, and an abundant bearer. Indeed, it usually sets so much fruit as to require severe thinning. The Abundance and Botan are good, but have not been such sure or abundant bearers as the Burbank. The Ogon seems more hardy than any of the Japan plums, but the quality is hardly as good as those mentioned above. It is a good bearer. The Satsuma and *simonii* have been unproductive and unprofitable. Of our native American varieties, the following, I think, are worthy of cultivation: Wild Goose, Miner, Bluemont, Golden Beauty, and Moreman. The Bluemont sometimes rots badly. All need to be thoroughly ripe before they are good to eat without cooking. I have found no curculio-proof plum. Besides those mentioned above, the following are grown on the grounds of the Kansas State Agricultural College and are thought worthy of cultivation—all are American: Wyant, Weaver, Wayland, De Soto, Robinson, and Clayton.

M. E. Wells, SMITH CENTER, Smith county. Have fifty plum trees in bearing which have been planted seven years; those doing best for me are a wild variety; soil is a clay loam, sloping to the east; sandy bottom next to creek is best. Plant ten feet apart. Sell at the orchard, receiving one dollar per bushel. Have never grown, budded or grafted my own trees. I would keep a new orchard clean for three years, then mulch with straw a foot deep. Neighbors are growing a few plums. I consider them a good paying crop in this locality.

D. M. Adams, ROME, Sumner county. I have a dozen plum trees in bearing, planted twelve years; they are Marianna and Wild Goose; they are profitable for home use only. My soil is prairie, sloping to the southeast. Have tried several wild varieties, and find some to be very good. Have never grown, budded or grafted my own trees. If planting over, I would set out the above-named varieties and the Abundance and German Prune. Neighbors are growing them only for home use.

A. M. Dull, WASHINGTON, Washington county. I have thirty-five plum trees in bearing, planted six years: they are Wild Goose, Pottawatomie, Wolf, and De Soto. The best bearers are Wild Goose and Pottawatomie. My soil is upland prairie, sloping to the north. Planted my trees 10x15 feet. We use all the fruit at home. I have tried one wild variety, but found it to be a poor bearer. Have never grown, budded or grafted my own trees. If planting over, I would set out Wild Goose, Pottawatomie, and perhaps one or two other varieties; would plant them in a block, and when they come into bearing I would fence, and turn in the chickens, as I think they would destroy the curculio and other insects. My neighbors grow a few plums. Do not consider them a good paying crop in this locality.

W. D. Cellar, EDWARDSVILLE, Wyandotte county. I have 1200 plum trees in bearing, planted from four to nine years. The varieties are: American class—Wild Goose and Miner; Japanese class—Abundance, Burbank, Red June, and also a few Damson. The Wild Goose do best for me; of the Japanese varieties the Abundance and Burbank are the best bearers. My soil is a hazel bottom, with clay subsoil, sloping towards all directions. I plant fifteen feet both ways. When gathering I shake them on the ground or on sheets, and market in twenty-four-quart crates and one-third-bushel boxes; in Kansas City and towns in Missouri, Kansas and Colorado they usually bring from 50 cents to \$1.50 per crate, or 25 to 75 cents per one-third-bushel box. I always grow, bud and graft my own trees. If I were going to do it all over again, I would plant as I now grow, excepting only a few Miners to fertilize, and none at all of this variety if I could find a better fertilizer for Wild Goose. My neighbors grow plums to some extent. I consider them a good paying crop.

F. Holsinger, ROSEDALE, Wyandotte county. Of the many varieties tried, few have succeeded. Those that give the best—I might say the only satisfaction—are the Chickasaw varieties; of these, the Pottawatomie stands first. The Wild Goose during past few years was among the best. Owing to the attack of insect enemies, the curculio and gouger, plum growing has become precarious. Of European sorts, I know of none that are worth planting; of Japanese sorts, all save one (Gold) have succumbed to the severity of winter; but for the occasional severe winters, plum growing would succeed, providing sufficient care was exercised to fight the insects. Jarring affords best protection—use of sheets upon which the curculio and gouger fall when the tree is suddenly jarred; then picking them into bottles they are easily destroyed by scalding. Unless you are intending to follow out the best methods of fighting insects, you will find plum growing unsuccessful; for while you may produce this fruit in abundance, it will be unsatisfactory and unsalable because of its faulty condition.

A DESCRIPTIVE LIST OF THE NUMEROUS VARIETIES OF PLUMS.

Aitkin.—Fruit very large, oval, slightly truncate at both ends, suture very obscure; skin nearly uniform, deep dark red, without dots, a little paler on shade side; flesh rich yellow, rather firm, sweet, moderately rich; skin very thin and tender, may be eaten with impunity, and is without harshness when fruit is fully ripe; stone large, but remarkably thin, obscurely margined. Leaves broad, with glandular stalks. Tree very vigorous; reported productive. Season very early. Found wild in Aitkin county, Minnesota. Introduced in 1896 by Jewell Nursery Company, Lake City, Minn. The reports thus far received from this plum are very favorable.

American Eagle.—Very large; skin dark purplish-red when fully ripe; form roundish oblong; cling. One of the finest of the group. Leaves rather large, the stalks glandular. Introduced by Osceola Nursery Company, Osceola, Mo. Good for market. Likely the best *americana*.

Apple Plum.—From the garden of D. U. Pratt, Chelsea, Mass. Fruit medium, roundish flattened, a little swollen on one side, suture medium; skin reddish purple, with a blue bloom and light dots; flesh greenish yellow, a little coarse, sweet, sprightly, with considerable austerity at the skin; adheres partially to the stone. Good. September. (Downing.)

Bavay.—Tree grows very strongly, and is one of the hardiest of the *domestica* class. Sets some fruit almost every year, but is not sufficiently hardy for this situation. It can be grown wherever peaches will bear a crop. The fruit is of best quality; season late—September 5 to 15.

Bingham.—Large (an inch and three-fourths long), oval, rather widest at base; surface deep yellow, with rich red spots to the sun; stalk slightly sunk; flesh yellow, juicy, rich, delicious. Season of ripening, medium or end of summer and first of autumn. Shoots downy. Handsome, productive, and valuable. Pennsylvania. (Thomas.)

Botan.—(See Abundance.)

Caddo Chief.—Small, round, red; very early. Louisiana. Chickasaw. (Thomas.)

Hawkeye.—Large, round-oblong, purple-red; skin thick; flesh firm; good; cling. Mid-season. Iowa. (Thomas.)

Chency.—Large to very large, round-oblong; dull purple-red; skin thick; flesh firm, sweet, good; cling. Ripens in August. Wisconsin. (Thomas.)

City.—Large, red on yellow ground, productive; perfect freestone; skin thick and bitter; ripens with De Soto; lacks attractive color. Hardy, good bearer; sells well in local market. Has withstood frost better than any other. More valuable for home use than market. Well reported by all. Minnesota.

Chickasaw.—Fruit about three-fourths of an inch in diameter, round, and red or yellowish-red, of a pleasant, subacid flavor; ripens pretty early; skin thin.

The branches are thorny, the head rather bushy, with narrow, lanceolate serrulate leaves, looking at a little distance somewhat like those of a peach tree. It usually grows about twelve or fourteen feet high; but on the prairies of Arkansas it is only three or four feet high, and in this form it is also common in Texas. The Dwarf Texas plum described by Kendrick is only this species. It is quite ornamental. (Downing.)

Climax.—Cross of *simonii* and Botan; very large, measuring $6\frac{3}{4} \times 7\frac{1}{2}$ inches in circumference, heart-shaped: a superbly rich plum, extremely early; ripens in the coast counties early in July, before any other good plum; color of flesh yellow; sweet and delicious, with a pineapple fragrance; skin thick, firm, deep vermilion-red, with very minute white specks; stem short, strong; pit medium to large, separates easily from flesh. Tree a vigorous grower, very productive; branches and leaves resemble the Heart cherries in size and vigor. This is destined to become the best shipping plum that has come to my notice. Originated by Luther Burbank, of Santa Rosa.

Damson (Common, Black, Purple, Early, etc.)—The common oval Blue Damson is almost too well known to need description, as thousands of bushels are annually sold in the market for preserves. The tree is enormously productive, but in the hands of careless cultivators is liable to be rendered worthless by the knots, which are easily extirpated if the diseased branches are regularly burned every winter or spring. Branches slender, a little thorny and downy. Fruit small, oval, about an inch long. Skin purple, covered with thick blue bloom. Flesh melting and juicy, rather tart; separates partially from the stone. September. As the Damson is frequently produced from seed, it varies in character. The Shropshire or Prune Damson is an English purple variety, rather obovate in form, but little superior to our common sort. The Sweet Damson resembles the Common Damson, and is but slightly acid. The Late Black Damson, Late Purple Damson, Prines's Early Damson, Small Red Damson, Small White Damson and Large White Damson are also varieties not of sufficient value or distinctiveness to render separate description necessary. The Winter Damson is a valuable market sort from its extreme lateness. It is small, round, purple, covered with a very thick light-blue bloom. Flesh greenish, acid, with a slight astringency, but makes good preserves. It bears enormous crops, and will hang on the tree until the middle of November, six weeks after the Common Damson, uninjured by the early frosts. (Downing.)

De Soto.—Large to very large, round-oblong, slight suture; red, slight purplish bloom; skin thick, flesh orange color, firm, juicy, good; cling. Late. Wisconsin. (Thomas.)

Fellenberg (Prune d'Italie, Italian Prune, Quetsche d'Italie, Altesse Double, Italian Quetsche).—Tree vigorous, spreading; branches smooth; fruit medium, oval; suture moderate; skin dark blue, with a bloom; stalk an inch long, rather stout, inserted in a very small cavity; flesh dark yellow, juicy, sweet, and good; separates from the stone. Good. First of October. (Downing.)

Forest Garden.—Large, round-oblong, orange yellow, overlaid and dotted red; skin medium, thick; flesh moderately firm, orange color, fibrous, juicy, good; cling; stem slender, short. Tree forked and inclined to split. Not good east of Illinois. Good for home use. August. Illinois. (Thomas.)

General Hand.—Origin uncertain; supposed to have originated on the farm of General Hand, near Lancaster, Pa. Tree very vigorous; branches

smooth; fruit very large, roundish, oval; suture obscure, running half round; skin deep, golden yellow, slightly marbled with greenish yellow; stalk long, set in a shallow cavity, the whole of that end being flattened; flesh coarse, pale yellow, moderately juicy, sweet and good, but not of high flavor; separates freely from the stone. Good. September. (Downing.)

Golden Beauty.—Medium, round ovate, pointed at apex, deep clear yellow; skin thick; flesh amber, firm, sweet; semicling. Late bloomer, and in ripening. Tree hardy, vigorous, productive. Good. Texas. (Thomas.)

Green Gage.—This plum has thirty-six synonyms. The Green Gage is everywhere highly esteemed. In France it is generally known as the Reine Claude, having, it is said, been introduced into that country by Queen Claude, wife of Francis I. During the last [eighteenth] century an English family by the name of Gage obtained a number of fruit-trees among the monks of Chartreuse, near Paris. Among them was a tree of this plum, which, having lost its name, was called by the gardener the Green Gage. It is pronounced by Lindley the best plum in England. The Green Gage is a very short, slow-growing tree, of spreading and rather dwarfish habit. It is an abundant and pretty regular bearer, though the fruit is liable to crack upon the tree in wet weather. Branches smooth. Buds with large shoulders. Fruit round, rather small, seldom of medium size. Suture faintly marked, but extending from the stalk to the apex. Skin green, or yellowish green at full maturity, when it is often a little dotted or marbled with red. Stalks half to three-fourths inch long, slender, very slightly inserted. Flesh pale green, exceedingly melting and juicy, and usually separates freely from the stone. Flavor at once sprightly and very luscious. Best. Ripe about the middle of August. There are several seedling varieties of this plum in various parts of this country, but none superior or scarcely equal to the old. (Downing.)

Hale (Burbank No. 3, Prolific).—Medium, globular; light orange red; flesh yellow, firm, spicy, sweet; cling. Very late. (Thomas.)

Heikes.—Much like Late Blood, but rather more flattened on the ends, or oblate, mostly darker in color, the flesh acid. Little known. Named for W. F. Heikes, of the Huntsville Nurseries, Huntsville, Ala.

Indiana Red.—Large, round; cling. Indiana Horticulture. (Thomas.)

Kelsey.—Very large, two to three inches in diameter, heart-shaped, lopsided, distinct suture; yellow, overlaid bright-red purple, dotted; flesh light yellow, firm, rich, free, usually hollow. Not hardy North. A good canning fruit. (Thomas.)

Kerr (Hattonkin No. 2).—Medium, conical, sutured; bright yellow; flesh yellow, juicy, subacid; cling. Prolific. Probably not hardy North. (Thomas.)

Klondike.—Earliest of all; ripe and gone by August 1. Golden yellow; freestone. Originated in Iowa by cross-pollination. Introduced, 1897, by W. F. Heikes, Huntsville, Ala. Wragg, Iowa.

Le Duc.—Medium, round, flattened; orange, spotted red; skin thin; flesh soft, sweet; semicling. Mid-season. Minnesota. (Thomas.)

Lombard (Bleecker's Scarlet, Beekman's Scarlet, Montgomery Prune).—Tree very vigorous, hardy; has strikingly crimped leaves, bright, purple, glossy shoots, very productive; popular. It was called the Lombard plum by the Massachusetts Horticultural Society in compliment to Mr. Lombard, of Springfield,

Mass., who first brought it into notice in that state, and it is said to have been received by him from Judge Platt, of Whitesborough, N. Y., who raised it from seed. But it was previously well known here by the name of Bleecker's Scarlet. Never having been described under that name, however, we adopt the present title. Fruit of medium size, roundish oval, slightly flattened at either end. Suture obscure. Stalk quite slender, scarcely three-fourths of an inch long, set in a broad, abruptly narrow cavity. Skin delicate violet-red, paler in the shade, dotted with red, and dusted thinly with bloom. Flesh deep yellow, juicy, and pleasant, but not rich, adhering to the stone. Good. Middle and last of August. (Downing.)

Lone Star.—Medium, round-oblong, red; very thin skin. Texas. Chickasaw. (Thomas.)

Mankato.—Fruit very slightly oblong, inclining to truncate at stem end; suture rather distinct; dull red, densely dotted with very minute yellowish specks; flesh yellow, sometimes red next the stone, sweet and rich; skin rather thick with very slight harshness, easily separable from the flesh; stone thick, with convex sides, rounded at ends, obscurely margined; semi-cling; season late; leaves medium, broad, smooth, sharp serrate, glandless. Tree thrifty, symmetrical, fairly productive; bears young.

Marianna.—Large, round-oblong; red, yellow specks, fine bloom; flesh soft, juicy, sweet; semi-cling. Not especially valuable for the fruit. The facility, however, with which this plum may be propagated from cuttings, and readiness with which the union takes place in grafting upon it, have made it a most common stock. It is supposed to be a seedling of some European plum. Originated in Texas. (Thomas.)

Maru.—Medium, round, slightly pointed; yellowish red; flesh yellow, melting, juicy, subacid; free. (Thomas.)

McLaughlin.—Raised by James McLaughlin, Bangor, Me. Tree hardy, vigorous, and productive; a valuable variety, nearly or quite equal to Green Gage. Branches smooth. Fruit large, nearly round, oblate, flattened at both ends; suture slight; stalk three-fourths of an inch long, inserted in a small cavity by a ring; skin thin and tender, yellow, dotted and marbled with red on the sunny side, and covered with a thin bloom; flesh deep yellow, rather firm, juicy, very sweet and luscious, perfumed; it adheres to the stone. Best. Last of August. (Downing.)

Moreman.—Medium, round, dark red. Horticultana. (Thomas.)

Munson (Hytan, Kayo, Douglas).—Medium, oblong; pale red; skin thin, tough; flesh yellow, melting, acid. Free, hardy, and productive; good South. (Thomas.)

Myrobalan (Cherry, Early Scarlet).—Small (one inch in diameter), round, remotely heart-shaped; bright red, bloom faint; stalk short and slender; cavity narrow; flesh juicy, slightly fibrous, soft, melting, subacid; not rich, adhering to the oval, pointed stone. Ripens very early, or about midsummer—its only value. Distinguished by its smooth, slender, small, bushy head and narrow leaves. There are many varieties. This plum is considered to be a variety of the *P. domestica*. It has long been a favorite stock for other plums, and immense numbers have been imported into this country. As it dwarfs the scion, however, it is not so much used as formerly.

Newman.—A variety of the Chickasaw family that has recently come into notice through D. L. Adair, of Kentucky. Tree healthy, hardy, vigorous, and productive. Fruit medium, roundish oval; skin light scarlet, with a thin bloom; flesh soft, light pinkish, vinous, juicy; adheres to the stone. Early August. (Downing.)

Niagara.—Medium, oval, dark purple; flesh pale yellow, juicy, sweet, free. September. (Thomas.)

Moore's Arctic.—Below medium, roundish oval, dark purple, with a pleasant but not rich flavor. Early autumn. Tree healthy, vigorous, extremely hardy, a great bearer. Maine. (Thomas.)

Normand (Normand Yellow, Normand Japan).—Medium, conical, heart-shaped, golden yellow; flesh yellow, firm, and good; free. (Thomas.)

Ogon (Oyon, Shiro-smomo, White Plum).—Medium, roundish, oblate, distinct suture; golden yellow, with creamy bloom; flesh thick, firm, not juicy; free. Keeps long; good canner. Mid-season. (Thomas.)

Peach Plum (Nectarine, Caledonian, Howell's Large, Jenkin's Imperial, Prune Peche, Louis Philippe).—Tree vigorous, upright; stout, blunt, purplish shoots, nearly smooth. A fine-looking fruit, of foreign origin, but only of second quality. Fruit of the largest size, regularly formed, roundish; stalk about half an inch long, rather stout, and set in a wide, shallow depression; skin purple, dusted with a blue bloom; flesh dull greenish yellow, becoming tinged with red at maturity, a little coarse-grained, with a rich, brisk flavor, and adhering partially to the stone; good. Middle of August. (Downing.)

Poole (Poole's Pride).—Medium, round-oblong, red with bloom, sweet, good; hardy, prolific. (Thomas.)

Pottawatomie.—Medium, round, red, streaked yellow; stem long, slender; flesh firm, juicy. Very productive. Mid-season. Tennessee. (Thomas.)

Quackenboss.—Introduced by Mr. Quackenboss, of Greenbush, N. Y. Origin in the garden of S. C. Groot, Albany. A very rapid, upright grower, and productive. Branches smooth; fruit large, oblong-roundish; skin deep purple, covered with a bluish bloom; suture scarcely apparent; stalk long, slender, and set in a slight depressed cavity; flesh greenish yellow, sprightly, juicy, and a little coarse-grained, sweet and subacid; adheres slightly to the stone. Good. September. (Downing.)

Quaker.—Very large, round-oblate, flattened; purple-red, orange on side, blue bloom; skin thick, astringent; flesh firm, sweet, juicy; semi-cling; very good. Mid-season. Requires good cultivation and thinning. Iowa. (Thomas.)

Red Negate.—(See Red June.)

Robinson (Miner, Hickley, Isabel, Gillett, Townsend).—This is an improved variety of the wild or Chickasaw plum, originated with Mr. Miner, Lancaster, Pa. Branches smooth, dark red; fruit medium, oblong, pointed at apex; skin dark, purplish red, with a fine bloom; flesh soft, juicy, vinous; adheres to the stone. Early October. (Downing.)

Rockford.—Trees planted in 1894 are still rather small, but thrifty in appearance, forming round, regular tops. Leaves large, coarsely and deeply serrate, short acuminate; stalks dark red, pubescent, mostly glandless. Fruit of medium size, oblong, somewhat pointed, broad at base; color dark red on green ground; skin thin; suture inconspicuous; flesh firm, very acid until quite ripe, then of

good quality; stone cling, broad at stem end and tapering to a rather acute, thick apex, sides strongly convex, margin narrow, but sharp. Productive; early; ripe August 31.

Rollingstone.—Very large, round, flattened, truncated at ends; mottled and spotted pink-purple; flesh firm, sweet, good; semicling. Mid-season. A very popular Western plum. Iowa. (Thomas.)

Satsuma (Blood, Yonemomo).—Medium, roundish-conical, more or less sharp apex, deep suture; very dark red, blue bloom, greenish dots; flesh blood-red, rather coarse, subacid; cling. Blooms early; midsummer; productive. (Thomas.)

Stoddard (Native).—One of the largest, perhaps the largest, of the native plums originated in Iowa. It is of light pinkish-red color, very handsome, with a tough, sweet skin, and of most excellent quality. (Sedgwick Nursery Company.)

Surprise.—A variety very recently introduced by Mr. Martin Penning, of Sleepy Eye, Minn., and perhaps finest in quality of all the cultivated native plums.

Best plum I have seen in this state; large, deep, meaty, fine flavor. Tree thrifty, productive; early September; do not think it *americana*. (Harris, Minn.)

It may be a hybrid of Miner and *americana*, but resembles Miner in tree, fruit, and leaf. Appears to be hardiest of that type. (Heideman, Minn.)

Best of my collection. Bears well and sells well. (Penning, Minn.)

One of the very best in all respects: equal to any on my grounds. (Lord, Minn.)

Washington (Bolmar, Bolmer, New Washington, Bolmer's Washington, Franklin, Irving's Bolmar, Jackson, Parker's Mammoth, Washington Jaune, Philippe I).—The Washington, although not equal to the Green Gage and two or three others in high favor, yet its great size, its beauty and the vigor and hardiness of the tree are qualities which have brought this noble fruit into notice everywhere. The parent tree grew originally on Delancey's farm, on the east side of the Bowery, New York, but, being grafted with another sort, escaped notice until a sucker from it, planted by Mr. Bolmer, a merchant in Chatham street, came into bearing, about the year 1818, and attracted universal attention by the remarkable beauty and size of the fruit. In 1821 this sort was first sent to the Horticultural Society of London, by the late Doctor Hosack. The Washington has remarkably large, broad and glossy foliage, is a strong grower, and forms a handsome round head. Wood light brown, downy. Fruit of the largest size, roundish oval, with an obscure suture, except near the stalk. Skin dull yellow, with faint marblings of green, but when well ripened, deep yellow, with a pale crimson blush or dots. Stalk scarcely three-fourths of an inch long, a little downy, set in a shallow, wide hollow. Flesh yellow, firm, very sweet and luscious, separating freely from the stone. Good to very good. Middle to the last of August. (Downing.)

Wayland.—Large, round-oblong; light red; skin medium thick and shiny. Very late; good for Southern states. Kentucky. (Thomas.)

Whitaker.—Large, red, seedling of Wild Goose. Texas Horticultural. (Thomas.)

Wickson.—Medium; glowing carmine, with heavy white bloom; flesh yellow, firm, spicy, subacid; cling. Good. Ships well. A cross of Kelsey and Burbank. (Thomas.)

Wild Goose.—Large, round-oblong, light red, skin thin; cling; stone long and narrow, prolonged above into a sharp point and below into a narrow base, finely pitted; flowers medium to large, stalked; leaves oblong-lanceolate, peach-like, not prominently pointed, the margins finely and evenly serrate, and the stalks usually bearing two to four small glands. Early. Quality poor, but on account of its productiveness, earliness, beauty, good shipping qualities and its early introduction it is the most popular of the native plums. The Wild Goose was first brought to notice by James Harvey, of Columbia, Tenn. Some time before 1850 a man shot a wild goose near Columbia, and on the spot where the carcass was thrown this plum came up the following spring. It was introduced about 1850 by the late J. S. Downer.

Willard (Botan No. 6).—Medium, roundish, dark red, numerous small yellow dots; flesh yellow, sweet; free. Productive; very early. (Thomas.)

Wolf.—Medium, round, yellow mottled red; skin thick; flesh yellow, firm, fibrous, good; free. Tree strong grower, prolific. Good for home and market. Iowa. (Thomas.)

Wyant.—Trees stocky, forming round heads, of slower growth than Wolf or Weaver. Leaves medium, crisp in texture, sharply serrate, dark green; stalks pubescent and glandular. Fruit large, round-oblong, flattened at apex; cavity large and deep; color purple red on yellow ground; stem short, stout; skin thick; flesh firm, of good flavor; stone free or nearly so, large, oblong, flat. Ripe September 18.

Yellow Egg.—The White Magnum Bonum, or Egg plum, as it is almost universally known here, is a very popular fruit, chiefly on account of its large and splendid appearance, and a slight acidity, which renders it admirably fitted for making showy sweetmeats or preserves. When it is raised in a fine warm situation, and is fully matured, it is pretty well flavored, but ordinarily it is considered coarse, and as belonging to the kitchen and not to the dessert. Branches smooth, long. Fruit of the largest size, measuring six inches in its longest circumference, oval, narrowing a good deal to both ends. Suture well marked. Stalk about an inch long, stout, inserted without cavity in a folded border. Skin yellow, with numerous white dots, covered with thin white bloom; when fully ripe, of a deep gold color. Flesh yellow, adhering closely to the stone, rather acid until very ripe, when it becomes sweet, though of only second-rate flavor. Stem long and pointed at both ends. A pretty good bearer, though apt in light soils to drop from the trees before matured. Middle of August. (Downing.)

Yosete (Earliest of All).—Small, conical, distinct suture; dark purple-red; flesh yellow; free. (Thomas.)

PLUMS FOR THE TABLE.

A FEW STANDARD RECEIPTS.

Butter.—Select mellow plums; pare and stone; weigh, and to every pound allow three-quarters of a pound of sugar. Put the plums in a porcelain-lined kettle: heat slowly; mash and stir until perfectly smooth, then press through a fine sieve; add the sugar; boil for fifteen minutes, stirring constantly. Put into jars, and tie up. (Canning and Preserving, by Mrs. Rorer.)

Canned.—Allow three-quarters of a pound of sugar to every pound of plums. Put in a porcelain-lined kettle: cook sufficient to fill one jar only at a time: bring slowly to boiling-point; simmer until the plums are soft, without being broken, skim and can. All large plums may be canned in the same manner, first pricking the skins to prevent cracking. (Canning and Preserving, by Mrs. Rorer.)

Canned.—Wash and put whole in a syrup made in the proportion of a pint of water and a pound of sugar to every two pounds of fruit; boil for eight minutes: can and seal immediately. If pricked with a fork before putting in the syrup, they will be less liable to burst. Cherries are canned in the same way. (Buckeye Cookery.)

Charlotte.—Stone a quart of ripe plums, and mix them with a pound of brown sugar. Cut slices of bread and butter, and lay them around the sides and in the bottom of a large, deep dish. Pour in the fruit boiling hot, cover the bowl, and set it away to cool gradually. When quite cold, serve with sweet cream. This is very nice in hot weather. (Skilful Housewife's Book.)

Cheese.—Bake the fruit in a stone jar, with a few of the kernels to flavor it; then pulp it through a course sieve, and to each pound of pulp, free from stone and skin, add a half pound of powdered loaf sugar, in a pan; boil and skim till the sides candy, when pour the cheese into shallow pans, previously rubbed with butter, and tie them over. (Mrs. Hale.)

To Prepare Fruit for Children.—A far more wholesome way than in pies or puddings, is to put apples sliced, or plums, currants, gooseberries, etc., into a stone jar, and sprinkle among them as much sugar as necessary. Set the jar in an oven, with a teacup of water to prevent the fruit from burning; or put the jar into a saucepan of water till its contents be perfectly done. Slices of bread or some rice may be put into the jar to eat with the fruit. (Mrs. Hale.)

Cobbler.—Take one quart of flour, four teaspoons melted lard, one-half teaspoon of salt, two teaspoons of baking-powder; mix as for biscuits, with either sweet milk or water, roll thin, and line a pudding dish or dripping-pan, nine by eighteen inches; mix three tablespoons of flour and two of sugar together, and sprinkle over the crust; then pour in three pints of canned plums, and sprinkle over them one coffee cup of sugar: wet the edge with a little flour and water mixed, put on the upper crust, press the edges together, make two openings by cutting two incisions at right angles an inch in length, and bake in quick oven one-half hour. (Miss S. Alice Melching, Buckeye Cookery.)

Compote.—Boil six ounces of sugar with half a pint of water to each pound of plums, the usual time; simmer the plums very softly for twenty minutes; in-

crease the proportion of sugar if needed, and regulate the time as may be necessary for different varieties of the fruit. (Mrs. Hale.)

Compote.—Four ounces of sugar and half a pint of water, to be boiled ten minutes; one pound of plums to be added, and simmered gently for ten or twelve minutes. (Mrs. Hale.)

Dried.—Fruits for drying should be perfect and quite ripe. Cut in halves and take out the stones. It is best not to pare them. Spread in a single layer on boards, and stand in the hot sun to dry gradually until they turn leather-colored; bring in always before sunset, and never put out in damp or cloudy weather; a piece of mosquito netting will prevent flies from reaching them; when dry put into paper sacks and hang in a dark, dry, cool place. Cherries should be stoned before drying. All fruits may be dried in the oven, providing the oven is not sufficiently hot to scorch or scald. This is an excellent way, as the fruit is dried more quickly and you escape the danger of its being stung by insects. (Canning and Preserving, by Mrs. Rorer.)

Euchered.—Nine pounds blue plums, six pounds of sugar, two quarts of vinegar, one ounce of cinnamon; boil vinegar, sugar and spice together; pour over plums, draw off next morning and boil, pour back on plums; repeat the boiling five mornings, the last time boiling the fruit in it about twenty minutes. (Mrs. Capt. W. B. Brown, Washington city, Buckeye Cookery.)

Jam.—Stew plums in a little water and press through a colander or coarse sieve, adding a little water to get all the pulp through; add three-fourths pound sugar to each pound of pulped plums; boil three-quarters of an hour, stirring constantly; pour into jars or bowls, and cover with paper, pressed to fit each jar or bowl, down close, and then larger papers, brushed on the inside with the white of eggs, with the edges turned down over the outside of the glass.

Jelly.—For this use common blue plums. Wash in cold water, put in a porcelain-lined kettle, and to every half peck allow a pint of water; cover and heat until soft and tender; then turn into a flannel jelly-bag, and drip slowly until the pulp is dry. Do not squeeze or handle the bag, or the jelly will be cloudy. To every pint of juice allow one pound of granulated sugar. Put the juice into a porcelain-lined kettle, and bring quickly to a boil; add the sugar, stir until dissolved; boil rapidly and continuously until it jellies, skimming constantly; twenty minutes is usually sufficient, but sometimes I have boiled it thirty-five minutes before it would jelly properly. It is wise to commence testing after fifteen minutes' boiling. To do this, take out one teaspoon of the boiling jelly, pour it into a saucer, and stand in a cool place for a moment; then scrape to one side with a spoon—if jellied, the surface will be partly solid; if not, boil longer, and try again. As soon as it jellies, roll the tumblers quickly in boiling water, and fill with the boiling liquid. Stand aside until cold and firm (about twenty-four hours). Then, if you have jelly tumblers, put on the lids; if not, cover with two thicknesses of tissue paper, and paste the edges of the paper down over the edge of the tumbler. Then moisten the top of the paper with a sponge dipped in cold water. This moistening stretches the paper, so that when it dries again it shrinks and forms a covering as tight and smooth as bladder skin. I do not recommend covering with brandied paper, as it has not been satisfactory. The jelly, in cooling, forms its own air-proof covering. Keep in a cool, dark place.

Jelly.—If plums are wild (not cultivated), put in pan, sprinkle with soda, and pour hot water over them; let stand a few moments and stir; take out, and

put in with water to cover them—less if plums are very juicy; boil till soft, dip out juice with a china cup, then strain the rest through jelly-bags; do not squeeze them. Take pound for pound, or pint for pint, of juice and sugar; boil eight to ten minutes. Jelly will be nicer if only one measure or a measure and a half is made at once; if more, boil longer. Some boil juice ten or fifteen minutes, then add sugar and boil five minutes. Test by dropping some in a saucer and placing on ice or in a cool place; if it remains rounded and does not spread, it is finished. If the plums are tame, discard the soda. Take the plums that are left and press through a sieve, boil half an hour, then take pint for pint of sugar and pulp, boil ten or fifteen minutes more. Half a pint sugar to a pint makes a rich marmalade, and one-third pint to pint, boiling it longer, is nice canned and used for pies, adding milk, eggs and sugar, as for squash pies. (Buckeye Cookery.)

Plum-and-apple Jelly.—This may be made by preparing the juice of one part plums to two parts apples, as above, and finish without flavoring. Marmalade is made the same way as above. Some add a little ginger root to it. One bushel of apples and one peck of plums make forty pints of jelly and sixteen quart glass cans of mixed marmalade. In making either kind of jelly, the fruit may be squeezed and the juice strained twice through swiss or crinoline and made into jelly. The pulp is not then fit for marmalade. (Buckeye Cookery.)

Marmalade.—When the plums are thoroughly ripe, take off the skins, weigh, and boil them quickly without sugar for fifty minutes, keeping them well stirred; then to every four pounds add three of good sugar, boil the preserve from five to eight minutes longer, and clear off the scum perfectly before it is poured into the jars. When the flesh of the fruit will not separate easily from the stones, weigh, and throw the plums whole into the preserving pan, boil them to a pulp, pass them through a sieve, and deduct the weight of the stones from them when appropriating the sugar to the jam. Any other plum may be substituted for Green Gages, in this receipt. Green Gages, stoned and skinned, six pounds, fifty minutes; sugar, four and one-half pounds, five to eight minutes. (Mrs. Hale.)

Marmalade.—Rub the fruit, but do not pare it. Cut in halves, remove the stones, and to each pound allow a half pound of sugar. Put the fruit into a porcelain-lined kettle, with sufficient water to cover the bottom, cover, and heat slowly to boil; then stir, and mash fine, add the sugar and three or four kernels, blanched and pounded to a paste, to every quart of marmalade. Boil for fifteen minutes, stirring continually; then stand over a more moderate fire, and cook slowly twenty minutes longer. Stir occasionally, that it may not scorch. Put away in stone jars. (Canning and Preserving, by Mrs. Rorer.)

Preserves.—Allow equal weight sugar and plums; add sufficient water to the sugar to make a thick syrup, boil, skim, and pour over the plums (previously washed, pricked, and placed in a stone jar), and cover with a plate. The next day drain off the syrup, boil, skim, and pour in over plums; repeat this for three or four days; then place plums and syrup in preserving kettle, and boil very slowly for half an hour. Put up in stone jars, cover with paper, like jellies, or seal in cans.

Preserves.—Plums may be preserved nice with the skins on or off. If on, they should be pricked at the top and bottom with a large needle; to take them off, turn boiling water over them. Plums require a pound and a half of sugar to

a pound of fruit; prepare your syrup thick and lay in your plums to simmer, not to boil: let them remain in a scalding state until cooked through, at least two hours; then skim out and boil the liquor down about an hour; it must be thick to keep well. The flavor will be much improved by boiling in the syrup one-half pint of the kernels, cracked; they must be strained out. Plums may be hardened by scalding them in alum water, and, when drained, pouring the hot syrup over them every day for a week: but, if done with care, they will remain whole preserved as above. (Skillful Housewife.)

Preserved.—Weigh, and to each pound allow a pound of sugar. Put them in boiling water for a few moments, until the skin comes off easily; peel and throw them into a large earthen bowl or jar, sprinkling sugar between each layer; let stand over night. In the morning carefully pour off the juice into a porcelain-lined kettle: bring quickly to a boil; skim and then add the plums; simmer gently about thirty minutes until tender and clear; take out one by one with a spoon and spread on dishes to cool; boil the syrup a few minutes longer until thick. When the plums are cool, put them into tumblers or jars, pour the boiling syrup over, and seal or tie up. Yellow Gages, copper plums, prunes and blue plums may be preserved in the above manner. (Canning and Preserving, by Mrs. Rorer.)

Preserve.—To every pound of Damsons allow three-fourths of a pound of powdered sugar; put into jars, or well-glazed earthen pots, alternately a layer of Damsons and one of sugar; tie strong paper or cloth over the pots and set them in the oven after the bread is drawn, and let them stand until the oven is cold. The next day strain off the syrup, and boil it till thick; when it is cold put the Damsons into small jars or glasses, pour over the syrup, which should cover them, and tie a wet bladder or strong cloth over them. (Mrs. Hale.)

Pudding.—Stew plums, fresh or dried, with sugar to taste, and pour hot over thin slices of baker's bread with crust cut off, making alternate layers of fruit and bread, and leaving a thick layer of fruit for the last. Put a plate on top, and when cool set on ice; serve with sifted sugar, or cream and sugar. This pudding is delicious made with Boston or milk crackers, split open, and stewed apricots, with plenty of juice, arranged as above. Or, another way, is to toast and butter slices of bread, pour over it hot stewed fruit in alternate layers, and serve warm with rich hot sauce. (Mrs. L. S. W., Buckeye Cookery.)

Spiced.—The plums should be pricked before cooking. Seven pounds of fruit, four pounds of sugar, one pint of vinegar, one-half ounce of ginger root, one teaspoonful of ground cloves, two teaspoonfuls of allspice, two teaspoonfuls of cinnamon, one-half teaspoonful of ground mace. Put the vinegar and sugar on to boil; mix the spices and divide them into four parts; put each into a small square of muslin, tie tightly, and throw them into the sugar and vinegar. When this mixture is hot, add the fruit; bring to boiling-point, take from the fire, and turn carefully into a stone jar. Stand in a cool place over night. Next day, drain all the liquor from the peaches into a porcelain-lined kettle, stand it over a moderate fire, and, when boiling, pour it back into the jar over the plums or cherries. Next day, drain and heat again, as before, and do this for nine consecutive days, the last time boiling the liquor down until there is just enough to cover the fruit. Add the fruit to it, bring the whole to a boil, and put in jars or tumblers for keeping. (Canning and Preserving, by Mrs. Rorer.)

Sweetmeats.—Take Damson plums that are perfectly ripe, peel and divide, and take out the stones; put over a gentle heat to cook in their own juice; when

soft rub through a sieve and return to the stove, adding just enough sugar to sweeten, a little cinnamon, and, when nearly done, wine in quantity to suit the taste. This is done more to keep the sweetness than for the flavor, as self-sealing cans are not used here. All preserves are pasted up with the white of eggs. (Mrs. Williston, Heidelberg, Germany, in Buckeye Cookery.)

Spiced Plums.—Make a syrup, allowing one pound of sugar and one pint of vinegar to each seven pounds of plums; to this add one teaspoonful of allspice, one of cloves, two of cinnamon, one-half ounce of ginger root; tie these spices in muslin and cook in the syrup. When it boils add the plums, bringing all to the boiling-point; simmer slowly for fifteen minutes and stand in a cool place over night. Next drain the syrup from the plums and put the plums into stone or glass jars; then boil the syrup until quite thick and pour it over the fruit.

Another recommends pouring the boiling spiced syrup over the plums in a stone jar, drawing it off and bringing it to a boil every other day and pouring over the plums again until it has been heated five times, after which the fruit and syrup are placed in a kettle and boiled slowly for five minutes, and sealed hot in glass jars. This is said to preserve the plums whole.

By simply covering the fresh plums with cold well water, they may be kept for three weeks or longer, and the water removes all harshness from the skin and pit. They may be kept in good condition for use until winter or the following spring, by placing in a barrel or jar and pouring boiling water over them.

To Remove Fruit Stains.—Mix two teaspoonfuls of water and one of spirits of salt, and let the stained part lie in this for a minute, then rinse in cold water. Or wet the stain with hartshorn (ammonia).

Another way to remove fruit stains: Pour on boiling water and let stand a few minutes.

A HORTICULTURAL WIZARD.

LUTHER BURBANK.

H. E. VanDeman has the following interesting sketch of our famous hybridizer in a late issue of the *Rural New Yorker*. As one must see from this, Luther Burbank was a born horticulturist:

Luther Burbank, of Santa Rosa, Cal., began by originating the Burbank potato while he yet lived in Massachusetts, and millions of bushels of that choice variety have since been grown and marketed in many parts of the world. He came of horticultural stock on his mother's side, for she is of the Burpee family, which is represented at Philadelphia by one of the most eminent flower and vegetable experts in the world. She is past eighty-five years of age, and lives with her son in California, witnessing the results of his useful life. His father's family were of a mercantile and manufacturing turn of mind. Although born and reared on a large farm in Massachusetts, the boy Luther was sent, when eighteen years old, as an apprentice to the Ames Plow and Spade Works, at Worcester, to learn wood-turning and pattern-making. The love of nature and outdoor work, which came from his mother's blood, would not allow him to endure the confinement and dust of the shop; so after three years of it he bought a small farm near Lunenburg, Mass., and began experimenting with plant life. It was here that he grew the Burbank potato from seed.

He told me once that he loved to work with plants from childhood, and can remember a big crying spell he had over smashing a pot with a cactus plant in it when he was less than three years old. He soon became inspired with the idea of devoting his life to originating new fruits, flowers, and vegetables. Thinking the climate of New England uncongenial to this line of work, he moved to Santa Rosa, Cal., in the fall of 1875. He started a small nursery there, in which the olive was a specialty. When I visited him there in 1888, he had all his propagating houses full of olive plants. He was constantly experimenting with seedling fruits and flowers, and, although this work was not so profitable as the nursery business, he loved it better, and sold out all but the experimental part, that he might devote his whole time and means to it.

At his home within the city limits, he has about ten acres, all devoted to experiments, and a large modern greenhouse, in which some of his most delicate work is done. At Sebastopol, which is a few miles distant in the foot-hills, he has eighteen acres closely set to experimental trees and plants, besides about thirty acres for farm experiments. Mere curiosity or pleasure seekers are not admitted to his premises, for he has no time to devote to them, neither does he wish to give information outside until he is ready.

At one time there were on his grounds over 80,000 seedling lilies. Mr. Burbank originated a new strain of the gladiolus, of which he sent me ten of the choicest varieties about ten years ago. He sold out the whole lot to an Eastern nurseryman. Over one million seedlings were grown before he was satisfied to send out his stock. He grew thousands of seedlings of the iris, and also originated new varieties of the calla and rose that are decided improvements. The chestnut and walnut have received attention at his hands. Some of the most phe-

nominal varieties of the chestnut ever known were originated by Mr. Burbank. The Persian walnut has been crossed upon the wild walnut of California, and various other crosses of the same nature were made in this family, which have resulted in some remarkable varieties. Among the berries, he has made crosses and grown millions of seedlings. He has repeatedly accomplished what was long thought to be impossible, in the crossing of the blackberry and raspberry, and even the strawberry and raspberry. The latter cross resulted in nothing of value, but the former has given us some very excellent varieties. Some of his quince seedlings are of the very highest character, and will, in due time, prove themselves so in culture.

He is making a new lot of crosses at blooming time, planting a new lot of seedlings every year. Not long since he wrote me that he had over 2700 new seedling plums fruiting this year. Of these but few, and possibly none, will be saved by him and sent out to the public. He requires several years' trial before allowing anything to be sent out, or even named. The consummate skill, the enduring patience and the immense expenditure of time and money necessary to accomplish what he does is rarely imagined and, perhaps, never fully appreciated.

Another writer has this to say of Luther Burbank:

He has made the plum a perfect thing. One of his creations was immediately bid for by a syndicate that offered \$10,000 for its control, but it was placed on general sale. Pieces of grafting wood of it were sold at the following prices for propagation: Two feet, \$15; five feet, \$30; fifty feet, \$200; one hundred feet, \$350. Dormant buds on peach and almond roots sold at \$10 each. When a customer questioned the price he said: "You do not appreciate the difference in value of two little pieces of living plum wood, one of which has the power of producing trees that will bear fruit worth \$855 a ton, while the other will bear fruit worth only \$5 a ton." Of another plum he said: "There is only a little bundle of the grafting wood in existence." (This fruit sold at \$8.50 for a box of twenty pounds, eighty-eight plums in the box—42¾ cents per pound, at wholesale.) In an announcement of new creations for 1900 he mentions a new hybrid plum of enormous size and flesh like a white, juicy peach. He is often called the "wizard of horticulture."

THE OPPORTUNITY FOR WIDER PLANTING.

By S. H. LINTON, Marceline, Mo.

That we may better understand the various varieties now in nursery catalogues, it is proper to give the origin, order and group of plums as laid down by scientific authority. The *domestica* or European types (*P. domestica*), native to western Asia, include all of the old-time plums, Green Gage, Bradshaw, Yellow Egg, Damson, Reine Claude. The Chickasaw types (*P. angustifolia* or *P. chicasa*), belonging to the Southern states (on a line with southern Delaware southward), are such varieties as Newman, Caddo Chief, and Lone Star. The American type (*P. americana*) is composed of the common wild plums of the northern part of the United States, from Michigan west to the Rocky mountains, thence south to the Gulf. The Wild Goose or *hortulana* types (*P. hortulana*) form the group of Wild Goose, Wayland, Moreman, Golden Beauty, and Miner; "no doubt hybrids of the native and Pacific coast plum." The Sand plum (*P. watsoni*), native to Kansas and adjoining states, is but little known or cared for by horticulturists. The Beach plum (*P. maritima*), native on the north and eastern Atlantic coast, has little value in fruit, but the trees are beautiful as ornaments. The Pacific coast plum (*P. subcordata*) is a natural product of the forests of Oregon and California, but little known in domestication except in the individual of the Sissin type.

Within the last decade has come the introduction of the Japanese type (*P. triflora*), "probably native of China," says Professor Bailey. During its brief stay the Japanese plum has made many warm horticultural friends, and generally adapted itself to the climate and soil in the United States in all territory south of the north line of Missouri, and will undoubtedly be of great value and a grand acquisition to the already large group of fine plums. By careful breeding, some choice varieties of the Japanese type can and will be produced that will withstand the severe winters of the more northern states. Prof. L. H. Bailey says: "I am still convinced that the Japanese plum has come to stay." Here in Missouri we can add to this, by saying that we are truly glad that they have come. With the addition of the Japanese plum the season is extended from June to the first and middle of September, and in some seasons even into October. . . .

The plum, being prolific in fruit, is necessarily a gross feeder and must have abundance of food combining the proper ration. The three elements in proper ratio which give both wood and fruit growth are: Nitrogen, two per cent.; available phosphoric acid, seven per cent.; potash, nine per cent. This fertilizer should be applied in quantities

of 500 to 1000 pounds per acre annually. The fundamental laws of systematic or scientific horticulture are based on proper food ration. The best soil for plums is a heavy clay, underlaid with a gravelly sub-soil, capable of conserving moisture. The color of the top soil needs little consideration in selecting a proper location for planting—more depending upon the proper chemical analysis of the soil, combined with complete drainage. Hillsides, points, and ridges—other advantages being favorable—make good locations for plum orchards; such locations are numerous in this state. We, as citizens of this great state of Missouri, know no limit or scarcely any bounds to the cultivation of the better and more profitable varieties of plums. “Of all the important fruits, the common plum has the smallest American literature,” says Professor Bailey. This is as much as to say that the culture of the plum, of all fruits, is most neglected, and what is true in this case in the Eastern states is also a fact in Missouri.* Then our fruit-growers should wheel into line with their best and most direct financial interests and plant more good plums, which make a quick return in profit and greatly assist in bridging over the expense of planting and growing other fruits that take longer to produce a crop. Progressive horticulture, toned with experience, polished by science, the products reaped with the golden sickle of success, stored in the broad, liberal minds of the intelligent grower, the joy and pleasure divided with the family and subdivided with friends and acquaintances, is the theme sought for. . . .

CLASSIFICATION OF THE SEXUAL AFFINITIES OF *PRUNUS AMERICANA*.

By C. W. H. HEIDEMAN. Read before the Minnesota Academy of Natural Sciences.

THE PROBLEM.

The uncertainty of the regular annual fruiting of plums in the Northwest, where only the native *Prunus americana*, in its many varieties, has been found sufficiently hardy to endure the climatic conditions, has long been a difficult problem in horticulture. Writers on the subject of plum culture have attributed as the cause of the more or less non-productiveness “the influences of domestication and consequent high culture,” “self-sterility,” etc. The beneficial effect of cross-fertilization has been hinted at and proposed as the remedy for all cases of infecundity. Mixed and close planting of the varieties to better insure cross-fertilization has been suggested by nearly all of them. Reports of various horticultural societies are filled with

* We think this applies to Kansas as well.—SEC.

instances of the beneficial effect of cross-fertilization, but, reading between the lines, as many or more instances of the failure of good results from cross-fertilization have been recorded. Cross-fertilization, therefore, unless it be effected in the direction of the natural affinities of the varieties, does not completely explain why certain varieties, even with the aid of cross-pollination, may be prolific one season and the next produce no fruit at all; why one season the fruit will be large and fine, the next inferior in size and quality; why an unusually fine variety in the woods and thickets will be worthless when removed from its surroundings, even with subsequent best of care and culture.

About ten years ago I began making artificial crosses for the purpose of breeding improved varieties. My grounds contained at least 200 trees, mostly selected from the woods and thickets along the Minnesota and Cottonwood river bottoms, together with a few horticultural varieties of *P. americana*. I soon found that many of my desired crosses were difficult to obtain. I observed numerous adaptations to ensure cross-pollination, together with differences in morphology of the stamen and pistil. Crosses between certain forms were fully fertile, while with others negative results were invariably obtained. Reciprocal crosses between varieties and between species were not equally fertile. I determined to go into the matter systematically, keeping a careful record of each cross made and noting the result, raising hundreds of seedlings and again experimenting with them.

P. americana and other species of *Prunus* vary much in their wild state in flower, fruit, foliage, season of maturity, and other botanical characteristics, so much so that an enterprising botanist might easily pick up in the thickets of almost any natural area where they abound a dozen or more varieties with characters so distinct from the type as to entitle them to the distinction of specific varieties. The writer has no desire to inflict upon scientific botany any further division of the botanical characters of a species which is already sufficiently defined, but only offers his classification for the purposes of this paper in the interest of economic horticulture.

CLASSIFICATION.

Adopting the nomenclature used by Darwin in his "Different Forms of Flowers on Plants of the Same Species," and classifying as to morphology and function, we find the following fairly well-defined forms in addition to the hermaphrodite form of botanists:

Dichogamous Group.—Proterogynous, on which the stigma is ready for fertilization and has passed the receptive stage before the pollen matures. Proterandrous, on which the pollen ripens and matures before the stigma is ready for fertilization.

Heterostyled Group.—Long styled, on which the pistil is nearly twice the length of the stamens. Short styled, on which the stamens are nearly twice the length of the pistil.

Bisexual Group.—Gynodioecious, on which the flowers in morphology consist of perfect flowers, but mostly females with anthers aborted and only a few grains of pollen, and these smaller and mostly aborted. Andromonœcious, on which the flowers in morphology consist of perfect flowers, but mostly males with most of the pistils wanting or only present in a rudimentary form.

These divisions in morphology and function are generally well defined, but sometimes graduate into each other. The hermaphrodite form, which is the only one capable of self-fertilization, is now scarcely found in a wild state. Most of our cultivated varieties of *P. americana* are transition forms of this, and are somewhat difficult to classify. Some of the horticultural varieties certainly belong to the next, and a few are certainly heterostyled. Dichogamous varieties are more frequently met with in nature. The proterogynous form is easily distinguished by most of the pistils projecting through and above the petals, which for a day or two remain incurved over the still immature stamens, thus mechanically preventing the ripening of the pollen, and fertilization, if accomplished at all, has generally been effected before the petals expand. I have also noticed in intense forms of this and the next a considerable difference in the time in which the stigma became receptive and the pollen mature after exposure to air and sunshine. The proterandrous form is also easily distinguished from the fact that the pistil, before the petals expand, is found curved within the corolla, the stigma being inverted and partly within the calyx tube. About twenty-four to thirty-six hours after the petals expand, and usually after the pollen on the anthers has all dehisced, the pistil gradually assumes an upright position and becomes receptive; and as the stigma does not become receptive until after an exposure to the influence of light and air for at least an hour or two, self-fertilization is prevented. The peculiarities of the two dichogamous forms not only in a measure mechanically prevent self-fertilization, but certainly prevent the maturation of the pollen grains and stigmatic secretion at the same time, and this alone in the more intense forms is sufficient to prevent self-fertilization.

With respect to heterostyled plants Darwin says: "Unless it be proved that one form is fully fertile only when it is fertilized with pollen from another form, we have not complete evidence that the species is heterostyled. But when pistils and stamens differ in length in two or three sets of individuals, and this is accompanied by a difference in the size of the pollen grains, or in the state of the stigma,

we may infer with much safety that the species is heterostyled." If the above test is correct, then a few individuals of our species are heterostyled, and many more are tending in that direction. Bisexuality is clearly defined in many individuals in nature, the male form being more numerous. I have frequently met forms entirely devoid of pistils. Now and then I have found forms which do not appear to come under any division of the foregoing classification. For instance, I have a tree which for three years has produced flowers, each of which had two, and in a few instances three apparently perfectly developed pistils. So far no fruit has set, although I made last spring a number of hand crosses to determine its affinity. These freak forms are the exception, and with them this paper has nothing to do.

POLLINATION AND FERTILIZATION.

The fruit-buds of *P. americana* are developed on the spurs and spur-like branches of the current season's growth. The following spring, on approach of steady warm weather in May, the buds swell and expose from one to five flowers, in a simple, umbel-like cluster. The period of bloom and the time when pollination may be effected generally extends over two or three days, and in cool and cloudy weather it may extend over a week. Pollination is effected by the aid of wind or insects. Within from two to twenty-four hours after the blossom has fully expanded, or, in the dichogamous forms, after the pistil and stigma have been exposed to light and warmth, the stigma becomes receptive, as may be plainly seen with a glass of moderate diameters by the glistening secretion on the stigma. Pollen ripens, during clear, warm weather in about the same time, varying slightly in the different varieties. Within three or four days after fertilization has been effected the petals drop off, and the calyx tube is parted over the now slowly swelling ovary and drops off. When pollination has not been effected the blossom continues fresh for several days, although the stigma may have become covered with dust and withered and become non-receptive, and it finally drops off, the peduncle remaining for a day or so longer. The peduncle lengthens to nearly its full length from the time the blossom bursts from the bud until fertilization is complete, and when legitimately fertilized enlarges in diameter. When fertilization has been illegitimately effected the peduncle does not enlarge in diameter as much, and the slightly enlarged ovary usually falls, together with the peduncle, within from three to twenty days after fertilization.

The season of full bloom ranges in different varieties over a period of about ten days. The past season, my earliest-blooming varieties were in full bloom May 2, and the latest May 10. The actual time in the life of a blossom during which fertilization may be effected

scarcely exceeds two hours, and is not, as many suppose, during the whole life of the expanded flower.

LEGITIMATE AND ILLEGITIMATE FERTILIZATION.

From the many artificial crosses that I have made and recorded, I long ago became convinced that fertilization might be effected in different degrees, and that many plants had the power of throwing off such ovaries as were fertilized by pollen lacking in sexual affinity, and that this was especially true in *P. americana*. It should be borne in mind that the production of seed is the chief end of the act of fertilization, and the vivification of the ovule is the primary object of pollination. By systematic crossing and hybridizing, I determined that the union of the reproductive elements of two trees possessing the proper selective affinity for each other readily produced a stronger development of the ovary; a union of this kind I shall call "legitimate." It is well known that by crossing distinct species fertilization is effected with more or less difficulty; that reciprocal crosses of the same two species vary in the intensity of fertilization. As to the union of the reproductive elements of varieties lacking in sexual affinity for each other, or in which the reproductive elements have become too greatly differentiated and the development of the ovary either fails entirely or is below the normal, I shall use the term "illegitimate," and in the same sense as used by Mr. Darwin.

The simplest test to determine the sexual affinity of any variety, and one which I have never known to fail when under proper conditions, is to take several sets of flower clusters and pollinate each individual stigma with pollen of a different form. The union of such crosses as possess the proper degree of affinity will prove fertile, while the union of those lacking in affinity will prove sterile. No matter how many of the flowers of each cluster are pollinated legitimately or illegitimately, the result will be as above. If all of the flowers of a cluster are pollinated legitimately, they will all set fruit, barring accident, of course. This experiment may be modified by many different combinations. Of the forty-nine possible combinations, or directions, of pollinations, but one form, the hermaphrodite, is fully fertile with its own pollen. Including the hermaphrodite form, cross-fertilization is legitimate in only thirteen directions. Thus, it will be seen that, among the seven forms of *P. americana*, pollination is possible in forty-nine directions, thirty-six of them giving negative or illegitimate results, and that there are only thirteen directions in which cross-fertilization is possible.

I know of no group of plants more favorable than the genus *Prunus* for the study of the order of evolution from the hermaphrodite stage to the higher stage of bisexuality. Their organs of reproduction, as

I have shown, present a number of peculiarities of morphology and function, unusually interesting and significant and at the same time unusually intelligible, nor are these peculiarities exhibited to the same degree by any other group of plants. A study of these numerous adaptations to insure cross-fertilization must necessarily end in the conclusion that our species is gradually approaching a state of dioeciousness, and, fortunately for our discussion, there appears to be no missing link in the chain. With these numerous adaptations and structures to prevent self-fertilization and to insure cross-fertilization in view, we are prepared to understand why, in the several cases, self- and cross-fertilization are possible, and why impossible; why cross-fertilization is possible in a certain direction, while the reciprocal cross may be sterile; and, finally, by what means our species is gradually becoming dioecious.

The wedge of variation, having gained a hold of our hermaphrodite form, still in existence and capable of self-fertilization, and forced by long-continued self- and occasional cross-fertilization, produced the earliest types of our dichogamous group which the better insured cross-fertilization. In the proterogynous form, the pistil, protruding through the still undeveloped petals and stamens and receiving the advantage of sunlight, air, and warmth, was encouraged to greater development, the stamens being correspondingly retarded. In the proterandrous form, the stamens received the benefit and the pistil was retarded. Through successive generations, the influence of the law of balancement has been at work, the evolution towards a separation of the sexual organs has fairly started, and we have the foundation in the proterandrous and proterogynous forms for the pistillate and staminate forms of a future dioecious species. Simultaneously with the development of the pistil and retardation of the stamens, and *vice versa*, came the further adaptation of difference in time of maturity of the reproductive elements, with an additional protection against self-fertilization.

The development of the reproductive organs, aided by the law of balancement, continued, and we have developed the heterostyled group. What we before accomplished to quite an extent by purely mechanical adaptations is now accomplished by a differentiation in the reproductive elements. So great a differentiation in the reproductive organs surely caused a differentiation in the sexual elements. Our species has now become divided against itself. The differentiation of the reproductive elements was followed by still further development and retardation of the reproductive organs, and we have nearly reached the bisexual stage, not only in morphology but in function.

We now have only a step further to the complete separation of the

sexual organs. In the earlier stages of the dichogamous group self-fertilization was possible, but mainly prevented by mechanical adaptations to insure cross-fertilization. In the heterostyled group, self-fertilization is prevented by the great differentiation in the reproductive elements, and the sexual affinity destroyed. There can be no doubt that the differentiation into species was accomplished by variation of form, foliage, cell structure, etc., without a corresponding differentiation of the sexual elements. We know this from the fact that distinct species will sometimes cross, but not freely, in a reciprocal direction.

I have myself, within the past ten years, produced hybrids between *P. angustifolia* and *P. americana*; between *P. domestica* and *P. americana*; between *P. besseyi* Bailey (*P. pumila* Lin.) and *P. hortulana* B.; between *Cerasus avium* var. and *P. besseyi* B. I made several hundred crosses to produce hybrids between our Sand cherry (*P. besseyi*) and horticultural varieties of *Cerasus avium*. Pollen of *C. avium* var. on *P. besseyi* invariably proved sterile; reciprocal crosses set fruit, but they failed to germinate, the seed containing only a trace of the aborted ovule. When I finally used the pollen of a proterandrous form of *P. besseyi* on a short-styled form of *C. avium* fertilization was effected and developed a normal fruit, the seed of which germinated and produced an undoubted hybrid. The reciprocal crosses of the same varieties failed to fertilize a single ovule out of over fifty crosses made. I had applied the same principle in the production of hybrids between *P. hortulana* and *P. besseyi* with fair success. The successful crosses just mentioned were made with pollen which had not been too greatly differentiated, on a pistil which, in accordance with the theory advanced for the evolution of the different forms, had been retarded. The unsuccessful crosses were made with differentiated pollen on a pistil not sufficiently differentiated.

Finally, we must conclude that the means by which the bisexual forms have been produced, though gradually and necessarily very slow, are identical with the forces that produced the different species. In the crossing of the different species, we find that, by applying the same rule for cross-fertilization, we can trace the genealogy back to the forms wherein the differentiation of the sexual elements had not destroyed their affinity. From these experiments we deduce the following:

CONCLUSIONS.

Self-sterility of *P. americana* in the heterostyled and bisexual forms is caused by the great differentiation of the sexual elements. Pollination by wind and insects cannot be controlled to any extent. Mixed planting, therefore, unless it be done with respect to the nat-

ural affinities of the varieties, may produce the most disastrous result for the horticulturist.

Other species of *Prunus* observed show these characteristics of *P. americana*, and it may be possible to bring them together under a similar classification.

Finally, we have gained some knowledge in the summary production of hybrids.

THE JAPANESE PLUMS IN NORTH AMERICA.

By PROF. L. H. BAILEY, Cornell University, Ithaca, N. Y.

In 1870 Mr. Hough, of Vacaville, Cal., secured several plum trees from Japan through Mr. Bridges, a United States consul in that country, at a cost of ten dollars each. These trees soon passed into the hands of the late John Kelsey, of Berkeley, Cal., who obtained the first ripe fruit in 1876 or 1877. Mr. Kelsey became convinced of the value of the plum for general cultivation, and its propagation upon an extensive scale was begun in 1883 by W. P. Hammond & Co., of Oakland, who afterwards named it in memory of Mr. Kelsey, and who made large sales in the planting season of 1884. Subsequently other parties, particularly Luther Burbank, of Santa Rosa, Cal., made importations of plum trees from Japan, and have disseminated the varieties widely. For the past four or five years these plums have awakened more interest throughout the country than any other new or recent type of fruits; and it has been found, contrary to the early opinion, that many of them are adapted to the Northern states. While they are often inferior in quality to the best garden or *Domestica** plums, they possess various desirable characteristics which the others do not, particularly great vigor and productiveness of tree, comparative freedom from disease, great beauty, and long-keeping qualities; and the best of them compare well in quality with the common plums.

For many years after the introduction of the Kelsey, there seems to have been little speculation as to the origin or botanical position of these oriental plums; but as the varieties increased and began to attract general attention, a demand arose for a knowledge of their genesis. A plum found in the botanic gardens at Calcutta about seventy years ago by Roxburgh, and by him named *P. triflora*, seemed the most likely parent; but as there were some difficulties in his characteriza-

*The term *Domestica* plums is used to distinguish the common cultivated plums, all of which have sprung from the European *P. domestica*, from the native and Japanese types. The term Japanese plum is used only for these varieties of *P. triflora* now under consideration, and does not include the Bungo or Bongoume types, which are apricots.

tion of the species, and as subsequent botanists have not found the wild form, and as Maximowicz, the most eminent botanist who has recently given careful attention to these oriental floras, does not identify the cultivated plum flora of Japan with Roxburgh's species, I accepted for a time a name proposed by Professor Kizo Tamari, of Tokio, *P. hattan*, and published it as the best means of classifying our knowledge of these plums until the proper botanical name should be determined. In 1891 Professor Georgeson, of the Kansas Agricultural College, who had spent some years in Japan in a critical study of its products, definitely referred these plums to *P. triflora*, of Roxburgh, in an article in *American Garden*.*

The types in cultivation vary much amongst themselves, but I have been unable to make more than one species out of them, and the variation is considerably less than in the families or groups of the *domestica* plums, which botanists are pretty well agreed have descended from a single specific type.

This plum is probably native to China. Roxburgh said that the species was introduced in Calcutta from China, and, upon this assertion, Hemsley admits it to his recent "Flora of China," having "only seen specimens cultivated in the Calcutta botanic garden." There is no record, so far as I know, of its occurrence in a native state in Japan. Professor Georgeson remarks that its cultivation is old in Japan and that its origin is uncertain; and Professor Sargent, of Harvard University, who has recently made an exploration of the forests of Japan,

* The following is Roxburgh's description of the species in his "Flora of India," p. 501 (in this work the plant is called *P. trifolia*, probably through inadvertence): "Unarmed, peduncles tern: leaves oblong, very finely gland-serrate, smooth, in the bud equitant; drupes cordate. China, Hong-sum-li. This elegant, very ramous, bushy shrub has been received from China into our gardens in Bengal, where it blossoms in February, immediately after which the luxurious foliage expands, and the fruit, which is about the size of the common plum, and nearly as palatable, ripens in May and June. Trunk in our young cultivated trees, or rather shrubs, very short, soon dividing into numerous branches and branchlets in all directions from diverging to erect. Bark on all smooth. Leaves alternate in the bud equitant, petioled, recurved, oblong, tapering equally at each end, very finely gland-serrate, considerably acuminate, smooth, from two to four inches long and from one to two broad, in Bengal deciduous about the close of the year. Stipules from the base of the petioles, ensiform, gland-ciliate. Flowers very numerous, rather small and white, short peduncled, regularly three from each bud, and there are generally two of those buds in each of the old axils, with a leaf-bearing one in the center. Bractes, the scales of the bud, cordate, scariose, and nearly caducous. Calyx, segments five, oblong; margins glandular. Petals oval, short clawed, the length of the peduncles. Filaments about thirty, shorter than the petals. Germ ovate, one-celled, containing two ovula attached to the same side of the cell. Style the length of the stamina. Stigma large. Drupe cordate, with an obtuse rising at the apex, the size of the common plum, and of the same purple color, covered with a similar bloom, grooved on one side. Pulp in large quantity, of a pale, reddish yellow. Seed single, conform to the nut. Integument single. Perisperm a thin covering on one side only. Embryo inverse. Cotyledons unequal, the small one doubled, and embraced by the larger, subequitant."

was unable to find wild plants. Much of the interior and western portion of China is unexplored botanically, and it is not strange that the aboriginal type of this interesting fruit is yet undiscovered. According to Bretschneider, the plum was anciently cultivated in China, which indicates an indigenous origin.

Maximowicz, Hemsley and other botanists seem to be confused with the resemblance of *P. triflora* to *P. domestica*, and it has also been said by various pomologists that some of the plums recently imported from Japan are only varieties of the *Domestica* type. While botanical specimens of the two may strongly resemble one another, the species are nevertheless readily distinguished, even in winter, and I have not yet seen a plum of Japanese origin which can be referred to *P. domestica*. In fact, the *Domestica* plums seem to be little known in Japan. Professor Georgeson, writing upon this point, makes the following statements: "The varieties of this species, which is our common plum, have been introduced in Japan, but are not generally known, if known at all, beyond the environments of foreign settlements and those regions reached by the Kaitakushi in its attempts to introduce and naturalize foreign fruits. The Kaitakushi was the name of a department of the government (commonly translated colonization department), which, however, was abolished long ago. Its object was to colonize the northern island with Japanese, and to this end large numbers of fruits and other economic plants from the West were introduced, the climate there being somewhat like that of central and northern Europe." If the *Domestica* plums are little known in Japan, it may also be said that the Japanese plums appear to be wholly unknown in Europe,* unless possibly in Russia, and it is therefore not probable that any serious confusion of varieties has occurred between the two species. It is very important, then, that a complete record of this species should be made while yet it is confined to comparatively isolated areas of the globe.

Botanical position of the Japanese plums.—There is a striking difference in the winter characters of trees of Japanese and *Domestica* plums. The Japanese varieties tend to make long and forking branches, with a light-colored, rough, somewhat peach-like bark, which is marked by numerous corky elevations, while the *Domestica* are closer and more bushy growers, with a dull gray or purplish, tight, smooth bark. But the greatest differences lie in the buds. For example, Coe's Golden Drop, a *Domestica* plum, in common with all varieties of the species, has single and pointed buds. The Japa-

*Naudin, for instance, in his admirable "Manual de l'Acclimiteur" (1887), knows the species (which he calls, erroneously, *P. japonica*) only from an account of the recent introductions into California contained in the *Gardener's Chronicle*.

nese varieties usually have their buds in threes, as in the Burbank, or sometimes even in fours or fives, as in the Kerr, and these buds are small and blunt. Three flowers commonly spring from each flower-bud of the Japanese varieties, and it was this circumstance which led Roxburgh to call the species *P. triflora*, or three-flowered plum; while in the *Domestica* type the flowers are more commonly one or two from each bud. The buds are often aggregated upon short spurs in the Japanese varieties, and the flowers are then crowded into showy masses, as in the Ogon. Upon the longer shoots, where the buds are but three at a joint, the clusters are less evident, as in the Kelsey, yet their glomerate character is always more marked than in the *Domesticas*. Brief characters of separation may be drawn between *P. domestica* and *P. triflora*, as follows:

Common Plums (*P. domestica*): Trees of moderate and more or less crooked growth, with not roughened gray or purplish and often pubescent young wood and single, pointed buds and large, protruding leaf-scars; flowers usually one to two from a bud, large and opening wide, mostly long-stalked; leaves mostly large, thick and heavy in texture and prominently netted and often pubescent below, dull above, varying from ovate to round-ovate to broadly obovate in outline, blunt or the point not pronounced, conspicuously obtusely toothed or sometimes almost jagged; fruit globular or oblong or even oboval but not prominently pointed, with a large, flat, pointed and winged pit.

Japanese Plums (*P. triflora*): Trees of strong growth, with widely spreading, long, forked branches, which are light colored and marked with corky elevations, the young growth not pubescent, the buds three or more at the joint, and the leaf-scars often small; flowers mostly two to three from each bud, generally rather small and short-stalked, and sometimes not opening wide; leaves firm but rather thin in feeling and not pubescent nor rough-netted below, although the whitish veins are pronounced, very smooth and often somewhat shiny above, commonly long-obovate or sometimes nearly elliptic in outline and the point usually prominent, the edges marked with fine, close serratures; fruit globular or more often conical, and with a deep depression at base and a very prominent suture, the flesh clinging to or free from the smooth or lightly pitted, scarcely winged pit.

But these Japanese plums are more nearly allied botanically to our native plums, particularly to the Wild Goose type, than they are to the *Domestica* class. This may be seen even in the twigs of the Wild Goose. And this similarity to our native species is really, to my mind, one of the strongest points in their favor, for it indicates that they will be likely to adapt themselves to a very wide range of our great country, inasmuch as we may fairly assume that similarity of

attributes has been produced by similarity of environment. This conviction of their kinship with our native species and the knowledge that they come from the eastern Asian region from which we draw so many of our adaptive plants, has led me to recommend them strongly for trial even in our more trying fruit regions; and recent reports indicate that some varieties bear so far north as Ottawa, Ontario, and in the trying winters of central Iowa; and one, at least, of Professor Budd's Russian plums is of this species. Several pomologists have been struck with this similarity of the Japanese and native types; and, strangely enough, Dr. A. B. Dennis, of Cedar Rapids, Iowa, in endeavoring to explain this relationship, in a recent paper before his state horticultural society, by supposing a former land connection between northwestern America and Asia, has independently hit upon one of the important points in the coincident evolution of the Japanese and eastern American floras, the discussion of which, over thirty years ago, made Asa Gray famous.

It may be well, in passing, to consider for a moment the possible effect of this new class of plums upon the further development of our native species. I am sorry to hear from some of my friends who have given careful attention to the amelioration of the natives, that they shall now relax their efforts upon the native types and accept the Japanese sorts in their stead. It is true that the Japanese plums are now better in their fruit, for all that we can see, than the natives, but we can depend upon it that they will develop weak points somewhere, even in comparison with the little-improved natives; and we should further consider that all types of plums now in the country, or likely to come in, add variety and diversity to the foundation upon which our horticulture must build, and make it possible to develop fruits for every variety of country and use. And if the Japanese plum promises more for large areas of our country than the European or *Domestica* type, because of its evolution in conditions somewhat like our own, certainly the native species must possess still greater promise. The native species are yet scarcely rescued from the woods, while the other two have been cultivated for centuries; but, while the latter have sprung from a single species in their respective countries, our native stock offers at least a half-dozen species, and it is from them, without a doubt, that the greater part of the American plum industry will some day be found to have sprung.

Nomenclature and classification of varieties.—There is much confusion in the nomenclature of the Japanese plums. If the varieties imported from Japan have been named at all, they have usually come as Botan or Botankio, Hattankio or Sumomo (generally written Smomo); but these names refer to classes or groups of varieties, and

the attempt in this country to apply them definitely has resulted in confusion. It may also be said that the Satsuma or blood class appears to comprise several varieties. The Sumomo class is characterized by small, globular fruit, with a firm, sweet flesh, ripening very early. The Botans or Botankios are larger and later round plums, while the Hattans or Hattankios are conical. The terms are applied loosely even in Japan, and it does not seem to be worth while to endeavor to retain them here, particularly as there appear to be all manner of gradations between the types of the different groups. There has been some misconception of the application of these terms, and it is often said that they refer to color rather than to shape.*

There are various colors in each of these classes of plums, from deep purple to light red, yellow, and nearly white. The Hattankio class seems to be the commonest in this country, being represented by the Kelsey, Burbank, Satsuma, Abundance, Berckmans, Normand, Kerr. The Botans are represented here chiefly by Ogon and Willard, while the Sumomos seem to be known only in the little, cherry-like Berger, which passes under a variety of names. The Japanese plums might be divided into two general groups upon the color of the flesh—the yellow-fleshed and the red-fleshed, or Satsumas—but this classification would serve little purpose, although the Satsumas seem to be recognized as a class by my Japanese correspondents.

Characteristics of the Japanese plums.—Many varieties of Japanese are now named and more or less disseminated in this county, and others are known by numbers or indefinite appellations. . . . Un-

* Upon this point, Professor Georgeson explains as follows: "Quite a number of the many other varieties [than the Sumomo] springing from this species are designated by two general names, a fact which is very confusing to a stranger when he begins to study them. These names are botankio and hattankio, or bodankio and hadankio, for they are variously pronounced as regards the sound of *d* and *t*. These two names are common, and are even occasionally heard in this country: but it is a mistake to suppose that they apply to two and only two varieties. They are names of two ill-defined classes of plums, and are applied rather loosely to several varieties which differ in color and size, and somewhat also in shape. The only distinction between the two classes that I have been able to establish is based on the shape. The round plums are designated by the term botankio, while those of an oval or pointed shape are called hattankio. A mistake often made by foreigners, and by some natives also, is to suppose that the distinction is based on color, though it is a fact that most of the botankios are red. The name hattankio is also sometimes given to the almond, while botan is the name of the peony, and ha-botan means cabbage, and one of the many meanings of kio, or kiyo, is large, or great. If these objects had anything to do with the naming of the plums, it seems probable that botan referred to the rounded shape and not to the color, since their peonies are found in a great variety of colors, and that hattankio referred to the resemblance in shape to the almond. But, as already remarked, these names are used very loosely, as it is an easy matter to find several evidently quite distinct varieties of each class for which both grower and dealer can give you no other name than botankio or hattankio, as the case may be. Sometimes, again, these terms may have a prefix indicative of color or size, or the place where it is grown." (Am. Gard., xii, 74.)

named seedlings are coming to be known to experimenters, and the time must be near at hand when a varied American progeny will come. . . . Unfortunately, the Kelsey was the first Japanese plum to become known in this country, and, as it is hardy only upon the Pacific coast and south of Virginia, it became a general impression that the species is not adapted to cultivation in the north. The varieties which are now known to be hardy in the plum regions of New York and Connecticut are Burbank, Abundance, Willard, Ogon, Satsuma, Berger, Chabot, and Yosebe, and most others give promise of hardiness. Doctor Dennis reports Burbank and Ogon to have borne at Cedar Rapids, Iowa, after having experienced a temperature twenty-six degrees below zero. Early blooming will probably prove to be a more serious weakness of these plums than lack of hardiness.

The season of these plums varies considerable. The earliest to mature in central New York is the little Berger, which ripens the middle of July. The earliest of what may be called the market varieties, in this latitude, seems to be Willard, which colors sufficiently for market about the 15th of July in ordinary seasons, and which is fully ripe for eating a week later. Ogon follows, coming in about the 1st of August, or sometimes late in July, or about ten days ahead of Wild Goose. Late in August, or very early in September, the Abundance is ready. Burbank ripens here about the first or second week in September.

As a class, the Japanese plums are long keepers. Even when fully colored and grown and fit to eat, some varieties will keep nearly two weeks, most will keep a week, and some, if not all of the varieties, ripen up well if picked rather green, after the manner of a pear, although they may suffer in quality from such treatment. Willard, picked when beginning to color on the exposed side, I have kept nine days in good condition in a warm room with no attempt to preserve them; Abundance picked August 24, when well colored, began to decay September 2; Burbanks, partly colored and picked August 24, were placed in a tight box in a warm room, and on September 5 they were nearly all in perfect condition and had colored well, but even then were not fully ripe; a red plum, much like Berckmans, kept from September 18 to October 1. J. H. Hale, of Connecticut, reports keeping Satsuma two weeks in his office in good condition, and they were fairly ripe when picked.

Varieties.—An attempt will now be made to describe the varieties of Japanese plums which are known in North America. The nomenclature is so much confused and many of the varieties so imperfectly known, that I cannot hope to have arrived at just conclusions in regard to the proper names and descriptions of all of them; but the

attempt will serve to classify and fix our knowledge of the varieties, and I hope that it will lead others to make a more prolonged study of them. It is particularly difficult to determine which is the proper type of any variety in those cases in which two or three fruits pass under the same name, and I presume that some of the following names may be found to be wrongly applied. On the other hand, it is very probable that some of the varieties which are here kept distinct may prove to be identical. Some of the varieties I know only from printed descriptions, but I have added them for the purpose of making the monograph complete. Many growers have given me great aid in the preparation of this descriptive list, among whom I should mention P. J. Berckmans, of Augusta, Ga., and S. D. Willard, Geneva, N. Y., without whose cooperation I could scarcely have attempted this essay.

It has seemed best to discard entirely the Japanese class names, as Botan, Botankio, Hattankio, Sumomo, and the like, as they only lead to confusion. I have therefore renamed some of the varieties which are passing under indefinite names or numbers. The introduction of the name Abundance for the plum first known as Yellow-fleshed Botan has been severely criticized in some quarters, but I have always felt that the renaming was not only justifiable but essential to lucid nomenclature. If the other Japanese generic names had been supplanted several years ago, much of the present confusion would have been avoided.

In rating the size of the varieties, Kelsey, of course, must stand ten; and in comparison with this standard even seven or eight represents a large plum.

It does not seem to be necessary to adopt any classification of these plums, and I have therefore listed them alphabetically. The most serviceable classification would be one founded upon color of skin and flesh. The varieties might be arranged as follows:

A.—Yellow-skinned plums: Georgeson, Kerr, Normand, Ogon.

B.—Red-skinned plums: (1) *Yellow flesh*.—Abundance, Babcock, Bailey, Berckmans, Berger, Burbank, Chabot, Kelsey, Long Fruit, Maru, Munson, Orient, Perfection, Red Negate, Strawberry, Willard, Yosebe. (2) *Red flesh*.—Delaware, Hale, Heikes, Late Blood, Satsuma, Uchi-Beni.

ABUNDANCE (Yellow-fleshed Botan). Medium in size (but large when thinned), varying from nearly spherical to distinctly sharp-pointed, the point often oblique; ground color rich yellow, overlaid on the sunny side with dots and splashes of red, in some specimens nearly uniformly blush-red on the exposed side; flesh deep yellow, juicy and sweet, of good quality when well ripened; cling. A strong-growing upright tree, with rather narrow leaves, and a decided tendency to overbear. This is the best known of all Japanese plums in the North, and its

popularity is deserved. Ripe in early September or late August. Imported by Luther Burbank in 1884. Named Abundance, and put upon the general market by J. T. Lovett in 1888. The fruit is apt to rot badly in wet seasons, unless well thinned.

BABCOCK (Botankio, Botan of some). Medium to large ($1\frac{1}{2}$ to $1\frac{3}{4}$ in. diam.), round, conical; skin yellow overlaid with purplish red, rather thick; flesh deep orange and solid, a little coarse, sweet, of good flavor and quality; cling; rather late, ripening about with the Burbank. Imported in 1885 by Luther Burbank. Now named for Col. E. F. Babcock, a well-known nurseryman of Little Rock, Ark., among the first to grow and recommend.

BAILEY. Large, nearly globular; ground color rich orange, overspread with light and bright cherry-red, and showing many minute orange dots; flesh thick and melting, yellow, of excellent quality; cling. Tree strong and upright, productive. Closely related to Burbank, but rounder and mostly larger, and a week or more later. Imported by J. L. Normand, Marksville, La., and by him named and introduced in 1891.

BERCKMANS (True Sweet Botan, Sweet Botan, White-fleshed Botan, Botan of some). Medium (slightly above if thinned), broadly and obtusely conical and somewhat angular in cross-section; deep blood-red if ripened in the sun; flesh very sweet, moderately juicy, excellent in quality; cling or semicling; ripens with Abundance or just ahead of it. One of the best. Introduced by Luther Burbank in 1887, from imported stock. The variety does not appear to be a true Botan, and its nomenclature is so confused and indefinite that I have renamed it for Mr. Berckmans, who has done much to popularize it.

BERGER. Fruit very small and globular; bright, uniform red, with a firm, meaty and sweet yellow flesh, and a very small, free stone, ripening as early as the middle of July in some parts of New York and Connecticut. The fruit is very distinct in appearance, and cannot be mistaken for any other Japanese plum which I have seen. T. V. Munson, of Texas, writes as follows of it: "The Berger plum is an upright, cherry-like tree. It bears a purple fruit about the size of the Black Tartarian cherry, with meaty flesh, nearly free stone, which is as small as the pit of the common Black Morello cherry, and much the same shape." Mr. Berckmans says that the "tree is very vigorous and distinct in growth, but a shy bearer. The fruit is too small to be worthy of being retained." What I have seen of this fruit, however, leads me to believe that it may be a useful sort for the home garden because of its earliness, daintiness, and pleasing flavor. Professor Georgeson, to whom I have submitted specimens, pronounces it a Sumomo.

BURBANK. Medium to rather large upon thinned trees, roundish conical form, the point generally blunt; ground color orange-yellow, mostly rather thinly overlaid with red, and showing many yellow dots, often more or less marbled, in the sun becoming rather dense red; flesh firm and meaty, yellow, rich, and sugary; cling. Strongly resembles Abundance both in fruit and tree, but the fruit averages larger and of better quality, rather handsomer in its varied markings, and is from two to four weeks later; exceedingly productive. One of the best of the Japans. Imported by Luther Burbank, Santa Rosa, Cal., late in 1885, and named for him by H. E. Van Deman.

CHABOT. Medium to large, oblong, conical; pink-red in color, with many very fine gold dots; flesh yellow and juicy, rather acid, of good quality; cling; medium to late in season; very productive. Ripe in this latitude early in Sep-

tember. Imported from Japan by Mr. Chabot, of Berkeley, Cal., but introduced to the trade by Luther Burbank in 1886. Especially valuable for drying.

DELAWARE. Roundish conical, medium in size; purplish bronze in color, with a white bloom; flesh wine color, juicy, combining many flavors. Trees semi-dwarf; very productive. Catalogued among Luther Burbank's novelties, 1893. Said to be a cross of Satsuma and Kelsey.

The following record of the actual dates of blooming of the Japanese plums has been prepared for me by J. W. Kerr, of the Chesapeake peninsula. It will be seen that some of them bloom as early as *P. pissardii* and *P. simonii*, which are known as very early bloomers.

Record of dates at which oriental plums bloomed at Eastern Shore nurseries, Denton, Caroline county, Maryland, 1892.

VARIETY.	Date when first open blossom appeared.	Date when half of buds were open.	Date when all or nearly all were out.
Kelsey	April 7	April 15	April 20
Botan.....	" 6	" 12	" 18
Ogon	" 16	" 18	" 24
Maru	" 8	" 16	" 22
Chabot	" 8	" 15	" 19
Botankio.....	" 4	" 8	" 10
Hattankio	" 10	" 15	" 19
Yosebe.....	" 16	" 18	" 24
Uchi-Beni.....	" 16	" 18	" 20
Shiro Smomo	" 14	" 16	" 19
Long Fruit.....	" 16	" 18	" 20
Yellow Japan	" 16	" 18	" 20
Burbank.....	" 7	" 11	" 16
Satsuma.....	" 7	" 10	" 17
Engre.....	" 15	" 17	" 20
<i>P. pissardii</i>	" 7	" 9	" 14
<i>P. simonii</i>	" 5	" 9	" 14

Some, at least, of the Japanese plums are much subject to fruit-rot, and this appears to be specially true of the Abundance, particularly when it is not well thinned. Mr. Kerr writes me under date of July 5, 1892, that "there is not a single variety of the Japanese plums that is holding its fruit except Botan, and even they are rotting very rapidly, and I doubt if a perfect specimen will go through. Bordeaux mixture seems to avail nothing as a remedy for the rot. Notwithstanding failures in general this year, I have begun shipping Chickasaws, of which I have a good crop." These plums are evidently not more subject to rot than many varieties of Domesticas, however, and I doubt if they are so much injured, as a rule, as the Lombard.

It has been said that these plums, or some of them, are curculio proof; but this is an error. Yet they often appear to escape much of the excessive injury which falls to the Domesticas varieties. The following note from the *Rural New Yorker* bears upon this point. I

saw the tree here described, upon the editor's grounds, just before the fruit was ripe, and it appeared to be free from curculio injury.

The Abundance plum (August 4) at the Rural grounds is a sight to behold. The branches are wreaths of fruit, and they, as well as the tree itself, are held up by props and ropes. Some of the plums are beginning to color; all are of good size, and, though the old marks of the curculio sting are engraved upon most of them, no injury seems as yet to have resulted. For twenty years, off and on, the *Rural New Yorker* has tried so-called curculio-proof plums. We have never used insecticides nor jarred the trees to destroy them, and we have never before had a crop of plums. Plums are not raised in the vicinity, simply because the people are not willing to put themselves to the trouble of jarring the trees, and they know from experience that they cannot raise plums without doing so. Now, here we have the Abundance loaded down with beautiful fruit, while not a precaution has been taken to destroy the curculio. Blessed be the Abundance! It is well named.

So far as I have been able to learn, none of the varieties are seriously attacked by black-knot, although the disease occurs on them. This circumstance, however, should not be dwelt upon too strongly, for it is possible that the exemption is largely accidental. Yet I have seen perfectly healthy trees on the Hudson river where all the common plums in the neighborhood were seriously injured. The varieties appear to be nearly exempt from leaf-blight, also.

The Japanese plums are commonly budded upon the peach, and so far very few complaints have reached me from failure of the union; but I shall be surprised if as strong and permanent results come from the use of this stock as from the use of their own seedlings or *Domestica* stocks.

REVIEW.

1. Twenty-four years ago a plum was introduced into California from Japan which proved to belong to a species heretofore unknown in America. It was first fruited by the late John Kelsey, of Berkeley, Cal., and for him it was named. It began to attract wide attention about ten years ago.

2. This plum belongs to the species *P. triflora*, which is supposed to be native to China, but which is unknown in a wild state. Subsequent importations have been made from Japan, and at the present time about thirty varieties are more or less known and disseminated.

3. These Japanese plums are distinguished from the common *Domestica* plums by their generally more-pointed or heart-shaped fruit, which has a deep groove or suture upon one side, by a longer-keeping flesh, and generally a less-winged pit. In other botanical features they differ, in commonly bearing three or more winter buds at a joint, instead of one, in the light-colored rough bark, flowers usually in twos or threes, leaves long-obovate or elliptic and finely serrate. They are closely allied in botanical characters to some types of native plums.

4. The nomenclature of the varieties is much confused, largely because the Japanese names are used for groups or classes and not for specific varieties; and there is no uniformity even in the generic application of these names. It is essential to an exact understanding of this fruit, therefore, that the Japanese class names be discarded in this country.

5. While importations from Japan have been made freely, there are probably many more good varieties in that country which have not reached America; but we must look for most permanent progress in the future from American offspring.

6. The Japanese plums differ amongst themselves greatly in hardiness. The Kelsey is adapted only to the states south of Virginia and to the warmer parts of the Pacific coast, but other varieties are fully hardy in parts of Connecticut, Ontario, New York, and Iowa.

7. The varieties now known to be hardy in the plum regions of New York are Burbank, Abundance, Willard, Ogon, Satsuma, Chabot, Yosebe, and Berger; and others give promise of being as hardy as these.

8. The period of ripening of the various kinds extends over a long season, running, in New York, from the middle of July to the middle of September. The same variety does not always appear to ripen at the same period in successive years. This is especially true of the Kelsey, which sometimes varies through a period of three months. In New York, the earliest market variety which has been tested appears to be Willard, followed closely by Ogon, then Abundance and Berckmans, and Burbank still later. Kelsey is generally the latest of all the varieties.

9. Most of the Japanese plums keep for several days, and some of them even for two weeks, after they are ripe. Satsuma is one of the best keepers known in the North.

10. The larger part of the varieties are red with deep yellow flesh, and the Satsuma, and a few varieties less known, have deep red flesh. There are only four well-known yellow varieties. There are eight freestones, as follows: Ogon, Willard, Kelsey, Berger, Maru, Munson, Normand, Yosebe.

11. The varieties which can be most confidently recommended at the present time are Abundance, Burbank, Willard, Kerr, Berckmans, Maru, Red Negate, Chabot, Satsuma, and, perhaps, Ogon. Kelsey is recommended for the South.

12. The chief weaknesses of the Japanese plums are too early bloom of some varieties and liability to the fruit-rot fungus. Amongst their advantages are partial immunity from black-knot and leaf-blight, and often a partial freedom from curculio injury.

13. Altogether, the Japanese plums constitute the most important type of fruit introduced into North America during the last quarter of a century, and they should receive careful tests in all parts of the country.

THE PLUM IN THE WEST.

From Bulletin No. 50, Colorado Experiment Station.

The genus *Prunus*, as now constituted, embraces those species from which have been developed all our stone fruits—almonds, peaches, nectarines, apricots, plums, and cherries. Its representatives are widely distributed over the earth, and the number of species given by different authors varies greatly. Bentham and Hooker, in their "Genera Plantarum," place the number at about eighty. A later work, the "Index Kewensis," recognizes 121 species, and records 290 names as synonyms. The 121 species here considered valid are distributed as follows: Eastern hemisphere, 87 species, 15 of which are credited to Japan and 12 to China; western hemisphere, 32 species, 21 of which belong to the United States and the region north; 7 are credited to Mexico, and 4 to South America and the West Indies; 2 species are recorded of unknown origin.

Our American manuals record species of the genus as follows: "Botany of California" (1876), 6 species; Chapman's "Flora of the Southern States" (1883), 7 species; Coulter's "Manual of the Rocky Mountain Region" (1885), 5 species, 1 variety; Gray's "Manual," sixth edition (1890), 10 species, 1 introduced variety; Coulter's "Flora of Texas" (1891), 8 species; "The Britton and Brown Flora" (1897), 16 native, 4 introduced species, 2 native and 1 introduced varieties. Taken together, these floras recognize 27 native and 4 introduced species, and 3 native and 1 introduced varieties.

Of the native representatives of the genus, sixteen species and one variety are true plums, or of such close affinity as to readily class with them, while eleven species and two varieties are cherries or belong with the cherry group. Nearly all the species enumerated in the manuals are, or have been at some time, introduced into gardens and cultivated, either for their fruits or as ornamentals, but the varieties now catalogued by nurserymen and grown in orchards represent but few species. Of the native cherries, only the shrubby Sand cherries (*P. pumila*, *P. besseyi*, and *P. cuneata*) are grown for fruit. The wild Red cherry (*P. pennsylvanica*) is occasionally used as a stock upon which the common sour cherries of European origin are grafted; it has also been used to a limited extent as a stock for some of the plums.

Of the native plum group, three species (*P. americana*, *P. hortu-*

lana, with its variety, *mineri*, and *P. angustifolia*) have furnished nearly all of the cultivated varieties. The Beach plum (*P. maritima*) is the parent of but one variety, of doubtful value. The Marianna, so largely used for stocks, and the De Caradeuc are closely related but of uncertain origin. A few varieties are probably hybrids, although the manner in which most of them originated is more a matter of speculation than of definite knowledge. There are still other varieties that cannot even be classed as hybrids and whose ancestry is likely to remain undetermined.

Professor Bailey, of Cornell, who has given the whole plum group careful study, arranges the native varieties into groups as follows:

The American group—*P. americana*.

The Wild Goose group—*P. hortulana*.

The Miner group—*P. hortulana*, var. *mineri*.

The Chickasaw group—*P. angustifolia*.

The Marianna group—of uncertain origin. De Caradeuc assigned to *P. cerasifera*, and Marianna thought to be a hybrid.

The Beach plum—*P. maritima*.

The wild plum of the Pacific coast—*P. subcordata*.

Hybrids, unclassified varieties—of uncertain origin.

Our foreign introductions belong to two groups, viz.: The European plums, such as Lombard, Green Gage, and the numerous *Prunus*, to *P. domestica*; the Japanese plums to *P. triflora*.

While the European plums can be grown in some sections, the tender nature of the fruit-buds makes them uncertain on the eastern slope, except in favored localities, and dependence must be placed mainly upon the *americana* varieties. In the fruit districts of the western slope the Wild Goose is eminently successful and stands at the head of the list of profitable varieties, but it is probably too tender for the eastern slope, certainly for the northern and central districts.

In general throughout the West the native plums are proving profitable. Even in districts where the *domestica* varieties are successfully grown, the native Red plums sell in competition with them, and at remunerative prices. While it may be admitted that most native varieties are inferior in size and flavor to those of the *domestica* class, it should be remembered that the extended introduction of the natives is comparatively recent, that the improvement in them has been rapid, and that they offer wonderful possibilities in the direction of future development. All the better varieties are very productive. Some show a strong tendency to excessive production, a habit which, if allowed to go unchecked, not only gives inferior fruit, but tends to shorten the life of the tree. With such varieties systematic thinning must be practiced in order to insure regular crops and fruit of the largest size and best flavor. Then, having produced good fruit, if the

grower will exercise the same care in handling that is given other fruits, and will place them on the market in the same attractive packages, the demand which already exists will be greatly stimulated.

PROPAGATION OF THE PLUM.

Most varieties of plums have come to us as seedlings, selected and retained because of their good qualities; they show development or variation from wild types in varying degree, but, with all, the departure is such that we cannot reproduce them through the seed, and, in order to maintain them, we are forced to adopt other means.

All varieties are perpetuated by either budding or grafting, usually on plum stocks. The kinds available as stocks are various, and exhibit as great differences as appear between the varieties to be propagated. No one stock can be regarded as perfectly satisfactory for general use with all varieties, and it follows that care and thought must be exercised in making choice of what shall be used.

The character of the soil, whether light or sandy, or verging on the other extreme of heavy clay, and the general features of the climate will largely govern this choice, but consideration must also be given to the characteristics of the varieties to be propagated.

The desirable varieties have parentage in widely different species, each of which has characteristics peculiarly its own. The derivative varieties follow more or less closely after the parent species, inheriting habits, likes, and dislikes, which must be regarded if we achieve success in their management. Even among derivatives of the same species we may find varieties sufficiently different to call for the use of different stocks and different methods of treatment. This would be looked for among the varieties that have been under cultivation for the longest periods, and is due to the fact that the variation and development from the original type has not been along parallel lines. Differences in climate, in food supply and in general environment have led to divergence, resulting in races which possess distinctive and well-marked characters. Some knowledge, therefore, of the history and derivation of varieties is essential to the propagator in order that he may make intelligent selection of the stock upon which to work his profitable varieties. Successful propagators, well versed in the history of varieties and in the principles of culture, will, however, often differ in their estimate of available stocks, just as they will differ on methods of practice. Strong-growing varieties are not suited to very slow-growing stocks, because they overtop them and the trees are short-lived. On the other hand, success does not follow the attempt to force a slow-growing variety by working it upon a rank-growing stock. The nearer the variety to be grafted corresponds with the

stock to be used in general habit and vigor of growth, the better will be the prospects for health and longevity in the tree.

For the European plums, such as Lombard, Green Gage, and Bradshaw, probably no stock is better than seedlings of some variety of the species from which these varieties came—*P. domestica*. These have been in common use for many years, but in recent years have been in some degree superseded by Myrobalan stocks (seedlings of *P. cerasifera*, a species of European origin). Myrobalan stocks are in common use in European countries, and have rapidly grown in favor with our nurserymen, not because better trees can be grown upon them, but because it is easier to secure good Myrobalan than good *domestica* stock. Seeds of *domestica* varieties that will produce an even stand of stocks is difficult to obtain, and the Myrobalan, which is easier to grow and less liable to injury from parasitic fungi, offers an acceptable substitute. Some nurserymen import the seeds and grow their own stocks; others find it more profitable to import the seedlings. They are usually received during the winter, planted in nursery rows in spring, and budded in July and August.

In the South, the stocks in common use are the Marianna plum and the peach, and very diverse opinions as to their relative merits have been expressed. Probably the differences arise from varying local conditions, for the testimony at hand indicates that on the light and dry soils the peach stock does best, while the Myrobalan is better suited to the heavier and more moist soils. Even at the North the peach meets with some favor as a stock for plums on light soils, but it is too tender for districts where severe winters are common. For the native varieties, Wolf, Weaver, De Soto, and other derivatives of *P. americana*, the natural inference that *americana* stocks would be best seems to be borne out by experience, but the degree of success may depend in a measure upon the seed used. The species is extremely variable in general habit and rapidity of growth as well as in the fruit produced.

Seeds from which to grow stocks should be chosen from vigorous, free-growing trees only. The progeny of such trees will most nearly accord with the varieties to be propagated and better insure the future of the tree. Seeds are obtained in the fall, separated from the pulp, mixed with sand, and kept in a cool, moist place during the winter. If they can be frozen and thawed several times, so much the better, for they will then more readily crack under the pressure of the swelling embryo. In spring they are sown in seed-beds of deeply stirred, rich soil. In the fall the seedlings are lifted, sorted, and packed away in sand in a cool pit or cellar. The following spring they may be planted in nursery rows, to be budded in July and August.

The commencement of the budding season is determined by the maturity of the scion buds to be used; they are buds of the current year's production and must be well matured. Budding may be continued as long as the bark will "slip," and this, as well as the maturation of the scion buds, will be largely influenced by weather conditions. The length of the budding season may therefore vary greatly in different years. Usually, the season with plums is shorter than with peaches or apples. About ten days after insertion the buds should be examined and the bands loosened, if necessary. Where buds have failed to unite the stocks may be rebudded, and this may be repeated as often as the length of the season will allow. Late in the fall stocks on which buds have failed should be taken up and stored for grafting in late winter or early spring. When growth starts in the spring the budded stocks must receive prompt attention. The stock must be "headed down," that is, cut off above the bud, and here practice varies somewhat. Some growers prefer to cut from four to six inches above the bud, while others would at once cut as close to the bud as it is safe. The idea in cutting high is to leave a stub which may serve as a support to which the shoot from the bud may be tied, the stub being removed at the close of the first season's growth. All shoots below as well as above the scion bud must be removed; otherwise they will starve the bud by diverting the sap to their own development. Further production of these shoots from the stock will occur, and they must be frequently checked in order to secure the best growth of the scion.

By far the greater number of plum trees grown commercially are produced by this process of budding. It is the easiest and best way when trees are grown in quantity, but as good trees can be produced by grafting, and often it is more convenient to graft than to bud. At the Colorado station we used both methods and found grafting rather more uniformly successful than budding. I am aware that the idea is current that stone fruits, and particularly plums, are difficult to graft. It is true that certain precautions must be observed that need receive little attention when grafting the apple, but, these simple precautions taken, the work is no more difficult, and success is as certain as with the apple. Of course, the mechanical work of putting scion and stock together must be well done, but outside of this there are three points upon which success mainly depends: (1) The perfectly dormant condition of both stock and scion at the time the operation is performed; (2) the protection of the union by coating with wax; (3) proper care of the plants between grafting and setting in nursery.

The work is usually performed during March or April, and may be continued so long as the dormant condition can be maintained.

Plums, however, start growth under slight stimulus, and a few warm days will end the work, even when all ordinary precautions have been taken. It is best to commence early enough, so that the finish need not be hurried by the weather conditions.

Scions must not only be dormant, but must be neither wilted from drying, nor water soaked from being kept too wet. Sometimes it is convenient to take them from the trees as wanted; more frequently they will be cut late in the fall, or come from a distance, and the question of how to keep them will present itself. They may be kept in an outside cellar or pit, packed in dry leaves, or in moss that is but slightly damp. The aim should be simply to provide conditions that will prevent the loss of moisture, without affording opportunity for the absorption of an excess.

The particular method of grafting to be used is much a matter of taste. Several are available, among which the four following are named in the order of the writer's preference: Veneer, side, whip, and cleft. The side-graft is probably in more general use than any of the others, but after several years' experience with all of them we are inclined to favor the veneer method as giving the most perfect union.

It is not our purpose to here discuss the principles of grafting, but may remark that in all grafting no union takes place between cut surfaces of the wood. It is only through the adjustment of the cambium of the scion to that of the stock that union is secured, and here it is not a union between cells existing at the time the grafting is done, but through new cells formed in extension of the cambium, which is the only channel of communication between leaves and roots. This being true, it seems reasonable that the less the area of cut-wood surfaces the better. The minimum of cut wood is secured by the veneer graft, which only exposes the wood in the oblique transverse cuts at the apex of the stock and the base of the scion. The one valid objection that may be urged against the veneer graft is that the scion is easily displaced. It is easily displaced if carelessly tied, but with reasonable care no trouble need be feared.

Whatever the method used, the union should be thoroughly covered with some protective wax. A liquid wax, to be applied with a brush, is most convenient, and, of several preparations, one known as "alcoholic plastic" answers the purpose admirably. It is made as follows: One pound of resin and one ounce of tallow melted together; remove from the fire, and, after cooling slightly, but while still liquid, add eight fluid ounces of alcohol and stir thoroughly. This preparation must be kept in a corked bottle or other closed vessel to prevent the evaporation of the alcohol. After waxing, the grafted stocks should be returned to the cellar and kept at as low a temperature as

possible without freezing until the time arrives for setting in nursery. The roots may be placed in damp sand, but the scions should be subjected to such a degree of moisture only as will prevent drying out. The practice as here outlined is successfully followed in our station work. In all grafting of plums, the scion should be set low on the crown, so that when planted in the nursery the union may be placed well below the surface.

The plum is seldom worked above the ground, and there seems to be nothing in the practice to commend it for practical purposes. If it is attempted, it should only be with varieties of close affinity, and trees of equal vigor. Scions from a slow growing tree cannot keep pace with the branches of a strong grower, and if the strong scion is worked on the slower stock it soon outgrows it and the wind breaks it off. A scion of Indiana Red worked on a wild *americana* stock three feet above the ground produced a straight whip five feet and four inches long; three feet above the union the new growth had the same diameter as the stock at the ground. It yielded to a moderate wind. Sometimes, when new varieties are procured for trial, a few scions are worked on old trees of some *americana* variety, with a view to obtaining fruit quickly. Thus, trees of Ogon, planted in 1894, have not yet fruited, because the tops have killed back every year, but scions from the same trees, taken at the time of planting and worked on *americana*, have given us fruit for four seasons. Several other varieties treated in the same manner at the same time have fruited, but all, or nearly all, are now dead.

PRUNING.

Plums are pruned for the purpose of forming and maintaining a symmetrical, well-balanced top. Five or six branches, equally distributed about the stem and having some vertical separation, are selected to serve as a framework of the top. All others are removed and the leader is shortened. The branches retained should be cut back to some extent, but this, as well as the shortening of the leader, must be determined for each tree, being dependent upon the root system and the apparent vigor. In shortening the branches and leader, the cuts should be made with reference to selected buds so placed that the future extension may be in the right direction. During the summer rub off shoots that start where they are not wanted, and pinch the tips of rampant branches. The second spring, before growth starts, the shoots produced the previous year should be shortened to encourage the production of secondary, interior branches, and the third year this is repeated. From now on no pruning is needed, except to remove branches starting from wrong places and to control the too vigorous branches. This is best done by summer pinching, and, in general, it

may be said that the less the knife is used on plum trees the better it is for the trees. Most varieties require very little pruning after the head is once formed.

SOILS.

Plums will adapt themselves to almost any soil that would be chosen for apples or pears. *Domestica* varieties are perhaps best on heavy clay, and choice may be more restricted with them than with most other sorts. The native varieties are suited to a wide range of soils, but no tree will do well on wet, mucky soils, and, as the plum is a rank feeder and a heavy bearer, the soil must be of good fertility.

IRRIGATION.

Frequency in the application of water is so entirely dependent upon the character of the soil that no rule can be made to govern it. How best to irrigate must be learned by experience for each orchard. In a general way, it may be said that young trees require more water the first season than is necessary in succeeding years. Trees that are bearing, however, should receive almost if not quite as much as young trees; it is necessary for the best development of the fruit. The soil of the Colorado station orchard is quite compact; water does not spread quickly, and each irrigation is prolonged for a greater time than would be necessary on more porous soils. When water is available, we aim to apply it once in ten days for young trees; somewhat less frequently for those older.

The effects of drought during July and August are frequently seen in small, inferior fruit. Reasonable care in the application of water during this period will well repay the trouble in the increased quantity and better quality of fruit. It is, however, possible to apply an excess that may work as great injury as the most severe drought. It is only by studying the appearance of the trees and the condition of the soil that we can arrive at a correct adjustment of the quantity to be applied and the time to apply it. It is the practice at the Colorado station to withhold water after the 1st of September, in order to check growth and allow the wood to ripen. If growing conditions are maintained through the fall, the young and succulent wood of even the hardiest varieties is in danger of being killed by low winter temperatures, but if well ripened it survives the extremes without injury.

Twice within the last six years we have had open winters that proved more productive of injury to trees than those of continuous cold. There were long periods of warm weather, with no frost in the ground, and no precipitation to supply the continuous evaporation. The soil became very dry and the trees suffered in consequence. To guard as much as possible against such injury, it is the practice to give a late irrigation usually in November. If the ground can be

well saturated at this time it is of advantage to the orchard, whether the months following be cold or warm. If warm, the soil will not so soon become dry, and danger from this source is lessened; if cold and the soil be continuously frozen, the moisture is retained and the conditions for spring growth improved.

The system practiced is to furrow for each irrigation, using a one-horse plow and turning from the trees on both sides of the row. Water is run in the furrows for from twelve to thirty-six hours, according to the supply available and the condition of the soil. As soon as practicable after irrigating, a harrow is used to close the furrow and smooth the surface. The aim is to keep a constant mulch of loose soil on the surface, so as to check evaporation as far as possible.

PLANTING DISTANCE.

The most common practice is to plant 15x15 feet, but this is too close for fully developed trees of spreading habit. A better plan is to plant 15x20 feet, or to adopt the accepted California practice and allow 20x20 feet. There seems to be a decided preference for low-headed trees, on the ground that they are less liable to injury from winds, and that less trunk is exposed to the action of the sun. With low-headed trees the disadvantages of close planting are more quickly apparent. The best-formed trees are those headed at from thirty to thirty-six inches from the ground, and this is the distance we prefer.

Young trees are frequently injured by what are known as "frost cracks"—a longitudinal splitting of bark and wood on the south side of the trunk, occurring in late winter or early spring, and attributable to the extreme daily range of temperature which often occurs at that season. To guard against this injury, the trunks should be protected in some way. Various devices have been used, but we found wrapping with burlap the most effective and least expensive. Burlap that had been used for baling was purchased at dry-goods stores for two cents per pound, and cut into four-inch strips three and four feet long; one pound giving an average of nine strips. These are wound spirally on the trunks, being held at the top by a lap and by tying with cord at the bottom. One man can cover from fifty to sixty trees per hour, with the material prepared and ready at hand. The covering is applied in November and removed in April or May. The same bands will serve for two or three seasons. The whole cost is less than one cent per tree, and will repay the trouble.

ARRANGEMENT OF VARIETIES.

The Wild Goose plum has long been regarded as infertile when isolated, and the same complaint has occasionally been made regarding other varieties, but the experiments carried on by Professor Waugh, of Vermont, in 1896 and 1897, indicate that the actual extent

of self-sterility among varieties of plums has by no means been appreciated or even suspected. His tabulation shows that of 6428 blossoms covered, on fifty-six varieties, representing all classes of plums, only five produced fruits, and from the experiments he draws the conclusion that "for all practical purposes, all classes and varieties of native plums may be regarded as absolutely self-sterile." It is possible that these results might vary with different seasons and in different localities, but, making due allowance for possible variations, the results are startling enough to warrant the attention of plum growers everywhere. The cause of this sterility appears to lie largely in the inefficiency of the pollen of the flowers of a plant upon the stigmas of the flowers of the same plant. It lies in a condition known to exist among many wild as well as cultivated plants. One of nature's provisions for securing cross-fertilization, and the plants come under the recognized Knight's law that "nature intended that a sexual intercourse should take place between neighboring plants of the same species."

Self-sterility may also be due in some degree to imperfect pistils, the cause for which must be sought in some physiological weakness of the tree, such as might be brought about by the work of insects or disease, or from a feeble condition following the production of a phenomenally heavy crop of fruit. Or it may be due to unfavorable weather conditions prevailing at blooming time.

Recognizing, then, the existence of self-sterility among plums, the aim should be to so associate the varieties that one may supply pollen for the other. No data are at hand to warrant any definite statement as to what varieties are especially adapted to the fertilization of certain other varieties, but it is perfectly plain that to be of use to each other the varieties must bloom at the same time.

The varieties now available from which to choose show a rather wide range in blooming period; some bloom together, some finish before others begin, and some overlap. All are much influenced by the weather at the time, and this may vary greatly in different years, not only in the appearance of the first flowers, but in the length of the blooming period. While irregularities may occur from one season to another, it is probable that the relative periods of the different varieties will remain much the same.

BLACK-KNOT OF THE PLUM AND CHERRY.

From Bulletin of the Tennessee Experiment Station.

The black-knot of the plum and cherry is one of the most striking and familiar of the fungous diseases which attack our cultivated plants. That it is a fungous disease there is no longer any question, although for a long time the trouble was thought by many to be due to the attacks of insects. It is a parasitic plant, belonging to the great group of plants called fungi, that causes the development of the black knots, and its characters and habits have been closely studied by mycologists, and are now very well understood.

In the Eastern and Middle states this disease is of common occurrence, and is often very destructive. Wild plum and cherry trees are attacked by the disease, and from these it may spread to the cultivated sorts; the disease may also be carried to new localities by the introduction of unhealthy nursery stock.

The knots are often very large, and not infrequently they completely surround the branches. The surface of the knots is black, more or less irregular, and free from bark, excepting, perhaps, here and there a fragment which has been carried up with their growth. Around the base of the knots one will find the raised and broken edges of the bark of the branch, showing that they (the knots) originated beneath it. If closely examined, the surface of the mature knots will be seen to be studded with slightly elevated and rounded projections, imparting to it a pimply appearance. Each one of these little pimples represents a fruit of the fungus, which is many, many seeded.

They have thick, black walls, and at the top of each is a small opening through which the seeds, or *spores*, as the seeds of fungi are called, escape when ripe. In the interior, or cavity formed by the fruit walls, there are a great number of delicate, elongated sacks, and it is within these that the minute spores are formed, usually eight in each sack. Each sack is hardly more than one three-hundredth of an inch long or high. The spores, which consist of two cells of very unequal size, are, of course, exceedingly minute.

The description just given is that of the mature stage in the development of the fungus. There are other and earlier stages, in which spores or reproductive bodies quite unlike those just described are produced. One kind is borne on dark, olive-green stalks, which, during the period of their formation, cover the knots so thickly that their surfaces resemble silk plush or velvet.

Other spores, supposed to belong to this fungus of black-knot, are

formed within cavities in the substance of the fungus similar to those in which those of the mature stage are produced. These are termed stylospores.

Some time during the summer the spores of the black-knot fungus, which have found lodgment in the crevices of the bark of the trees, germinate and push their germ-tubes into the cambium or growing layer just underneath the bark, and the action of the fungus growth upon the living cells of the cambium excite these into rapid and irregular development, resulting finally in the production of the well-known knots. By autumn the increased growth of the cambium is often externally manifest as a slight swelling along the branches; little change occurs during the winter, but in the spring following the swellings begin to enlarge rapidly, and often attain their full size in a few weeks.

The bark covering the forming knots expands for a time with their growth, but is finally burst asunder, exposing the diseased tissues composing them. The fungus itself continues alive and active throughout the summer and following winter, when the spores of the mature stage, referred to above, are produced, after which the parasite dies, and there is left a mass of open, dead tissues which offer protection and support to various insects that are likely to add to the injury already occasioned.

The fungus of black-knot is remarkably well supplied with means for reproduction, each spore produced being capable of developing a new fungus growth and consequent "knot," if it falls under proper conditions. To prevent this spread of the disease, we ought to remove and destroy at once the knots wherever they may appear, both from our orchards and from all wild trees that may be growing in the vicinity. The knots on a single wild tree may yield spores enough to infect the cultivated trees of an entire county. Badly diseased trees of either sort should be cut down and the knots burned or otherwise destroyed at once. When there is only here and there a branch that is diseased, these alone may be removed with a saw or knife, the knots destroyed, and the trees then disinfected by a thorough washing with Bordeaux mixture, or, if the work be done in the winter, with a very strong (30 to 50 per cent.) solution of sulphate of iron. These solutions, if well applied with a strong force-pump, will doubtless destroy or at least prevent the germination of any of the fungus spores that may be resting on the bark awaiting suitable conditions for development. The same solutions, if applied directly to the newly developed knots, would probably prevent the formation of the spores, but would not be likely to check the growth of the fungus occupying the deeper tissues. The spread of the disease might thus be prevented, but the injury then going on could not be checked.

The knots ought to be removed on account of the attraction they offer to insects, if for no other reason. When the swellings appear on the larger limbs and trunks of the trees, cut them out carefully, extending the cut from two to three inches above and below the knots, and then paint the wounds, first with a strong solution of iron sulphate, and then with some oil paint. From the contagious character of the disease, it can be stamped out only by concerted action, and the extent of the losses which it may occasion when well established make it a subject for state consideration. Now is the time to take action on this matter. Our fruit interests are too important not to demand the protection which the state can give by stamping out the disease in the sections where it now exists, and by preventing its further introduction through diseased nursery stock.

REMEDIES FOR BLACK-KNOT.

From Bulletin No. 81 of the New York Experiment Station.

Many remedies for the black-knot have been suggested but none has proved to be efficient. The most generally recommended preventive measure is to cut out the knots and destroy them. This work should be done as soon as the knot is observed, and if well carried out it is an excellent method of exterminating the disease.

Since fungicides have come into use, spraying for the black-knot has been recommended. The conclusions drawn by Maynard from the experiments of one season recorded by him were that "the number of warts were very decidedly less where treated with the copper mixture than where untreated, . . . and we believe that the plum wart may be held in check by this remedy."

A thicket of Morello cherries which had been treated during two seasons produced only 165 knots. From another portion of the same thicket which had not been treated there were cut 2002 knots on April 25. On November 26 of the same year, this portion yielded 3466 new knots, an increase of nearly fifty-eight per cent. Had the sprayed portion remained untreated, it may be supposed that a similar increase would have taken place in this part, making the assured number cut within a fraction of 2000. The reduction of the number of knots from 2000 to 165, considering the present state of our knowledge and the conditions under which the experiment was carried on, is encouraging, and point to a final control of the disease.

Some of the applications which now appear necessary for the control of the black-knot are to be made when other diseases require treatment. This necessitates but little extra labor in spraying for the prevention of the knot.

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The spraying of plums and cherries to protect them from the black-knot fungus, as stated, can be carried on with profit in all sections where this disease threatens to interfere seriously with the profitable cultivation of these fruits.

BORDEAUX MIXTURE.

Copper sulphate.....	6 pounds.
Quicklime.....	4 "
Water.....	40 gallons.

Dissolve the copper sulphate by putting it in a bag of coarse cloth and hanging this in a vessel holding at least four gallons, so that it is just covered by the water. Use an earthen or *wooden vessel*. Slake the lime in an equal amount of water. Then mix the two and add enough water to make forty gallons. It is then ready for immediate use. For rots, molds, mildews, and all fungous diseases.

AMMONIACAL COPPER CARBONATE.

Copper carbonate.....	1 ounce.
Ammonia.....	enough to dissolve the copper.
Water.....	9 gallons.

The copper carbonate is best dissolved in large bottles, where it will keep indefinitely, and it should be diluted with water as required. For same purpose as Bordeaux.

COPPER SULPHATE SOLUTION.

Copper sulphate.....	1 pound.
Water.....	15 gallons.

Dissolve the copper sulphate in the water, when it is ready for use. *This should never be applied to foliage, but must be used before the buds break.* For peaches and nectarines, use twenty-four gallons of water. For fungous diseases.

PARIS GREEN.

Paris green.....	1 pound.
Water.....	250 gallons.

If this mixture is to be used upon peach trees, one pound of quicklime should be added. Repeated applications will injure most foliage, unless lime is added. *Paris green and Bordeaux can be applied together with perfect safety.* The action of neither is weakened, and the Paris green loses all caustic properties. For insects which chew.

LONDON PURPLE.

This is used in the same proportion as Paris green, but, as it is more caustic, it should be applied with the lime, or with the Bordeaux mixture. Do not use it on peach or plum trees. For insects which chew.

HELLEBORE.

Fresh white hellebore.....	1 ounce.
Water....	3 gallons.

Apply when thoroughly mixed. For insects which chew.

KEROSENE EMULSION.

Hard soap.....	$\frac{1}{2}$ pound.
Boiling water.....	1 gallon.
Kerosene.....	2 "

Dissolve the soap in the water, add the kerosene, and churn with a pump for five to ten minutes. Dilute ten to fifteen times before applying. For insects which suck, cabbage-worms, and all insects which have soft bodies.

OTHER PLUM-TREE DISEASES.

From Bulletin No. 92, North Carolina Experiment Station.

POCKETS OR BLADDERS.

Plum pockets, or plum bladders, as it is indifferently called, is a disease produced by a fungous parasite. This disease is probably of foreign origin, but is now naturalized in America wherever the plum is grown. It attacks the light-colored plums with greatest virulence. The Wild Goose and Marianna are especially susceptible, but the Japanese varieties seem exempt so far. The disease attacks the leaves and branches, also producing a sort of blight very similar in appearance to the blight of peach twigs, which is, however, caused by a different fungus. On the fruit it causes the recently formed plums to swell out and become hollow, producing what are aptly called bladders. Such fruits soon fall to the ground. The spores of the fungus pass the winter in the diseased twigs and probably also upon the remnants of the rotten fruit on the ground and in the fallen leaves.

Remedies: Collect and burn all leaves as soon as possible after they have fallen. Cut back severely all branches or twigs which have borne diseased fruit, or which show the blight-like blackening. Early in spring, as soon as the flower-buds begin to burst, sprinkle the ground under the trees with air-slaked lime. Spray before the buds start with the Bordeaux or copper sulphate mixtures diluted one-third more than the formula gives.

SHOT-HOLE DISEASE.

Like the other stone fruits, the plum is subject to a fungous leaf parasite which produces small black spots, which soon wither and fall away, leaving the leaf full of small, round holes, sometimes called "shot holes." The fungus passes the winter in the fallen leaves of the preceding year. It does not attack the fruit or twigs.

Remedies: Rake up and burn all leaves as soon as they fall. In spring spray with diluted Bordeaux or sulphate mixtures as soon as the leaves are one-half grown, and repeat in two weeks. Usually two treatments will be sufficient.

POWDERY MILDEW.

This fungus works entirely on the surface of the leaves, drawing its nourishment from the cells by means of minute suckers called *haustoria*. Badly affected leaves appear as if dusted with a white powder and this suggested the common name. The fungus does not usually appear until late in summer.

Remedies: Being on the surface, it is easily reached by any of the fungicides in common use. Finely powdered sulphur, which has been successfully used in combating the closely related powdery mildew of the grape, would probably be equally effective in destroying this parasite.

LEAF RUST OR BLIGHT.

A disease which causes the leaves of the plum to fall off in summer; is sometimes common during dry weather. This is caused by a fungous parasite which attacks the leaves only, producing red or yellow spots which soon spread all over the leaf. The fungus lives through the winter in the fallen leaves.

Remedies: Rake up and burn all leaves as soon as they fall; spray the leaves as indicated for shot-hole fungus.

BROWN ROT OF PLUMS.

From Bulletin of Virginia Experiment Station.

Concerning brown rot we may say that only the most persistent effort can hold this fungus in check. As all growers have observed, decayed fruits hang to the twigs and persist over winter. It is from these, in the early days of spring, that an abundant crop of spores is born, and the petals of the flowers, young leaves, and even many branches, are attacked. These mummied fruits also hang on all summer, and continue to produce spores. Hence, by the time the fruits become half grown or begin to mature, the infecting spores may come from the old, decayed fruits of the previous year or from more recent infection on the young growth of the current year. Whenever the fruit has become badly attacked, treatment is quite useless.

The proper plan is to remove all decayed fruit from the orchard when the trees are free from foliage, as it can be easily seen at this time; then, before the buds swell in the spring, wash the trees thoroughly with a solution of concentrated lye or of sulphate of copper. The first solution should be made by dissolving eight cans of lye in fifty gallons of water, and the copper sulphate solution by dissolving two pounds copper sulphate (bluestone) in fifty gallons of water. I consider the lye preferable, but the latter may be somewhat pleasanter to handle. This washing is very important, and, perhaps, does as much real good as all later work.

The later washings should be given as follows; Weak Bordeaux, just as the color shows plainly in the bloom-buds, and repeated soon as bloom has fallen. If the work is well done to this point, very little infection will have survived. Concerning value of later sprayings I am very much in doubt. If the early washing is not well done, I have almost no faith in later treatment.

All washing or treatment of orchards should be done with a spray pump. Poor, half work is usually a dead loss.

CRACKED PLUMS.

We find some complaint of this nature, probably the result of the climatic conditions and irrigation combined. Some of the cases are rather serious, and may result in loss; others simply hurt the looks of

the first fruit and cannot be noticed when the fruit is cured, except now and then a piece where a hard spot may possibly be noticed. We have not noticed any cases of the brown rot of the prune to which our attention has been called from the southern districts, but something similar in a few trees of young apricots. Such cases should be marked and a spray of Bordeaux mixture applied next spring which will destroy the germs of the rot.

PLUM-TREE FUNGUS.

The fungus may be looked for from the time of flowering till the fruit is mature, says Professor Pammel, of the Iowa Agricultural College. Much may be done by removing the diseased plums from the trees in the autumn. I have made observation on this fungus for a number of years and am certain that it is much more troublesome where mummied plums remain on the tree. Some years ago I observed the fungus upon the flowers. It attacked the petals, stamens, and pistil. Soon the whole branch became affected with this blight. In a few days not a single healthy flower remained on the tree. It was also noticed to start from certain parts of the tree. I soon located the cause in the old monilia-attacked plums which were hanging on the trees. In quite a number of cases the starting-point was thus found to be in these old, diseased plums. The object-lesson is plain: remove all of the diseased plums in the fall. Horticulturists often overlook this important point in the treatment of diseases. Rubbish heaps containing the spores of fungi are too often neglected. They should be burned.

INSECTS INJURIOUS TO THE PLUM.

POULTRY AND PLUMS.

A writer in the *Poultry Messenger* says: "The prairie region of the West seems to be the home of the plum. This fruit is found in a wild state in the greatest abundance along the river bluffs and every place where there is natural timber. And yet the cultivated plums always meet with ready sale in towns and villages. Many of the cultivated varieties are natives, improved, of course, by careful selection and propagation. They are the equal of the best California varieties, and, owing to their greater freshness when placed on the market, are generally preferred to them by consumers. They are the easiest to grow of all the tree fruits in this section of the country. And they do best when grown in the midst of the runs given to the poultry. The insects which war against the fruit are choice delicacies for the fowls, and but few of the most destructive of these insects will escape their sharp eyes when they have constant access to the

ground. The people who give free run to their poultry, and those as well who keep it confined, if they have ground room suitable for the growth of plum trees, are throwing away dollars in not planting plum trees. Under right management the fruit can be made to pay for the keep of the hens, leaving all returns from them net profit. Plums cannot be successfully grown in all localities, but there is no question about their success within the territory above named, and every one can have the profit of them who will reach forth his hand to take it."

PLUMS IN THE CHICKEN YARD.

A writer in the *Indiana Farmer* says: "Theories vanish by the side of facts in every avocation. I have at the present writing three Robinson plum trees loaded with ripening fruit and two others with not a plum left. The five trees were set on the same kind of ground seven years ago and have had the same culture. The same results have been derived for the past three years, the three trees bearing a full crop of sound plums, and the two a crop of wormy fruit—worthless. The three fruiting trees are in the chicken yard; the others outside. The ground in said yard is not plowed, but early in the spring is swept and kept hard and smooth. Under these trees I scatter bran and screenings, and 'biddy' does the work of eating the pestiferous insects. While looking for the little seeds and specs of bran she garnishes her food with the spicy curculio. I know this to be true, for I have the evidence. Now, for seven varieties of plums, I must speak a good word for the Robinson. It always produces. I have Wild Goose, Marianna, English Blue, Lombard, *Prunus simonii*, etc., but the Robinson gives me the only crop in this year of 1898. I have been out with saw and lumber this morning and propped up the limbs that are hanging almost to the ground with tempting fruit. Even the chicken yard is not a sure defense with other varieties this year, but the Robinson, where plenty of fowls are enclosed and fed, will not disappoint the planter."

CHICKENS IN THE PLUM ORCHARD.

One cannot live on a fruit farm and allow the chickens full range during the summer, for they are very destructive to grapes and the smaller fruits. As one of our plum orchards extended quite close to the chicken-house, we decided to fence off one part of the orchard with six-foot wire netting, with the following results: Plums have been almost a total failure with us for the past three years, except within the part fenced off. Some trees within the chicken yard bore as high as five crates last year, while all bore a good crop. The row just outside of the fence bore perhaps one-half of a good crop, while the next row and the remainder of the orchard bore from a few boxes to nothing at all. Trees within the yard this spring are looking much brighter

and made a far better growth than the remainder of the orchard, and at this writing, May 3, the fruit is set much heavier. Now, as to the reason, I can only say that chickens are great cultivators, scratching and enriching the soil. All the summer through the ground is kept moist and free from weeds. Some say the chickens eat the bugs and cause a great crop of fruit. There is nothing in that at all. It is very true a chicken will eat the curculio, but that does not cause the tree to set fruit. In conclusion, I would say fence off your plum orchard for a chicken yard, and the heavy crops will more than pay the price of fencing. At the present time all of our plum orchards—Burbank, Abundance, Miner, and Wild Goose—have set fruit, with a fair prospect of maturing a crop.—*M. E. C., in Kansas Farmer.*

PLUM CURCULIO.

From Bulletin No. 65, Utah Experiment Station.

This pest is very injurious to plums, cherries, peaches, and apricots. The mature insect is a dull gray, rough-backed beetle, about three-sixteenths of an inch long. As soon as the tiny fruits are formed the female beetle is on hand to "sting" them. "Stinging" consists of the female puncturing the skin, then depositing an egg in the puncture, and cutting a crescent-shaped slit at one side and beneath the egg. It is then in a little flap and will not be crushed by the development of the fruit. In about a week the egg hatches and the larva tunnels to the pit, where it feeds for from three to five weeks, and then escapes and enters the ground to a depth of a few inches. Here it transforms to the pupa stage, from which it changes to a mature insect in three or four weeks. The beetle spends the winter under any rubbish or under the rough bark of trees.

Remedy: The universal practice is to catch the beetles by jarring. There are several methods of doing this, the most ordinary of which is to spread a sheet or pieces of canvass on the ground beneath the tree and strike the limbs with a padded mallet. When disturbed the insects "play 'possum," and drop on the sheet, from which they are readily collected and destroyed.

A more improved method used in commercial orchards is a two-wheeled cart upon which is built a light frame in the position of the ribs of an inverted umbrella. Over this frame is spread a canvas, the center part of which is two or more feet lower than the edge. The canvas has an opening at the center, below which is fastened a zinc box about one foot in length, breadth, and depth. On the front side of the canvas is an opening wide enough to accommodate the trunk when the cart is pushed under the tree. A few jars with a padded mallet dislodge the beetles and they drop on the canvas from which they are swept into the box below, after which they may be killed in whatever manner is most convenient. The jarring should be begun as soon as the petals fall and be continued as long as any insects are caught. It is best done in the morning while the insects are quiet; later in the day they become active and fly away when disturbed.

Spraying with poisons is also recommended, but with varying results, by different experimenters. Paris green, London purple, or green arsenoid, one

pound, with from three to five pounds of freshly slaked lime, in 250 gallons of water, should be applied first when the leaf-buds are opening. The second application should be given as soon as the petals fall, and a third about ten days later. The poison may be combined with Bordeaux mixture at the rate of one pound to 250 gallons when the latter is used against the shot-hole fungus.

ANOTHER CURCULIO CATCHER.

Orange Judd Farmer.

The curculio attacking quinces, plums, peaches and a few other fruits is but little affected by spraying mixtures of any kind. The mouth-parts of the insect are elongated in the form of a beak, and when the curculio damages the fruit, very little if any of the poisonous substances which may have been applied in the spraying solution is taken into the system. The most effective means of combating the insect, therefore, is to take advantage of its habit of dropping to the ground when alarmed. If a cloth is spread under the tree and the limbs struck with some kind of a pole, the insects will drop at once onto the sheet and can be collected and destroyed.

Placing the sheet about the trees is a slow process. Consequently, the Cornell station has suggested a device. It consists of an arrangement built on the plan of a double-wheeled wheelbarrow with much elongated axle. On this is arranged a number of projecting arms radiating from a point midway between the two wheels. A canvas or any kind of cloth is attached to these arms, with an opening on the far side large enough to admit the trunk of the tree. This is very inexpensive and easily built.

The time to begin jarring is still a question, but as the curculio are usually more active in the early morning, possibly the work had best be done then. These beetles begin operations as early as May, and it will not do to delay jarring them much after they appear. Some years they will not appear until the latter part of July. Those who practice this method successfully jar the trees every day until the numbers are so small that they do not affect the fruit seriously. In one orchard, noted by the Cornell station in 1897, 200 curculio were jarred from seven trees, and it is not uncommon to get as high as fifty from one tree at a single jarring. This process involves considerable labor and expense, but it costs only about fifteen to twenty cents per tree for one season. After the insects are captured they can be destroyed by the most convenient method. Some put them in kerosene or boiling water, while others have a charcoal stove built for the purpose, in which everything that falls on the sheet is burned.

A CURCULIO PREVENTIVE.

Rural World.

Clear the ground under the trees of undergrowth of any nature, then stir the soil about one inch deep, and apply on top (in early spring, before any fruit is set, or, if soil will permit the working, before

bloom falls) the following: One bushel of air-slaked lime, one bushel of wood ashes, two pounds of concentrated lye, two pounds of copperas, ten pounds of sulphur, one package of salt; mix with a hoe, and apply through an old sieve. Protect the hands while applying it, or they will suffer much.

PLUM-TREE APHIS.

From Bulletin No. 65, Utah Experiment Station.

The plum-tree aphid lives over winter in the egg stage. The eggs hatch early in spring into a generation of wingless females, known as "stem-mothers," which soon attain maturity and begin to produce living young. This second generation is also entirely females, and they, in turn, produce female young. After this manner the succeeding generations are all females until the last generation of the season, which contains males. The sexes then mate and the females lay their eggs on the twigs and buds, for hatching early the following spring into the "stem-mothers." If at any time during the season the colonies of aphids become crowded, or the food supply becomes limited, then winged young are brought forth, and they fly to other host plants and start new colonies.

The aphids congregate on the under sides and suck their food, the sap, from the leaves. As soon as they begin their work the leaves crumple up and the edges turn under, thus partially covering up and protecting the lice. When this condition occurs it is extremely difficult to reach the insect with the spraying solution. The time to spray them is just as soon as the young lice appear in the spring, and before the leaves begin to crumple and the edges to turn under.

The black aphids of the plum collect on the tips of the new shoots, and in case they are securely located before spraying has been done, it is probably best to cut off the infested tips, and burn them. In this way thousands of the lice will be destroyed.

Remedy: Some remedy must be used which kills by contact, and of these there are several, as mentioned below. Whichever mixture is used must be applied early in spring, when the first generation hatches, and as often thereafter as it is necessary to keep the lice in check. The spraying must be done thoroughly, directing the spray so it will drench the lower side of the leaves. Whale-oil soap, one pound to seven gallons of water. Kerosene emulsion, one gallon to from ten to fifteen gallons of water.

NATURAL ENEMIES OF THE APHIDS.

There are several insects which [feed upon plant-lice, the most prominent of which are several species of the ladybird beetle. Both the mature beetle and its larvæ feed upon the aphids, and thus are friends to the fruit-grower. A ladybird beetle should never be injured. Other predaceous enemies are the larvæ of the syrphus fly, and the aphid lion or larvæ of a lace-winged fly. There are also a few parasitic insects which destroy many plant-lice.

FRUIT-TREE BARK-BEETLE.

Press Bulletin No. 14, Kansas Experiment Station.

Of the insects that have been introduced into Kansas during the past few years, none seem to be more destructive to stone-fruit trees than the fruit-tree bark-beetle, or shot-hole borer, as it is sometimes called, from its peculiar habit of riddling the bark of the trees with numerous small holes. It has been found in Riley, Bourbon and Allen counties, and without doubt is present in a large number of the other counties of the state. In Allen county it was very numerous, particularly in an orchard of cherry trees which were suffering badly from the cherry scale.

The presence of the pest will probably be first shown by the wilting and falling of the leaves at an unseasonable time. A close examination of the tree infested with the insect will reveal numerous small holes in the bark, from which, in the case of the stone-fruit trees, such as the plum, peach, cherry, etc., there is a considerable exudation of gum. To show how the insect may riddle a tree, a piece of bark less than an inch square, taken from an infested cherry tree, contained nineteen perforations about the size of a pin-head.

The insect that is the cause of the mischief is a small beetle about one-tenth of an inch in length by about one-third as wide. It is black in color, with the exception of the wing-covers and the lower part of the legs, which are reddish.

With the beginning of spring the beetles appear, and commence to bore small, round holes through the bark to the sap-wood, where they make a central burrow or brood chamber, on each side of which little pockets are made, in which eggs are deposited. As the larvæ hatch from the eggs they commence to make burrows away from and at right angles to the brood chamber, which become larger as the larvæ develop in size.

The larva is a small grub about one-tenth of an inch in length. It is footless and white, with the exception of the head, which is brownish.

When the larva has attained its full growth it makes a slightly enlarged chamber, in which it pupates. Upon becoming an adult, the beetle makes its way out through small holes in the bark and escapes. It takes about a month for the insect to go through its various stages, so that during the summer there may be several broods. Many of the beetles, upon emerging, will turn and renew their attack upon the tree, thus increasing the damage that has already been done. In time, the tree becomes completely girdled by the numerous channels, and dies.

Strong and vigorous fruit-trees may resist for a time the attacks of the beetles through the exudation of the gum, which seems to be obnoxious to both the beetles and the larvæ. But if the attacks are con-

tinued for a length of time, the tree may be so weakened that the flow of sap will not be strong enough to repel. In such a case it is not long before the fate of the tree is sealed, unless vigorous and prompt measures are taken for its protection.

To prevent loss from this insect, the tree should be kept in a healthy condition; the stronger the tree the better it can resist attack. Trees that are diseased, or are suffering from the attacks of scales or other insects, seem most subject to attack.

It is a good practice to remove and destroy all dead wood in the orchard, as it furnishes excellent breeding-places for insects and is a source of danger to surrounding trees.

Badly infested trees should be cut down and burned. In the early spring the trunks of trees liable to attack should be coated with an alkaline wash, consisting of soft soap reduced to the consistency of paint by adding washing-soda dissolved in water. Enough carbolic acid should be added to give a strong repellent odor to the mixture. Apply the wash with a stiff brush. Several applications should be made during the spring and summer.

THE PRUNE.

INTRODUCTORY.

It is scarcely to be expected that Kansas will ever grow prunes for commercial purposes; but, as the average Kansan desires to know what is going on in the world and the why and the how of it, and as our people are much given to experimenting, no one can tell in advance what wonderful results may come from horticultural experiments; besides, our people *eat* prunes, and desire to know where and how they grow, the methods of "manufacture," and how to choose the best. They are of the same nature as the plum, and we hope these few pages on the prune, immediately following the plum, will be appreciated. We hope they may enlighten some of our citizens, and make instructive and interesting reading for all.

SECRETARY.

WHAT IS A PRUNE?

DEFINITION IN THE STANDARD DICTIONARY: The edible fruit of a sapindaceous tree; a plum; a *dried* plum used in cookery; as French or Turkish prunes; California prunes. The German prune is a large, dark purple plum, of oval shape, often one-sided; much used for preserving, either dried or in syrup.

Prune tree.—A tree of the genus *Prunus*, which produces prunes.

DEFINITION IN THE CENTURY ENCYCLOPÆDIC DICTIONARY: (1) A plum in recent usage, especially in the western United States; a plum suitable to be dried. (2) The dried fruit of one of several varieties of the common plum tree. The most highly reputed prunes are raised in the valley of the Loire, from the St. Julian and other varieties of plum, the very finest being known as French plums. There is a large and increased production of prunes in California, the variety of plum chiefly grown for that purpose being identical, or nearly so, with that employed in France, while the Myrobalan variety is the accepted grafting stock. Prunes are produced also in Spain and Portugal. German prunes are largely produced, though of second quality. Bosnia and Servia export large quantities. Prunes are stewed as a sauce or otherwise prepared, and valued for their nutritious, demulcent and laxative properties.

NOTES ON PRUNES AND PRUNE RAISING.

The prune was first planted or grafted in California in 1856, and it required about twenty years to get much of a foothold, it being about 1876 before the crop of cured fruit began to assume any size. Captain Bradley planted ten acres as a venture, and when it came in bearing realized \$16,000 from it in four years. This set people wild, and California is to-day prepared to show a crop of from 100 to 125 million pounds of cured fruit the first year when all conditions are favorable to a fair yield. We now see the time when orchards that do not produce well are taken out, but expect the planting to go on until some year Californians will have a crop of 200 million pounds to try their wits on to dispose of.

MONEY IN PRUNES.

A recent issue of the Colusa (Cal.) *Sun* says a Mr. P. V. Berkey shipped 560 sacks of cured French prunes, grown and cured on his ranch three miles above Colusa, on the east side. These prunes weighed when they reached the city 54,300 pounds. They were grown on 600 trees nine years old, making an average of 225 pounds of fresh fruit or 90 pounds of cured fruit to each tree. This, at the low estimate of four cents per pound, will return Mr. Berkey \$2172, or \$3.62 per tree.

THE FRENCH PRUNE CROP.

A correspondent of the *California Fruit Grower*, writing from Bordeaux, France, says:

The annual blooming of prune trees here generally takes place during the first two weeks of the month of March, but this year, in consequence of low temperature, the trees did not blossom until about April 10. This explains, despite the very high temperature which has prevailed for the last three months, the delay in the maturing of the fruit. Harvesting is being done under the most favorable circumstances. The gathering of the fruit commenced in the first week of September and will not be terminated before the end of the month or the first week of October.

The crop is said to be very abundant: pessimists figure it at from 700,000 to 800,000 quintals (French quintal 110 pounds), and optimists figure it at from 900,000 to 1,000,000 quintals. The fruit will be of average size only, from 60-65 to 120-125 to the half kilo (a kilo is 2.20 pounds). It will be of excellent quality, sweet, of good skin, and of excellent conserve. We shall certainly find a little of 40-45 and 50-55 size fruit, but in so small a quantity that it will be impossible to quote them, as they will be sold at fancy prices.

Taking it as accepted that the crop will be 800,000 quintals, you can estimate the output of different sizes as follows:

60-65 fruits to the half kilo.....	75,000 French quintals.
70-75 " "	200,000 " "
80-85 " "	300,000 " "
90-95 " "	100,000 " "
105-130-140 " "	125,000 " "

The quantity brought to the market up to this writing is calculated at about 72,000 quintals of 80-85 to 130-140 fruit. This explains the high prices paid during the past week for a few baskets of 60-65, 70-75 fruit which have been offered for sale. The situation may continue up to the end of this month for two reasons: First, that the fruits 60-65s to 70-75s are, in the majority of cases, still on the trees; secondly, the farmers, seeing that prices which have actually been paid for some small lots have been very high, will keep the fruit back for some time. Still, it is my opinion that prices will not be well established before the quantities brought to the markets correspond with the importance of the crop—that is to say, not before the end of this month.

Following are the prices recently paid for prunes in bulk on the markets of the producing districts: Sizes 60-65 to the half kilo, 42 francs per 50 kilos; 60-75s, 32 francs; 80-85s, 21 francs; 90-95s, 16 francs; and 100-105s to the half kilo, 13 francs per 50 kilos.

In 1897 the crop was about 250,000 French quintals, and the quantity brought to market up to September 15 of that year had reached 175,000 quintals.

NOTE.—The four sizes, 70-75 to 100-105 bulk prunes, converted into American coin and weight, would be equal to \$3.59 per 100 pounds in Bordeaux. To this add freight, incidental expenses and duty of \$2 per 100 pounds for cost laid down in New York city.

PRUNES IN SERVIA.

The cured-prune industry of Servia is an extremely important feature of that country's exports. It is stated that the excellent and abundant prune crop of 1897 will add fifteen million francs, or close to three million dollars, to the total value of the exports from Servia. The high value placed upon the dried-prune exports for this year is not so much owing to the meager and indifferent crops of Bosnia, Slavonia, and Bohemia, as to an order issued by the minister of agriculture as to the best method of gathering, drying and preparing the article for shipment. The instructions under this order have been enforced with great strictness, says the *Fruit Grower*, of London, and has led to a vast improvement in the quality of the exported product. This excellent result from the supervision of his department has given the minister of agriculture an incentive to exercise more rigorous supervision over other articles exported from Servia which come under the control of the department.

PRUNES AS FOOD.

Speaking of what it terms "the plum famine" in England, the *Fruit Grower*, of London, says: "And the mere fact that the public will, on a pinch, pay from twenty-four to thirty-two shillings per bushel for plums proves that that fruit has become one of the most popular food-products of the day. When we say food-products, we mean it. The fruit is rich in sugar, albumen, and blood-thinning juices, and, when dried and sold in the form of prunes, becomes the most perfect food-product known. Science has demonstrated the fact that people can live in good health solely upon prunes, and, as in this

form they are rich in nutriment and strength-giving properties, sales and prices in the future will be forced up to a phenomenal degree."

THEY TIRE OF TART PRUNES.

We have often explained that, while people who have only been used to dried plums, very sour, at first prefer the tart prunes of the Pacific coast, of which the California Fellenberg and the Italian from Oregon and Washington are types, to the sweet California prunes, this taste soon changes with use, and very soon the sweet prunes are much preferred for steady use. They make a richer and better food. The following from a St. Louis paper shows how the taste inclines in that section:

Italian prunes are not so popular in this market as in some other sections of the country, their tart flavor not being appreciated as much as the sweeter taste of the Petite or French prune. The market on Oregon and Washington Italian prunes is about the same as on California French prunes, except the Italians are weak and lower all along the line, large sizes included.

A NEW PRUNE.

Even in Europe California French prunes are acknowledged to be the best produced, and are winning their way everywhere on their superior merits; but California fruit-growers have made one serious mistake in being the very last to acknowledge and take advantage of the new fruits originated in their very midst, and have learned to their sorrow, too late, that more enterprising Eastern growers had the market before them. The Sugar prune, of which a very small quantity of grafting wood will be offered to California growers this winter, ripens nearly a month before the common French prune, averages four times as large, shrinks less in drying, and contains more sugar than any other prune. In beauty of form, color, and excellence of flavor, it stands alone. The tree is a strong, shapely grower, and even more productive than the little French prune. Prominent fruit-growers who have seen the Sugar prune acknowledge that the French prune is a back number, and that the old and young prune, almond and the many unprofitable peach orchards must be grafted to the Sugar, the coming prune.

PITTED PRUNES.

A correspondent of the *California Fruit Grower* says: "Is there a growing demand for pitted prunes of a strictly first-class quality? I know the Klondike trade consumed some, and wanted more, but the quality was probably very doubtful, if indeed they were "prunes" at all. Speaking from personal experience, it occurs to me very forcibly that the better class of trade in the United States would certainly strongly favor such an article, and in this connection—but please remember I have no interest whatever in the trees—I would suggest

that the Splendor prune, being a real freestone, and of very small seed, is exceptionally fitted for this purpose. It may be that the Imperial or Clairac prunes, being so large that some trouble is had with the curing, may profitably be seeded for the finer trade. We need among our prune men a few of similar caliber to the Fresno raisin growers, both in the curing and marketing processes."

Commenting on the above, the editor says:

We do not know of a growing demand for pitted prunes, but know no reason why, under right conditions, such a demand cannot be created. The prune men of California have not begun to exhaust the possibilities of this really delicious fruit product. Witness what France has done and is doing with the prune. The Klondike demand for pitted prunes came not from a desire for a fancy article, as such, but because the conditions of freight transportation necessitated a reduction of bulk and weight to the minimum, and because of this a pitted prune was wanted. We know no reason why a pitted prune should not be as desirable in household economy as a seeded raisin.

RUBY AND BLACK PRUNES.

Mr. A. W. Lane, in a paper before the farmers' institute at Hanford, Cal., in speaking about the two methods of curing, says: "I placed upon one tray fifty pounds of prunes in a condition to make rubies, and on another the same amount of black. After curing, the rubies weighed nineteen and one-half pounds, and the blacks twenty-six and one-half pounds." The prunes to make rubies must be picked or shaken from the trees before they are perfectly ripe and sulphured to produce the ruby color.

THE BURBANK PRUNE.

There were recently brought to the Healdsburg (Cal.) *Tribune* office, by John McClish, samples of the new Burbank Sugar prune, dried and ready for market. The samples, which were fair specimens of the prune, would run about eighteen to the pound. This prune, says the paper just mentioned, has many advantages over the French variety. The grafts will bear in about half the time the French requires; it ripens from a month to six weeks earlier, dries quicker, and also contains more sugar than the French prune. Mr. McClish is greatly pleased with the new prune and will secure some 1300 or 1400 buds for himself and other orchardists who are interested in it. In one instance where this prune and the French variety were grafted on the same stock, the latter bore a very few prunes, while the Burbank graft was loaded with fruit.

In the event of phylloxera destroying the vineyards, Mr. McClish believes that this new prune can be most advantageously used on land now occupied by vines. Being very early in maturing, the fruit would reach marketable condition before the moisture in the soil had been drawn out by the hot days of late summer. Were the French

prune planted on this soil the fruit resulting would likely be too small to pay for gathering.

CARELESS METHODS OF CURING.

The president of the Oregon state board of horticulture, Mr. H. B. Miller, makes the following public criticism of methods prevailing among some Oregon orchardists:

The prune growers of Oregon often wonder why their French prunes do not command as good a price as the California product. An examination of the ordinary methods of curing of the average Oregon prune grower explains much of the cause of this difference in value.

I have just returned from a careful investigation of a number of prune driers, and found much carelessness and slovenliness. In the first place, they pick everything from the ground that they find there at the first picking. Some are half rotten, some half dried, some sunburnt, and almost all immature or defective. These are dried and go into the bins with the general crop. Then, again, a strong man goes over the orchard, shaking the trees as hard as he can, bringing off the prunes in every stage of ripeness, many of them altogether too green to make a good product. A dish of these prunes will have about as many different tastes or flavors as there are prunes, and none of them will be truly first class.

Many of these driers are operated in the most careless manner, without thermometer to indicate the temperature, and, as a result, no two lots are cured equally; and so in the drying, as well as in the methods of gathering, many varieties of flavor are developed. After being cured they are often dumped into coal-oil cases, dirty packing boxes, and finally bring up in a dirty barn for storage. The dirt and filth about some of these driers is intensely disgusting.*

Good fruit, clean and pleasant to the taste and uniform in flavor and quality, cannot be produced by such methods and will not command a good price in the market, and, until better, cleaner and more systematic work is done in the gathering, drying and packing of our prunes, we will be far behind the California price.

In the first place, the sunburnt, immature and partially decayed fruit should not be dried. The trees should not be shaken, but the fruit should ripen on the tree and be allowed to drop, and in this way you will secure uniformity of ripeness. A careful uniformity of temperature for drying should be maintained and the fruit removed when it reaches a fixed standard.

Prune buyers should examine the quality of fruit much more carefully than they do, and by variation in prices reward the careful and conscientious producer for his good work. So far the buyers have offered so much for dried prunes, regardless of their real qualities. Associations for elevating the standard of quality will do much good. I realize that many of the fruit-growers are doing good, conscientious work, and are turning out a first-class product; but I have been surprised at the extent of careless methods in gathering, drying and caring for the prune, and I desire to urge upon all the utmost attention to every detail of production.

*This grade sells in Kansas at six pounds for twenty-five cents.—SEC.

VARIETIES OF PRUNES AND PROCESSES OF CURING.

From Bulletin No. 45, Oregon Experiment Station.

At present there are but three varieties of prunes largely grown in Oregon—the ITALIAN, or Fellenberg; the PETITE, or French or Robe de Sargent; and the SILVER, or Coe's Golden Drop. By far the major part of these are Italians, the Petites being second. Most of the other varieties grown now are sold, when cured, as one or another of these three varieties. All black prunes are sold as Italians, amber ones as Petites, and light-colored ones as Silver.

ITALIAN (Fellenberg, German, Swiss).—Medium size or large, roundish, but tapering at both ends; suture small but distinct; color dark purple with a heavy bluish bloom; stalk one inch long; cavity shallow; flesh yellowish green, juicy, parting easily from the stone; flavor sweetish, subacid, delicious. Tree hardy, vigorous, very productive; rather late. It is not known where the Italian prune originated, but it has been grown in Italy for a long time, where it finds great favor in the fresh state. The Italian is at present the leading prune in the Northwest, probably more than four-fifths of the trees in that section being of this variety.

PETITE (Prune d'Agen, Prune d'Ente, Lot d'Ente, French, Robe de Sargent).—The fruit, as grown in Oregon, may be described as follows: Medium size or small, oval or egg-shaped, not uniformly pyriform; suture small, distinct; color violet-purple with bright-colored bloom; stem short, slender; cavity small and shallow; flesh greenish yellow, sweet, full of sugar, rich and delicious, clinging slightly to the stone. Tree hardy, strong grower, very productive. This is the prune most widely grown in the great prune-growing countries, the favorite in the markets, and is mostly known as Prune d'Agen, excepting in the Northwest, where it is always called the Petite.

SILVER (Coe's Golden Drop).—Size large, oval or roundish; suture distinct, one side abnormally large oftentimes, necked; color light yellow in the sun, dotted with small red spots; stalk stout, nearly one inch long; flesh yellow, juicy, firm, adhering slightly to a very pointed stone; flavor rich, sugary, good quality; tree a precarious grower, but very productive when all conditions are favorable; season late. This variety originated with a Mr. Coe in England in the early part of this century, and received the name of Coe's Golden Drop. A few years ago it was introduced in the Northwest as a new variety, the Silver, a supposed seedling. Much discussion was engendered because of the close resemblance to Coe's Golden Drop, and finally led to the appointment of a committee from the state horti-

cultural society to investigate the matter. The investigating committee reported that the seedling Silver prune tree was a grafted Coe's Golden Drop plum.

REINE CLAUDE (Green Gage).—Fruit small and round; suture not well marked, but showing from stalk to apex; color yellowish green, sometimes, or in the sun or at maturity, slightly marbled with red; stalk short and slender, and inserted in a shallow cavity; flesh yellowish green, free, juicy, melting; flavor delicious, mildly acid, sweetish, unsurpassed. Tree of low, slow-growing, spreading habit; very productive. The nomenclature of this variety is somewhat mixed, from the fact that the trees come fairly true from seeds, and there have thus been propagated several varieties closely resembling the Reine Claude. There is much discussion as to whether our Reine Claude is the Green Gage plum of the East. The writer feels sure that those he has seen in Oregon are the same. For a prune in the fresh state we have no superior, in flavor, to the Reine Claude.

YELLOW EGG (White Egg, Magnum Bonum).—Large, oval, tapering at both ends; suture very prominent; stalk about an inch long and inserted in a very shallow cavity having a fluted border; flesh, when ripe, of deep golden color, dotted with white dots, and covered with a thin white bloom; flesh yellow, clingstone, juicy, quality rather poor, subacid or sweetish, coarse grained. Tree fairly vigorous and fairly productive. Chiefly desirable on account of the splendid appearance of the fruit.

GERMAN.—A name applied to several varieties of plums and prunes, the name representing a class rather than a variety, since the tree comes fairly true from seed. The German prune is a great favorite in central Europe, because of its being easy to propagate and grow. It is an abundant bearer, and of fair quality and easy to cure. Fruit medium size, long, oval, tapering at the ends, swollen on one side; suture very distinct; color dark purple, with a thick blue bloom; stalk an inch long, slender, inserted in a shallow cavity; flesh firm, and of a greenish color; freestone; flavor good, subacid, sweetish. Tree vigorous and productive. Two weeks earlier than the Italian.

DOSCH.—Hon. Henry E. Dosch, horticultural commissioner, writes as follows concerning the prune bearing his name, and which originated with him: "Replying to your favor regarding the Dosch prune, I beg to say: When I bought my present place, there was an acre of Washington plums grafted on plum roots on the place. On one of these trees grew a sprout which started below the union. The former owner called my attention to it, and said that he judged from the dark foliage, large leaves and immense bud shoulders that it was a promising seedling, and begged me to leave it. I did so, and was agreeably

surprised at the beautiful large, dark purple prunes it yielded." Tree a vigorous, healthy grower; leaves extra dark. Dark-purple fruit, covered with a fine light blue blush, and hanging on the tree with great tenacity, shriveling before it will fall off. The prune keeps in good condition three weeks after being picked. When ripe, the flesh is a golden green and is very aromatic; semi-freestone. It evaporates 45 pounds of cured product to 100 pounds fresh fruit. In flavor it is sweeter than the Italian, but not so sweet as the French. It bears every year, and is about ten days earlier than the Italian.

HUNGARIAN (Pond's Seedling, Grosse Prune d'Agén).—Fruit large, oval or ovate, tapering at the stem end, and oftentimes having a divided, elevated neck; skin thick and rich in color, sprinkled with brown dots and covered with a thin white bloom; stalk stout and of medium length, set in a melon neck; flesh yellow, coarse, juicy, quality rather poor, sweet, but not rich. Tree a strong grower and prolific bearer. Season two weeks earlier than Italian, or about the middle of September.

CHAMPION.—Large size, roundish, tapering somewhat at both ends; suture well marked; color dark purple, with reddish bloom; stalk of medium length, rather stout, and placed in cavity of medium depth; flesh firm, very juicy, parting from the stone easily; flavor much like the Italian. Tree very vigorous, healthy, and strong grower. Fruit a month earlier than the Italian. Very productive. The Champion is one of the most promising of our new prunes for shipping in the fresh state. The vigor of the trees, their productiveness, the size, beauty, quality and earliness of the fruit all recommend it.

TECHNICAL TERMS AND PHRASES.

It takes an intelligent person some time to learn the meaning of the somewhat technical phrases commonly used in the prune industry. We therefore give the definition of those most current. Some of the words defined are colloquialisms, but most of them are common to the trade.

Bleaching.—The process of changing the dark color of prunes to a lighter hue; generally accomplished by sulphuring.

Bloaters.—Prunes which, in drying, swell up to an abnormal size. The swelling is supposed to be caused by fermentation, which produces a gas. Bloaters are generally produced from large, soft, overripe prunes.

Dipping.—A process of cleansing and cutting the skin of fresh prunes preparatory to putting in the evaporator, in which the fruit is submerged in boiling lye made by using one can of concentrated lye to fifteen gallons of water. Cured prunes are also sometimes dipped in glycerine and water—one pound of glycerine to twenty gallons of water—which improves their appearance and adds to their weight and keeping qualities.

Drip.—The syrup liquid which oozes from prunes in the process of curing;

it generally characterizes a poor prune or a poor evaporator. As a verb, the falling of the drip.

Extras.—A superior quality of prunes; generally referring to size.

Frogs.—Small, poorly developed prunes, having an abnormal shape—not a synonym of bloaters. Supposed to be caused by unripe fruit, poor soil, or any unhealthy conditions of the tree.

Grading.—Separation of prunes, either before or after curing, into uniform sizes.

Pricking.—The process of puncturing the cuticle of the fresh prune preparatory to putting it in the evaporator. Pricking is done by means of a machine, the essential part of which is a board covered with projecting needles over which the prunes must pass. A substitute for lye dipping.

Sizes.—The number of cured prunes it takes to make one pound. Those requiring from 40 to 50 prunes to weigh a pound are called 40s–50s, those requiring 50–60, 50s, 60s, etc. The four sizes are the 60s–70s, 70s–80s, 80s–90s, and 90s–100s. Commercially, it means equal quantities of these sizes. Sizes and grades are used as synonyms.

Sugaring.—The formation of globules of sugar upon the cuticle of cured prunes, rendering them syrupy and sticky, and destroying the luster of the prune.

Sulphuring.—A process cured prunes are put through to give them a lighter color. The prunes are put in a tight room, generally just as they are put on trays before being placed in the evaporator, and subjected to the fumes of burning sulphur for a half-hour. Or they may be sulphured after being taken from the evaporator.

Sweating.—A process prunes are subjected to, immediately after being taken from the evaporator, in which they are put in piles or bins with the temperature at from seventy degrees or eighty degrees, turned several times, and allowed to sweat.

Picking and Grading.—There are all sorts of prunes put upon the market. The differences are largely attributed to the care and attention given to the details of curing. Simple as it may seem, the picking of the fruit is one of the most important matters in the process of curing prunes. Half the “bad luck” attending evaporation, in which frogs, bloaters, sugared fruit and drip are produced, is caused by carelessness in picking. We put the greatest emphasis upon this, as neglect in picking is one of the commonest faults in prune making, and its betterment must be recognized as a fundamental requisite of success. I have seen men knocking the fruit from the trees with clubs, handling it with shovels, and pouring it roughly from boxes into a wagon-bed. “There is nothing in prunes,” was the cry when the product was put on the market. Shortly before the picking season begins the ground under the trees should be cleared of rubbish and worthless fruit, and the soil mellowed with a steel rake. The Petite prune, and to a large extent the Italian and other varieties, when ripe enough to dry will drop to the ground; at least, no further assistance is given it in falling than a gentle shake of the tree. If the fruit shrivels a little before dropping, all the better. The object in thus letting the fruit get thoroughly ripe is, that not until then is there a maximum amount of solids and saccharine matter so desirable in a good cured prune, much drip is prevented, since there is less juice, and the essential rich flavor is not present until the fruit is ripe. . . .

Dipping vs. Pricking.—Prunes are dipped in boiling lye or pricked by needles in a pricking machine, to check and make tender the tough skin, so that the moisture can escape easily and drying be thus facilitated. Incidentally the fruit is cleansed. Both processes are in vogue, and a discussion of their relative

merits is in order. Lye dipping, as practiced in Oregon, is about as follows: One pound of concentrated lye is dissolved in from ten to fifty gallons of water, the proportion of lye and water differing greatly with the various prune growers. The primitive way is to keep the solution boiling in a large kettle, into which the prunes, placed in a wire basket or a much-perforated metal vessel, are immersed and there kept in motion, by twirling or swinging, for from thirty to sixty seconds, depending upon the condition of the fruit. A more modern way is to have the fruit run from the grader to a set of endless chains with carrying aprons, and by them carried through a pan containing the boiling lye solution, heated with submerged steam-pipes; from the lye the prunes are carried on through fresh water, preferably running water, and then spread on trays. If the operation is well done the prunes on coming to the trays should have their skins bright and shining, and present, upon close examination, a finely checked condition. Over or under immersion causes the fruit to dry unevenly: when too much scalded the skin tears and becomes ragged, and the fruit becomes soft and mushy, making a sticky, nasty mess on the trays. Pricking machines mechanically cut or perforate the skins of prunes. The fruit is fed over a shaking table that has needle points projecting above the surface, these cut and perforate the skins of the prunes. The needle table can be regulated, so that by having different slants the skins may be cut more or less, as the condition of the fruit requires. The dirt and leaves are separated by a screen, and the fruit is washed, either by having it pass through hot or cold water or by having a stream of water play on the fruit as it comes on the pricking table. The pricking machine may have grading and spreading attachments, so that the fruit from the time it is poured from boxes need not be handled until on the drying trays. Each of the two methods is championed by experienced and practical men, some of whom have tried both, and seemingly have obtained directly opposite results. We must, then, come to the conclusion that a choice between the two methods rests either upon prejudice or that there is a place for both, depending on the product desired or the fruit that is to be handled.

Final Processes.—After dipping, or pricking, the prunes are ready for the evaporating chamber. It is impossible to give detailed directions for treatment in the evaporator, since the process must vary with the character of the evaporator. The time required for drying prunes differs with various varieties, and with each variety depends much upon the circulation of air, since circulation governs the degree of heat allowable. Lye-dipped Italian prunes require from twenty-four to thirty-six hours; Petites, twelve to twenty-four hours; Silvers, thirty-six to forty-eight hours. All three varieties are cured in less time, but seldom well cured. A common fault is to hasten the process too much. A prune is well cured when it feels soft, smooth, and spongy: the pit should be loose, but should not rattle; the flesh should be yellow in color, elastic, and “meaty”; the skin should be bright and lively and free from drippings and exudations. An overcured prune is harsh and coarse, and has a dried-up appearance. In prunes not cured enough there is risk of loss through molding or fermenting. The Petite prune, well cured, is of a clean, bright, amber color; the Italian, very dark red, approaching black in color. The Silver must have a beautiful golden hue.

After the fruit is taken from the evaporator it is put in bins or piles to sweat. The sweating room is generally kept at a temperature of from seventy to eighty degrees. To facilitate the process, the fruit is occasionally turned with a scoop-shovel. The sweating is sometimes omitted, but at a risk, as fruit will often-times discolor and possibly ferment if not allowed to “go through the sweat.”

Preparatory to packing, the fruit is graded to sizes, the various grades indi-

eating the number of prunes to the pound, as 30s to 40s, 40s to 50s, and so on to 110s to 120s. By some, the prunes are dipped in boiling water and glycerine, or other solutions, but such dipping is in disrepute, as indicating an undue amount of avarice to secure weight. However, intelligently done, "glossing" or "finishing" prunes may be made a valuable process.

In packing, many different methods are used. A producer will adopt whichever one, for his particular reason, or his particular market or conditions, will give him best results. Only experience can teach this. Much fruit is packed in cotton sacks, many buyers preferring it so packed, as it gives a chance for re-packing. Producers with a good product like to establish a reputation for their brands, and so pack in boxes. There is a gain in weight by this method, as the fruit does not dry out so much as in the sacks. Packing fruit is an art, and must be learned by observation. Lining with paper, filling, facing, etc., all require a little education. If the boxes are to be faced, average specimens of fruit should be flattened and neatly laid in the box, which should be upside down. Fill the box, press, nail on the bottom, invert, and brand or put on the label.

THE COMPOSITION OF THE CURED PRUNE.

Of all the methods for preserving fruit none is of so great importance to the American people as that of fruit evaporation. Of all fruits so preserved the prune certainly takes first rank. The reader must not confound the term *evaporated* fruit with that of *dried* fruit of years ago, for the newer process gives a cured product much superior to the sun- or oven-dried article, retaining, as it does, much of the original color and flavor, being soft, pliable, and palatable to eat out of hand. The process of evaporation has for its object primarily to drive off a sufficient amount of moisture to make the fruit keep, and to do this in such a manner as to leave the fruit in the condition above described, and leave the flesh of a transparent appearance—a clear yellow in the case of the French prune, and an amber in the case of the Italian. No prune which has not these characteristics has been properly cured. It is not possible at this time to go into the technique of fruit curing, but rather to state the results of the analyses of samples of fruits cured by this method, as they are found on the market. The composition of the prune may be expressed as follows:

Fruit	{	1. Juice	{	Water.	{	Sugar.
			Soluble solids. . . .			Pectin.
						Albuminoids.
						Acids.
		2. Pulp.	{	Cellulose.		
				Carbohydrates.		
				Pectose.		

During the process of ripening the first division is increased much at the expense of the second.

“PASS THE PRUNES.”

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THE CHERRY

IN KANSAS,

WITH A CHAPTER ON THE APRICOT AND NECTARINE.

“CHERRIES ARE RIPE!”

Makes boys, birds and everybody happy.

“CHERRY PIE”

Fits every appetite, and little is left for tramps.

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OUR HORTICULTURISTS SHOULD BE

BETTER ACQUAINTED WITH

APRICOTS AND NECTARINES.



Compliments of
William H. Barnes,
Secretary.

COMPILED AND REVISED FOR THE
KANSAS STATE HORTICULTURAL SOCIETY,

By WILLIAM H. BARNES, SECRETARY,

State Capitol, Topeka, Kan.

ISSUED BY THE STATE,

1900.





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THE BALDWIN CHERRY.

Tree an upright, vigorous grower, forming a round head; leaves large and broad; bloom pure white, changing to pink; fruit large, almost round, very dark transparent wine color; flavor slightly acid, yet the sweetest and richest of the Morello type; stems rather large, of medium length, and generally in pairs. Unexcelled in earliness, vigor, hardiness, quality and productiveness. Out of 800 trees it readily attracted attention as being the most thrifty and beautiful. The original tree was planted eight years ago and has fruited five years, and is now one-third larger than any Early Richmond tree of the same age in same orchard near Seneca, Kansas, on the grounds of S. J. Baldwin the introducer.

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THE CHERRY.

DEFINITIONS.

Standard Dictionary: (1) A tree or shrub of the genus *Prunus* (which also includes the plum), bearing a fleshy drupe with a bony stone. (a) The common garden cherry (*P. cerasus*), of which several hundred varieties are cultivated for the fruit, some of which are, the Bigarreau, Blackheart, Black Tartarian, Oxheart, Morelle or Morello, May Duke (corrupted from Medoc, of France). (b) The wild cherry: as, *P. serotina* (wild black cherry), valued for its timber. *P. virginiana* (choke cherry), an American shrub which bears astringent fruit. *P. avium* and *P. padus*, European tree (bird cherry).

Century Dictionary: (1) The fruit of a species of *Cerasus* (which is commonly regarded as a subgenus of *Prunus*), consisting of a globose pulpy drupe enclosing a one-seeded, smooth stone. The cultivated varieties of the garden cherry probably all belong to two species, *P. cerasus* and *P. avium*, both doubtless natives of Europe. It is related by Pliny that this fruit or a cultivated variety of it was brought from Cerasus in Pontus to Italy after the defeat of Mithridates by Lucellus, about 70 B. C. It was introduced into England by the Romans about 120 years afterward. There are many kinds, as the red, black and white hearted, the May Duke, Bigarreau, Morello, Kentish, etc. The wild or crab cherry, Mazzard or Gean of Great Britain, in a wild state of the *P. avium*, which is also found in various other parts of Europe. From the fruit of its different varieties several highly esteemed cordials are prepared, as the Maraschino of Italy, the Ratafia of France, the Kirschwasser of Germany, etc. To this group of cherries, distinguished by having their flowers and fruits in clusters, belong also the Mahaleb cherry (*P. mahaleb*) of Europe, with very fragrant flowers, and the ground-cherry (*P. pennsylvanica*), and the dwarf cherry (*P. pumila*), of North America. A second section of the genus has the flower in racemes, and the fruit smaller and less palatable. To this belong the bird-cherry (*P. padus*) of Europe, and the wild black cherry, also called the rum or cabinet cherry (*P. serotina*), and the choke-cherry (*P. virginiana*) of America. Still a third section consists of evergreen trees, with the flowers in racemes and the

fruit inedible, including the bastard cherry, bay-cherry or laurel-cherry (*P. lauro-cerasus*) of Europe, and the Carolina laurel-cherry (*P. carolinana*) of the southern United States.

OXHEART.—A large variety of cherry, so called from its shape.

MORELLO.—A kind of cherry with a dark red skin, becoming nearly black if allowed to hang long. The flesh is deep purplish red, tender, juicy, and acid. It is a standard cherry, much used in cooking and preserved in brandy.

MAY DUKE.—(A corruption of Medoc, a district near Bordeaux, France, from which these cherries were introduced.) A variety of cherry of the sour type.

THE CHERRY IN KANSAS.

Our people have hardly come up to a full understanding of the value of this fruit. Our markets are never one-quarter supplied and the demand is increasing. Occasionally a horticulturist who for some unaccountable reason put out few or many cherry trees is greatly surprised when they come into bearing to find them a bonanza. Growers near our larger towns are enthusiastic over the nice returns. Several of our growers claim a profit of \$250 per acre from their cherries. They are almost a sure crop year by year. Coming early, the first of the tree fruits, the trees have a long growing season in which to recuperate, and prepare material for a crop the following season. While the crop of cherries varies in quantity yet there is almost never a total failure. Heavy spring frosts are most to be feared. The curculio, the aphid and birds affect them some, but still we have cherries, and the young robins and other fledglings annually build up their systems upon such choice delicacies as Richmond, Montmorency, etc. For the aphid we should spray, for curculio jar, for the birds, bells, stuffed cats, hawks, etc., are used; but we should plant more; we can grow so many in our soil and climate that the birds cannot increase in proportion; besides, after cherries are gone, and healthy bird appetites remain, the insects are devoured next. Plant cherries! We have not yet found a sweet cherry that is sure here. Ostheim is good. Governor Wood is uncertain. As the sour cherry tree grows low and wide, we cannot do as the Europeans, plant cherry trees along the roadside; but our lands are cheap, and we might get a fine income from many a waste acre if planted to cherries. They are as early to market as berries, and sell as readily. No fruit is preferable for canning, and cherry pie is the choicest of pies.

"Can she make a cherry pie
 Billy boy, Billy boy?
 Can she make a cherry pie,
 Charming Billy?
 Yes, she can make a cherry pie,
 The top notch for you and I,
 But the young thing will never leave her mother."

This girl knew how to "touch" Billy in the right spot, but she wanted to stay with the one who had taught her the secret, as she knew there was more a comin'. See recipes in this book.

THE CHERRY.

From Downing's "Fruit and Fruit-trees of America."

Cerasus sylvestris, and *C. vulgaris*, Arb. Brit. *Rosaceæ*, of the botanist. *Cerisier*, of the French. *Kirschenbaum*, German. *Ciriego*, Italian. *Cerezo*, Spanish.

The cherry is a fine, luxuriant fruit-tree, with smooth, light-colored bark, and generally of rapid growth. The varieties of the black and heart-shaped cherries are always vigorous, and form fine, large, spreading heads, forty or fifty feet in height; but those of the acid or red cherry are of lower, more bushy and tardy growth. In the spring the cherry tree is profusely covered with clusters of snow-white blossoms, and earlier in the summer than upon any other tree. These are followed by abundant crops of juicy, sweet or acid fruit, hanging upon long stalks, and enclosing a smooth stone. The cherry comes originally from Asia, and the Roman general, Lucullus, after a victorious expedition into Pontus, has the reputation of having brought it to Italy from Cerasus, a town in that province, in the year 69 B. C. According to Pliny, the Romans, 100 years after this, had eight varieties in cultivation, and they were soon afterwards carried to all parts of Europe. The seeds of the cultivated cherry were brought to this country very early after its settlement both from England and Holland.

USES.—As pleasant and refreshing dessert fruit the cherry is everywhere esteemed. The early season at which it ripens, its juiciness, delicacy, and richness, render it always acceptable. While the large and fleshy varieties are exceedingly sweet and luscious, others, which are more tender and more or less acid, are very valuable for pies, tarts, and various kinds of cookery. The fruit of the Kentish or Early Richmond is excellent when stoned and dried, and the Mazarin and our wild Virginia cherries are used to give a flavor to brandy. When canned, they retain their character and are very delicious. The

Dukes or Merellos are best for their purpose. The celebrated German Kirschwasser is made by distilling the liquor of the common black Mazzard or Gean (in which the stones are ground or broken and fermented with the pulp), and the delicious Ratafia cordial of Grenoble is also made from this fruit. Maraschino, the most celebrated liquor of Italy, is distilled from a small Gean or Mazzard, with which, in fermenting, honey and the leaves and kernels of the fruit are mixed.

The gum of the cherry is nearly identical with gum arabic, and there are some marvelous stories told of its nutritive properties. The wood of the cherry is hard and durable, and is therefore valuable for many purposes; but the best wood is afforded by our wild or Virginia cherry, which is a very good substitute for mahogany, taking a fine polish.

The large-growing sorts of black cherry are the finest of all fruit-trees for shade, and are therefore generally chosen by farmers who are always desirous of combining the useful and the ornamental. Indeed, the cherry, from its symmetrical form, its rapid growth, its fine shade and beautiful blossoms, is exceedingly well suited for a road-side tree in agricultural districts. We wish we could induce the planting of avenues of this and other fine-growing fruit-trees in our country neighborhoods, as is the beautiful custom in Germany, affording ornament and a grateful shade to the traveler at the same moment. Mr. Loudon, in his "Arboretum," gives the following account of the cherry avenues in Germany, which we gladly lay before our readers:

On the continent, and more especially in Germany and Switzerland, the cherry is much used as a roadside tree; particularly in the northern part of Germany, where the apple and the pear will not thrive. In some countries the road passes for miles together through an avenue of cherry trees. In Moravia, the road from Brunn to Olmutz passes through such an avenue, extending upwards of sixty miles in length; and in the autumn of 1828 we traveled for several days through almost one continuous avenue of cherry trees, from Strasburg by a circuitous route to Munich. These avenues, in Germany, are planted by the desire of the respective governments, not only for shading the traveler, but in order that the poor pedestrian may obtain refreshment on his journey. All persons are allowed to partake of the cherries, on condition of not injuring the trees, but the main crop of the cherries, when ripe, is gathered by the respective proprietors of the land on which it grows; and when these are anxious to preserve the fruit of any particular tree, it is, as it were, tabooed: that is, a whisp of straw is tied in a conspicuous part of one of the branches, as vines by the roadside in France, when the grapes are ripe, are protected by sprinkling a plant here and there with a mixture of lime and water, which marks the leaves with conspicuous white blotches. Every one who has traveled on the continent in the fruit season must have observed the respect that is paid to these appropriating marks; and there is something highly gratifying in this, and in the humane feeling dis-

played by the princes of the different countries in causing the trees to be planted. It would indeed be lamentable if kind treatment did not produce a corresponding return.

SOIL AND SITUATION.—A dry soil for the cherry is a universal maxim, and although it is so hardy a tree that it will thrive in a great variety of soils, yet a good sandy or gravelly loam is its favorite place. It will indeed grow in much thinner and dryer soils than most other fruit-trees, but to obtain the finest fruit a deep and mellow soil of good quality is desirable. When it is forced to grow in wet places, or where the roots are constantly damp, it soon decays and is short-lived. And we have seen this tree, when forced into too luxuriant a growth in our overrich Western soils, become so gross in its wood as to bear little or no fruit, and split open in its trunk, and soon perish. It is a very hardy tree, and will bear a great variety of exposures without injury. In deep, warm valleys, liable to spring frosts, it is, however, well to plant it on the north side of hills, in order to retard it in the spring.

Propagation.—The finer sorts are nearly always propagated by budding on seedlings of the common black Mazzard, which is a very common kind, producing a great abundance of fruit, and very healthy, free-growing stocks. To raise these stocks, the cherries should be gathered when fully ripe, and allowed to lie two or three days together, so that they may be partially or wholly freed from the pulp by washing them in water. They should then be planted immediately in drills in the seed plat, covering them about an inch deep. They will then vegetate in the following spring, and in good soil will be fit for planting out in the nursery rows in the autumn or following spring, at a distance of ten or twelve inches apart in the row. Many persons preserve their cherry-stones in sand, either in the cellar or in the open air, until spring, but we have found this a more precarious mode; the cherry being one of the most delicate of seeds when it commences to vegetate, its vitality is frequently destroyed by leaving it in the sand twenty-four hours too long, or after it has commenced sprouting.

After planting in the nursery rows, the seedlings are generally fit for budding in the month of August following. And in order not to have weak stocks overpowered by vigorous ones, they should always be assorted before they are planted, placing those of the same size in rows together. Nearly all the cherries are grown with us as standards. The English nurserymen usually bud their standard cherries as high as they wish them to form heads, but we always prefer to bud them on quite young stocks, as near the ground as possible, as they then shoot up clean, straight, smooth stems, showing no clumsy joint where the bud and the stock are united. In good soils the buds will fre-

quently make shoots six to eight feet high the first season after the stock is headed back. Grafting of the cherry may be performed the same as with the apple and pear, but the work, to be successful, should always be performed early in the season, before the frost is well out of the ground. If omitted until the buds begin to swell strongly, the chances of success are less than those of failure.

When dwarf trees are required, the Morello seedlings are used as stocks, or the Perfumed cherry (*Cerasus mahaleb*) is employed; but as standards are almost universally preferred, these are seldom seen here. Dwarfs in the nursery must be headed back the second year, in order to form lateral shoots near the ground.

CULTIVATION.—The cherry, as a standard tree, may be said to require little or no cultivation in the Middle states, further than occasionally supplying old trees with a little manure, to keep up their vigor, pruning out a dead or crossing branch, and washing the stem with soft soap should it become hard and bark-bound. Pruning, the cherry very little needs, and as it is always likely to produce gum (and this decay), it should be avoided, except when really required. It should then be done in midsummer, as that is the only season when the gum is not more or less exuded. The cherry is not a very long-lived tree, but in favorable soil the finest varieties generally endure about thirty or forty years. In the county of Perry, Ohio, there is a tree of the Black Mazzard variety which is eighty feet high, and four feet one inch in diameter of main trunk, while the length of the largest limb or branch is forty-two feet. A large cherry tree at Walworth, N. Y., is recorded as measuring fourteen feet six inches in circumference, sixty feet in height, and having a spread of over four rods. It has produced forty bushels of fruit in one season. Twenty feet apart for the strong, and eighteen feet for the slow-growing kinds, is the proper distance.

Gathering the Fruit.—This tender and juicy fruit is best when freshly gathered from the tree, and it should always be picked with the stalks attached. For the dessert, the flavor of many sorts in our climate is rendered more delicious by placing the fruit, for an hour or two previous, in an ice-house or refrigerator, and bringing them upon the table cool, with dew-drops standing upon them. For the market or transportation long distances, they should be gathered only when perfectly dry.

THE CHERRY.

Written for Bailey's "Cyclopedia of American Horticulture," by G. HAROLD POWELL, and published on page 291 of same.

Cultivated tree cherries have probably sprung from the European species, *Prunus avium* Linn., and *Prunus cerasus* Linn. The domesticated forms of *P. avium* are characterized by a tall, erect growth; reddish brown, glossy bark, which separates in rings; flowers generally in clusters on lateral spurs, appearing with the limp, gradually taper-pointed leaves; fruit red, yellow, or black, generally sweet, spherical, heart-shaped or pointed; flesh soft or firm. Sour cherries are low-headed and spreading; flowers in clusters from lateral buds, appearing before the hard, stiff, rather abruptly pointed, light or grayish green leaves. The following is the latest classification. (Bailey, Bulletin No. 98, Cornell Exp. Sta.)

Prunus avium has four representatives in the United States: (1) The MAZZARDS, or inferior seedlings; fruit of various shapes and colors; common along roadside. In the middle Atlantic states the wild Mazzard trees often attain great age and size, particularly in the Delaware-Chesapeake peninsula. (2) The HEARTS, or heart-shaped, sweet cherries, light or dark, represented by Black Tartarian and Governor Wood. (3) The BIGARREAUS, or heart-shaped, firm-fleshed, sweet cherries, like the Napoleon and Windsor. (4) The DUKES; light-colored, somewhat acid flesh, such as May Duke and Reine Hortense.

From *Prunus cerasus* two classes have sprung: (1) The AMARELLES, or light-colored sour cherries, with colorless juice, represented by Early Richmond and Montmorency. (2) The MORELLOS, or dark-colored sour cherries, with dark-colored juice, like the English Morello and Louis Philippe.

The following species also have horticultural value: *Prunus mahaleb*, an old-world type, hardier and smaller, on which other cherries are largely worked. *P. pennsylvanica*, the native wild red, pin or bird-cherry, whose hardiness may adapt it as a stock for the plains states. *P. besseyi* and *P. pumila*, the native sand or dwarf cherries, the former represented by the Improved Dwarf Rocky Mountain cherry.

The cherry is not cultivated as a leading industry east of the Rocky mountains, excepting in western New York, where the sour varieties are grown for canning. The sweet cherry is confined mostly to door-yard and fence-corner plantings. Sour kinds are found in orchard blocks in New York, New Jersey, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Kansas, and Nebraska. Sweet-cherry culture, how-

ever, is adapted to the states between the thirty-ninth and forty-fourth degrees of latitude and the sixty-eighth and eighty-sixth degrees of longitude [this area is not in Kansas], and to contiguous areas having similar climatic conditions. Spontaneous forms of it attain great size on the Chesapeake peninsula. The sour cherry may be grown with profit between the thirty-fifth and fourth-fifth degrees of latitude and the sixty-eighth and one hundredth degrees of longitude [five-sevenths of Kansas is within this area]. The Mazzard is the best stock for both sweet and sour cherries in the East. The Mahaleb is more widely used for the sour kinds, however, as it is easier to bud, and it is free from leaf-blight in the nursery. The Mazzard forms a better root system, stronger union, a longer-lived tree, and is sufficiently hardy. For the plains states the hardier Mahaleb stocks should be used.

The cherry likes an elevated, naturally light, dry, loamy, retentive soil. The sour kinds need more moisture, and will thrive in heavier land. A soil not naturally dry may be corrected by underdraining, and on light, dry knolls the moisture capacity may be increased by green manures and surface tillage. The sweet cherries should be set twenty-eight feet to thirty feet apart each way; the sour kinds, from sixteen to eighteen feet. The trees are generally set at two years from the bud. The sweet kinds are started with three to five arms, with no central leader, about three and one-half feet high, and the branches are pruned to side buds for a few years to induce spreading, rather than a spike-like form. The top of a sour cherry is made like that of a peach tree. Plow the cherry orchard lightly in the early spring, and cultivate it every ten days, or after every rain, till the middle of June or the 1st of July. Seed at the last cultivation with a winter cover crop. Stimulate the trees with leguminous cover crops when needed; but the sweet cherry is a gross feeder and a rapid grower, and undue stimulation must be avoided. Keep the orchard in sod and pasture it with sheep, along the southern and western limits of profitable sweet cherry culture, and withhold nitrogenous manures.

Nitrogen, potash and phosphoric acid are the three essential fertilizers. Nitrogen may be supplied in leguminous crops; potash as muriate, at 150 pounds to 300 pounds; and phosphoric acid in dissolved rock, at 300 pounds to 500 pounds per acre.

Cherries should be picked by the stem in small baskets a few days before ripe. Sort out all stemless, small and imperfect fruits. Place the perfect cherries in small, attractive boxes or baskets, and pack these in small cases or crates. The choicer the fruit the more strikingly it should be displayed. Guard against breaking the fruit spurs in picking the sweet cherries. Fruit for canning is less laboriously

packed, but may [should] be as carefully picked. The profits depend on the varieties and markets, but largely on the personality of the grower, and on his skill as a salesman. The range of profit for the sour cherry is from \$30 to \$100 per acre, and from \$50 to \$300 or more for the sweet.

The varieties adapt themselves to a wide range of territory. An imperative need, however, is the development of varieties with striking features for local adaptation. In the prairie states in the extreme north the hardier Amarells and Morellos comprise the profitable kinds. Formerly the dark-colored, more acid Morellos were most sought after; now the milder Amarells are demanded by both canners and consumers. In the following lists the varieties are named more for the purpose of illustrating the different types than for recommending specific varieties. Among Amarells the Early Richmond and Montmorency are the leading types.

• Early Richmond: Size medium; pit large; light red; poor quality; vigorous growth. Ripens June 20 in New York.

Montmorency: Large, broad, flattened; pit medium; light red; flesh nearly colorless; juice moderately sour; vigorous growth; generally productive. Two weeks after Early Richmond. Most valuable Amarelle for the east.

Among the Morellos, Ostheim, Louis Philippe and English Morello are important types.

Ostheim: Dark red; roundish, flesh dark, tender, juice mild, dark; productive, hardy; growth slender. A week after Early Richmond, smaller. Too early for the East. [One of the best for Kansas. Keeps well after picking.]

Louis Philippe: Size of Montmorency, and ripens with it; round; acid; skin and flesh dark. Rather shy bearer in the East, but valuable in the West.

English Morello: Two weeks later than Montmorency; more open, drooping habit; fruit medium; roundish: red-black; very sour; slightly astringent; flesh and juice dark, purplish crimson.

Among the sweet cherries, the firm-fleshed red or black Bigarreus are the most profitable. The light Bigarreus and Hearts are more susceptible to the fruit rot, and sell less readily. Representative types of Heart and light Bigarreau cherries are the following:

Black Tartarian: The most valuable Heart cherry; productive, vigorous, hardy, early; large, dark red or black; flesh dark purplish: very juicy, sweet.

Napoleon: One of the best light Bigarreus. Fruit large; flesh hard, brittle, colorless; light lemon yellow, with reddish cheek; heavy bearer; rots if not picked before ripe; splits in wet weather. A week before Black Tartarian.

From the dark Bigarreau the following are among the best types: Robert's Red Heart: Bright, dark red, with an under mottling; as large as Napoleon; flesh pinkish; juice nearly colorless, subacid; heavy, regular bearer in Hudson river valley. Ripens with Napoleon.

Mezel: Large, heart-shaped, obtuse, flattened at both sides; uneven skin, dark red to black: firm, but heart-like; juicy: very sweet, stem long and tortuous; heavy bearer locally. Ripens with Napoleon.

Windsor: Large, roundish-oblong, firm, juicy; mottled dark red; flesh pinkish white; stem medium, set in a slight broad depression; heavy bearer, vigorous, upright. Ripens two weeks after Napoleon. Very profitable.

Dikeman: Large, heart-shaped, obtuse, flattened on one side; black, with extremely firm reddish flesh; subacid, reddish juice; stem medium, in a slight broad depression: vigorous. Ripens three weeks or more after Windsor. A variety of great value.

DISEASES AND INSECTS.

The brown rot (*Monilia fructigena*), which attacks the fruit at the ripening period, and particularly during sultry weather, can be largely avoided by picking the fruit a few days before ripe. It may also fatally attack the flowers, leaves, and twigs. In localities where the cherry blooms but does not fruit, the trees should be sprayed with Bordeaux mixture before the buds unfold, again when the fruit is set, and two or three times thereafter, with a colorless fungicide.

Black-knot, (*Plowrightia morbosa* Sacc.) [See elsewhere in this book.]

Leaf-blight (*Cylindrosporium padi* Karst). [See elsewhere in this book.]

Powdery mildew (*Podosphæra oxycanthæ* De Bray). Often severe in the sour cherry, but can be checked by thorough applications of a fungicide.

The aphid (*Myzus cerasi* Linn.) appears in the early part of the season on the young shoots, the leaves, the stems, and less frequently on the body or the fruit of the sweet cherries. It excretes honey-dew abundantly. The leaves curl upward and inward. Spray with kerosene emulsion, one part to sixteen of water, or with fish-oil soap, one pound to six gallons of water, before the leaves curl.

The curculio (*Conotrachelus nenuphar*). [See elsewhere in this book.]

Climatic injuries.—Sun-scald and bursting of the bark. The sweet cherry is liable to a fatal injury from sun-scald in the South and prairie states. The trouble occurs in the spring, when the rays of the sun cause alternate freezing and thawing of the growing tissues on the south and west sides. In these localities, the bark of the tree

frequently bursts open, and large quantities of gum exude. A rich garden loam, a summer drought followed by rain, excessive wood stimulation, violent changes of temperature in the winter, or other factors unfavorable to the maturing of the wood, aggravate the difficulty. The bursting of the bark is probably caused by the freezing and thawing of the tissues under these unfavorable conditions. Both troubles are more injurious to trees with exposed trunks. A low-headed and spreading top, soils not too rich, and cultural methods which favor the early maturity of the wood, lessen the danger. The trunks may also be protected by a board, matting or screen of some kind on the sunny side during the spring months.

(Written for Bailey's "Cyclopedia of American Horticulture," by EDWARD J. WICKSON, and published on page 293 of same.)

THE CHERRY IN CALIFORNIA.—In commercial importance, the cherry is least of the fruits of the temperate zone grown in California on a commercial scale. This is not because the finest cherries cannot be grown, but because the avenues for the disposition of the product are not as wide as for other leading fruits. Recently there are indications that these avenues will be widened, for last year (1898) about 300 car-loads were profitably shipped in a fresh state to Eastern markets, and a product of 500,000 cases of canned cherries was disposed of to advantage; but until it is demonstrated that such distant demands will increase, present plantations will not be largely extended.

Cherries are costly in picking and packing, and to incur the chances of a local market, oversupplied whenever the trees do their full duty, the grower does not enjoy. Cherry drying has never seemed warranted on a large scale, because of the large amount of labor required to the pound of product; and the grower has had no recourse when the canner and local consumer will only pay the cost of picking and boxing. A good shipping demand seems, therefore, to measure the extension of California's cherry interest, and the early ripening of the fruit, which permits its sale during the blooming season of Eastern cherry trees, is the leading surety of such demand. On several occasions early varieties have been shipped from the Vacaville district overland, on March 31, but the usual opening date is about two weeks later, and thence onward later varieties, and from later regions, may be shipped until July, if found profitable. But, though there is plenty of good land upon which to multiply the present total of half a million trees, the cherry regions of California are restricted. It is one of the most exacting of all trees, and is only profitable when its requirements are respected.

About one-half of the present acreage lies in valleys opening upon

the Bay of San Francisco, where deep and moist but well-drained alluvial soil fosters strong and sound root growth, and modified atmospheric aridity favors leaf and fruiting. On similar deep and moist soils, however, the tree enters the hot interior valleys to certain limits, chiefly along the river bottoms. It abhors dry plains. In dry air it usually refuses to fruit, although, if the soil be moist, it may make a stalwart tree growth. In foot-hill valleys it sometimes does admirably, both in growth and fruiting, and in mountain valleys, above an elevation of 2000 feet, on good soil, and in greater rainfall, and even with the snow flurries, which are experienced every year at proper elevation, the trees become very thrifty and profitable to the limits of local markets. The tree seems to have no geographical limitations in California; wherever suitable soil and weather conditions occur it accepts the situation—the Dukes and Morrellos succeeding under conditions too trying for the Hearts and Bigarreaus, but the latter comprise all the varieties that are of commercial account.

Cherry trees are grown by budding upon Mazzard and Mahaleb seedlings—the latter chiefly imported. It is customary to plant out in orchards at the end of the first year's growth from the bud, though two-year-old cherry trees can be more successfully handled than other two-year-olds. The trees are headed at one to two feet from the ground, cut back to promote low branching for two years, and then allowed to make long branches, and not usually shortened in, so long as thrifty and healthy. The tree, in a good environment, is, however, a very hardy tree, and will endure pruning to almost any degree. We have many trees which have made a very broad but not usually high growth, bearing 1000 pounds of fruit to the tree, and a few others which have even doubled that figure, while others have been dwarfed and trained *en espalier*. The commercial orchards are, however, uniformly of low trees, approximately of vase form in exterior outline, and with branches curving outward without shortening.

The cherry is very readily grafted over by the usual top-grafting methods, and large orchards have been thus transformed into varieties more acceptable for canning or shipping. Comparatively few varieties are grown. Early Purple Guigne, Guigne Marbre, and Knight's Early Black are grown in early ripening localities. Black Tartarian and Lewelling are the mainstay for black cherries. The Napoleon Bigarreau (locally known as Royal Ann) is the ideal for a white cherry, and almost excludes all others, though the Rockport Bigarreau has some standing. Of all the varieties grown, the Black Tartarian and Napoleon Bigarreau constitute seventy per cent. of the crop and probably ninety per cent. of the amount marketed.

California-grown cherries attain large size; the canner's require-

ment for fancy fruit is a diameter not less than seven-eighths of an inch, and for No. 1, not less than three-fourths of an inch. Wholesale prices usually range from \$40 to \$60 per ton for black and \$80 to \$120 for white, but this year (1899) canners have paid as high as \$160 per ton for white cherries. The higher rates can only be expected during years of short crops.

A KANSAS CHERRY—THE BALDWIN. (*See colored plate.*)

By its Discoverer.

The original was planted in the spring of 1888 in an orchard at Seneca, Kan., for an Early Richmond cherry, which had been budded on a common Morello seedling. The budded part was accidentally broken off and a sprout came from the root which seemed so vigorous that it was left to grow. It proved to be such a rank grower that it soon attracted attention, and when it fruited, which was the fourth year, it showed so much finer, larger and better fruit than any other, that the small boys always sought it out from among several hundred cherry trees of various sorts. The tree is an upright, vigorous grower, forming a round head; leaves large and broad; bloom pure white, changing to pink; fruit large, almost round, very dark, transparent wine color; flavor slightly acid, yet the sweetest and richest of the Morello type; stems rather large, of medium length, and generally in pairs. Unexcelled in earliness, vigor, hardiness, quality and productiveness. Out of 800 trees it readily attracts attention as being the most thrifty and beautiful.

It fruited four years, and each year seemed to be so uniform in size, productiveness and earliness, that I decided to give it a name and propagate from it. It was first named the "Kansas Queen," but on account of it being against the rules of the American Pomological Society to give compound names to new fruits, and upon the suggestion of W. F. Hiekes, of Huntsville, Ala., who became interested in it, it was named "Baldwin." Since then I have gathered fruit from it every year.

The unprecedented severe cold weather of the winter of 1898-'99 fully tested its endurance and hardiness. All Baldwin cherry trees came through in the best of condition, with perfect buds, more vigorous and thrifty than English Morello, Early Richmond or Montmorency in same orchard under same conditions, and while old varieties show forty per cent. of dead trees and only half a crop of fruit, the original Baldwin tree was loaded with fruit, and 200 Baldwin trees planted in orchard in spring of 1898 show only a loss of four per cent.

This proves by its tested hardiness, its extreme productiveness, taken in consideration with its large size, beautiful shape, and most delicious quality, together with its superior shipping qualities, that it is ahead [for the West] of any other cherry known. The fruit ripened this year (1900) June 17, and was loaded, as usual.

OREGON, Mo., July 22, 1898.

Mr. S. J. Baldwin, Seneca, Kan.:

DEAR SIR—The samples of Baldwin cherry sent me by mail last month came in nice condition, and on examination I found them to be a large, beautiful Morello, of very firm flesh and good quality. I regard it as superior to any of the old varieties; and if it is an abundant bearer it will certainly prove a great acquisition to our list of Morello cherries.

Yours truly, N. F. MURRAY,

President Missouri State Horticultural Society.

DAVENPORT, IOWA, July 22, 1898.

DEAR SIR—The Baldwin cherry arrived in fine condition, and is a much better cherry than English Morello.

NICHOLS & LORTON.

DEAR SIR—Accept my thanks for the Baldwin cherry. They are surely a superior Morello. I will be very pleased to try a few trees here.

I am, yours,

E. W. M. KIRKPATRICK, McKinney, Tex.

DEAR SIR—Having eaten fruit from your Baldwin cherry tree, I am free to testify to its superior quality, large size, beautiful color and shape. I consider it a great acquisition to our cherry list, and far better than any Morello cherry I have ever seen, and, as it is about three weeks earlier, I think it should be planted largely; it will certainly be profitable as a commercial cherry. The tree is a very healthy, vigorous grower, being fully one-third larger than other cherry trees of same age.

G. W. JOHNSON, Seneca, Kan.

THE CHERRY.

From "Fruit Manual," a work published in 1886 by the State Horticultural Society of Kansas.

This fruit has become a general favorite throughout the state. Its easy culture, hardiness and productiveness, and the value of its fruit for general uses, have caused a large planting in Kansas. It thrives quite well on either high or low lands, and on sandy and loamy soils. The Morello family is highly successful wherever planted, and embraces the sour varieties—Early Richmond, Kentish, Montmorency, English Morello, and common red (black) Morello. In some localities the finer flavored varieties—as May Duke, Governor Wood, Royal Duke, Belle Magnifique, Belle de Choisy, Reine Hortense—are quite successful. The class known as "sweet varieties" do not succeed. The tree often becomes fatally injured by the intense heat of summer and the extremes of winter weather.

The main requisites in successful culture are deeply prepared and enriched land, where not so by nature, and a vigorous wood growth. Whenever a tree becomes stunted by neglect or from sterility of the

land decay soon sets in at the heart, and death generally follows in a few years.

This, as well as all classes of soft fruits, should be as near the dwelling as practicable, for convenience in gathering the fruit and general care of the trees.

High lands are preferable, as the fruit-buds are less liable to be injured by spring frosts, and the tree maintains a normal condition better through varying weather in winter, and better facilities are afforded for circulation of the currents of air during extreme rainfalls and sudden changes in temperature.

An eastern or northern slope is preferable, as trees do not suffer so much from droughts or heat of sun, and should be sufficiently inclined to drain off any sudden, heavy rainfall, as a retention of a surplus amount in the land will weaken the vigor of trees, and endangers their lives.

A deep loam and a sandy soil are to be preferred; but other soils can be made suitable by deep tillage and manuring, and for arid lands a heavy mulching.

When planted on flat lands drains must be provided; but on slopes water is seldom retained in amount detrimental to the trees. This is forcibly impressed on the grower when heavy and continuous rains flood the land at the ripening period, which is followed with cracking and bursting of the fruit, rendering almost the entire crop unmarketable.

On open prairie windbreaks are an advantage, when on the south side only.

Deep plowing and pulverizing of the surface and stirring of the subsoil are as much needed with the cherry as any fruit. Sterile lands must be well enriched with barn-yard litter, wood ashes, or any well-rotted vegetable matter.

The trees should never be over two years old; strong, vigorous, and well rooted. A second-class tree is never cheap, and its use is questionable economy; better plant fewer of the first class, at same cost. Of stock there are three kinds, viz., Mahaleb, Mazzard, and common Morello. Mahaleb is short-lived; Mazzard not always hardy, and Morello sprouts from the root. The preference of the Society has been towards Morello as preferable, claiming early and profuse fruiting and hardiness.

The holes, experience in Kansas has demonstrated, need not be any larger than is necessary to receive the roots when spread out naturally, and deep enough to set the tree about as deep as it grew in the nursery. In light, sandy soil it may be some deeper, but not in clay or heavy soil. Several of our members have for the past ten years been

planting their orchards in the following manner, and we consider it as having more advantages than any yet recommended: First, procure a half-dozen or more stakes, four or five feet high; set these stakes in line where you want the south row of trees; then, with a steady team, plow and mark out a straight furrow in range with the stakes; have a man follow after and measure the distance for the next row to the north, and set the stakes, then mark out as for the first row; and so on until the north side of the plat is reached. Now set the stakes north and south one foot east of where the east row of trees is wanted. Begin at the south end, and mark out a furrow in line with the stakes, throwing the furrow to the east; then turn back, letting the near horse walk in the furrow; run another furrow parallel with the first one, and about twenty inches west of it; make one more round, and throw out the center, thereby making a dead furrow where the first row of trees is to stand. Use a good, stout team and have a dead furrow running north and south where the rows of trees are to stand, twenty to twenty-four inches wide and eight to ten inches deep, which is about the right depth. Go along with a shovel and throw out any loose dirt that may have fallen back where the east-and-west marks cross, where the trees are to stand.

The cherry tree is a close grower, requiring little room, forming either an upright or low, round head, according to varieties. For convenience in cultivation, the rows should be twenty feet apart, and trees fifteen feet in the row.

Many trees fail because planted too late in the spring, and many more fail because planted in the fall. The safest time is in the spring, as soon as the winter's frost has left the ground. Let one man take a tree, set it in the dead furrow, where the east-and-west marks cross, spreading the roots in natural shape; another throws on a few shovelfuls of well-pulverized surface-soil, seeing that this is well worked around the roots; then let the one holding the tree tramp the soil well around it while the other fills, till the earth is about level with the surface. Lean to the southwest. It is best to plant the trees of each variety together [?].

The first summer after planting is a critical time and the trees should receive great care. Keep clean and cultivate well. Provide doubletree not over twenty-five to thirty inches long, and singletrees not over sixteen or eighteen inches, and when cultivating always use them. With care there is no need of barking. If planted in dead furrows, soon close up the dead furrows with a plow. In eight or ten days plow the ground again, throwing a furrow to the trees, not more than two or three inches deep, about four rounds to each row. Repeat three or four times during the season, or as often

as the weeds start, running a little deeper each time. This gradually deepens the earth around the trees as the season advances, and by fall we have a deep, mellow bed eight feet wide and quite deep. All weeds not covered by the plow should be cut out with a hoe. On the ground between the rows plant crops that require cultivation, such as corn, potatoes, beans, etc. Corn is best, as it receives cultivation when the trees need it, and affords some protection from wind. The second year throw furrows from the trees, and next to them, and so on, keeping the ground clean and well stirred till the middle of July, when cultivation should cease for the season. Stirring the ground later than this stimulates fall growth, which does not have time to ripen well, and is liable to winter-kill. The third, fourth and fifth years cultivate as the second, and if the trees have been well cared for they will have become well established in fruiting. After this, if cultivation is not continued, the land should have each year a liberal dressing of stable litter. Cherry trees must be kept in a vigorous, growing condition, and if varieties adapted to our climate are used there will be but few failures.

It is generally conceded that pruning is a necessity, the question being as to the extent. The points are: First, a low and uniformly shaped head; second, to facilitate the penetration of light and air to the inner portions of the head; third, to encourage and direct annual growth to form a shade sufficient to break the force of the sun's intense heat upon the branches and trunk of the tree; fourth, to remove all chafing, straggling and succulent growth. It should be done mainly while the tree is young, and in the spring before the buds break into leaves. Succulent growth should be removed as it appears.

Convenient ladders are found at almost any store dealing in hardware or implements. As the trees become large and tall, the staging platform is better. To construct this, two wooden horses are made of a convenient height, and placed at safe distances apart along the sides under the branches of the trees, and on their tops is constructed a platform where one or more pickers may stand and work. These will accommodate several pickers at a time, are movable, and easily shifted from place to place.

A crate, made of light but strong material, and of a size to receive four common berry boxes, is suspended to the picker, adjusted to a convenient position in front of him, relieving both hands for picking.

A shanty or packing-room is convenient, and will also be found handy for storing the fruit and to shelter the pickers from a sudden rainfall. In this may be constructed a facing and packing-table.

If for shipping, the best time to gather will be when wholly of a light red color—approaching scarlet; if for a near market, a dark red color.

The picking force should be divided into two sections. The first gathers all fruit within easy picking distance of the ground, and keeps in advance of the second section, which works from ladders or staging, and cleans up all. Cherries must be picked by the stem, and not by taking hold of the fruit, and care must be taken not to even start the stem from the fruit, as the juices will flow out, and such fruit quickly spoils. None but sound, ripe specimens should be placed in the boxes, and the top layer in every box should be an honest index of the whole. With the picking crate swung to the picker, he can easily do his work well, and quickly detect any damaged or inferior fruit before it is picked. As soon as the boxes in the picking crate are filled they are taken out and placed in a shipping crate, and others put in their place, and the crate when full carried to the facing table.

Packing.—Facing consists in turning the stems of the top layer down, which gives the appearance of a solid surface. Boxes should be filled a little above their edges, to avoid the semblance of stinted measure, and provide for the inevitable settling sure to follow the jarring of transportation. Pack in twenty-four-box crates, close up securely, brand with name of variety and name of grower and consignee, and send to destination at once. This fruit is never so attractive as when first taken from the tree, and the sooner it is in the market the more readily it will sell. The practice of facing is receiving severe criticism, as offering too great temptation to dishonest conduct. [This book is for Kansans, not for "dishonest people."]

Cherries can be safely held in a cold storage for several days, but must be quickly used when taken out; this is an advantage to the grower when the market is overstocked.

CHERRY GROWING FOR PROFIT.

A paper read before the Southwestern Iowa Horticultural Society, by J. G. BERRYHILL,
of Des Moines.

The fruit-growers of Iowa are interested in the growing of varieties that are generally known as the "sour cherries," but are more properly called the Morellos. There has been some experimenting in the growing of the sweet cherries and of the Duke varieties, all of which have, I believe, been unsuccessful, although some of the Dukes have been grown in southern Iowa, and have borne more or less sparingly. The trees and fruit-buds are subject to winter-killing. It is claimed that certain varieties of sweet cherries, introduced by Prof. J. L. Budd, of the Iowa Agricultural College, from eastern Europe and western Asia, can be grown successfully in this latitude. I am,

myself, experimenting in growing the Orel Sweet, the Vilna Sweet, and the Yellow Glass. The first two, judging from the appearance of the trees and leaves, are of the Duke family, and the Yellow Glass evidently belongs to the Bigarreau. The Vilna Sweet has fruited in the vicinity of Des Moines, and, while it bears more or less sparingly, the fruit is of such superior quality as to justify its culture for home use. The Orel Sweet is a beautiful tree, but is, I fear, tender in fruit-bud, in view of the fact that the buds swell under the influence of abnormal heat in the fall, and the buds being thereby exposed to winter injury.

Prof. L. H. Bailey, of Cornell University, New York, divides the sour cherries into two classes, the Amarells, with uncolored juice, and the Morellos, with colored juice. The first division is represented by the Early Richmond, and the second by the English Morello. Successful growing of these sour or Morello cherries in the West is limited to a territory about 500 miles in width, commencing in the latitude of St. Louis on the south, and extending to the line of the Chicago & Northwestern railroad, in Iowa, north.

This limit, it is probable, will be extended a degree or two further north by the introduction of the Russian varieties, many of which have already been satisfactorily tested in and north of the territory referred to.

The varieties of the cherry with uncolored juice adapted to the latitude of the south half of Iowa are as follows:

First, the Early Richmond, which may be regarded as the standard cherry of this territory, the same having been introduced with the earliest settlements, and now extensively grown in a wide extent of territory in the Northwest. The tree and fruit are so familiar to every one that further description is unnecessary. It is to-day the most reliable known cherry for this section of the country.

Second, the Dyehouse, grown by Mr. H. A. Terry, of Crescent, Pottawatomie county, Iowa, for the last thirty years. The tree is a more spreading grower than the Early Richmond. It is a fair bearer of fruit, very similar in appearance to the Early Richmond, possibly a little larger in size, a little deeper in color, and of about the same quality, and ripening a few days earlier.

Third, the Late Richmond, similar to the Early Richmond in appearance. The tree is rather an erect grower, and the fruit ripens about two weeks later than the Early Richmond. It is a little smaller in size, but is most excellent in quality. I have two trees growing on my farm, near Des Moines, over twenty years old. These trees have grown seven good crops during the seven years I have owned the place, and I have been led to propagate from them by reason of the

good quality of the fruit, and the good bearing quality of the tree. I understand that the Late Richmond, as it is known in many portions of the state of Iowa, has the reputation of being a very poor bearer. This criticism, however, cannot be raised against the Late Richmond, as grown by me.

The most beautiful of cherries with uncolored juice, and the most popular in the market, is the Montmorency. It should be called the Montmorency Ordinaire. The tree is an erect and symmetrical grower. The leaves are larger than those of the Early Richmond and the varieties above named. The fruit is long stemmed, a little flattened, much larger than the Early Richmond, and superior to that fruit in quality. I believe that this variety is grown in western Iowa and eastern Nebraska as the Large Montmorency. I have trees of the western Iowa variety growing side by side with the Montmorency Ordinaire, secured from Cornell University, New York, and the two cannot be distinguished. I believe that the western Iowa variety is improperly named the Large Montmorency, which is a distinct variety much inferior to the Ordinaire in bearing quality and size of fruit.

The cherries with colored juice are represented by the following varieties:

The English Morello.—The tree is dwarf in habit, the fruit large and somewhat heart-shaped, and very dark and beautiful in appearance, but exceedingly sour. This variety is very prolific, and is a popular market sort. The tree, however, is short-lived. It is claimed that this variety, and all of those with colored juice, should be grown on Mazzard stock, as distinguished from the Mahaleb, and that on the Mazzard the tree will live a much longer time, as well as be more prolific.

The Wragg is very similar to the English Morello in appearance, but it is exceedingly sour. The tree is a dwarf grower and very prolific. It is claimed that this variety is identical with the English Morello. As grown by me I think it can readily be distinguished from the English Morello, both in habit of tree and in flavor of fruit.

A third variety of the dark cherries, now grown more or less extensively throughout the Northwest, is the Cerise d'Ostheim. The tree is somewhat dwarfish in habit, the leaves have a peculiar heart-shaped form, and the branches are pendent. The variety is quite prolific. The fruit is quite dark, with dark juice, and is very much sweeter than the English Morello. A number of varieties of the Ostheim family have been planted in this country, but the one referred to is the best of the family. It was included in the Russian importations of Prof. J. L. Budd, of the Iowa Agricultural College. These Russian varieties are now being tested quite generally throughout the Northwest, and

are indorsed by many growers as superior to the Early Richmond and the English Morello.

Among the varieties that give promise of success, I mention the Orel, Sklanka, King's Amarelle, Lutovka, and the Terry, which was named by the Iowa Horticultural Society at its meeting in 1896. This variety was received by H. A. Terry, of Crescent, Pottawatomie county, Iowa, with other Russians from Professor Budd, twelve or thirteen years ago, but was improperly named. He called it for some years the Early Morello. Professor Budd, at the 1897 meeting of the Iowa Horticultural Society, expressed the opinion that this variety was the Bouquet Morello. Mr. Terry claims that it is the finest variety, taking everything into consideration, that has been raised in Iowa. It, together with the Russian varieties above mentioned, has light juice. The tree which I am now growing is a very erect grower, and gives evidence of great hardness and fertility. I have not fruited it.

Among the Russians with colored juice may be mentioned the Spate Amarelle, Schatten Amarelle, Double Natte, Bruesler Braun, Brussarbian, and the Criotte du Nord. Of these, the Schatten Amarelle has been grown by Mr. Hinkley, of Marcus, Cherokee county, Iowa, and is pronounced by him to be hardy and prolific. The Double Natte has been grown by Mr. Terry and by Mr. Coleman, on the latter's farm in Adams county, and is regarded by both as of very superior quality. The Bruesler Braun is a fair bearer of fruit much larger than the Montmorency, very rich and almost sweet when thoroughly ripe. I regard it as a very valuable cherry for home use, and it may prove valuable for commercial growing.

Among other varieties grown in the Northwest I can mention the Early Morello, a chance tree grown by the late David Reed in his orchard in Gage county, Nebraska. This cherry is a strong grower, and the fruit, which has light juice, ripens a week or ten days earlier than Early Richmond, and is pronounced by those who have grown it as of good quality. The Early Morello grown in the vicinity of Kansas City is a black cherry of the Morello type, imported by the late A. Sauer, of Rosedale, Kan., from Erfurt, Germany, about twenty years ago. This Early Morello has been pronounced the Black Morello, and is highly commended by those who have grown it, and is claimed to be a week earlier in ripening than the Early Richmond.

The Ostheimer Weichsel, also an importation of Mr. Sauer, has been grown in the vicinity of Kansas City for twenty years, and is pronounced by competent horticulturists the finest variety grown in that vicinity. I am inclined to think that it is from the same family as the Cerise d'Ostheim. I have trees of both of these varieties, as also of the Early Morello of Nebraska, and will be able to form an opinion as to their merits in the course of time.

Cherries should be planted upon well-drained soil, such as is suitable for the growing of cereal crops, in rows about twenty feet apart, running north and south, with the trees fifteen feet apart in the row. They should be cultivated from the earliest time in the spring until about the 1st of August, and no other crop should be grown in the orchard. I believe that continuous cultivation from early spring to late summer will produce very much better results than can be secured by seeding down the orchard to clover, although it is probable that benefits may be secured by sowing clover and turning the same under to restore nitrogen to the soil. When the trees commence to bear the fertility of the soil should be restored by dressing with manure, potash, and phosphoric acid fertilizers. The trees should never be pruned except at the time of planting, when the roots should be cut back and at least two thirds of the last year's growth removed from the top. If cultivation is continued late in the fall, growth is continued late in the season without maturing the wood and buds, rendering winter injury thereto probable.

The cherry will begin to bear four years after planting, and will bear a reasonably profitable crop at the age of six years. None of the varieties usually planted are long-lived. In view of the fact that cultivation has been rarely practiced in the past, I am led to hope that the longevity of the tree may be greatly extended by the treatment herein recommended. It is my opinion that the greatest success in raising the cherry in the Northwest can be secured in the latitude of the south half of Iowa. I have noticed that in the vicinity of St. Louis the intense heat of the late fall frequently causes swelling of the buds, which are thereby exposed to winter injury, and understand that in south central Missouri this is the cause of the frequent failure of crops.

THE CALIFORNIA CHERRY.

Probably no fruit grown in California is received by consumers with greater genuine pleasure than the cherry. The cherry is not adapted to all parts of the state. The portions which produce lemons and oranges fail to produce cherries. They require a deep sediment soil and a climate not too hot. Santa Clara Valley is probably the largest and best cherry district in the state, including in this district the section on the east side of the bay on both sides of Haywards. Chico has some good cherry orchards, and the largest cherry tree in the state, so far as known, is on the American river above Sacramento. Vacaville and Winters are in a section noted for shipping very early cherries, the first box generally going out in April.

Very early varieties are grown for these early shipments, such as the Early Purple Guigne, Belle d'Orleans, Knight's Early Black, etc. These sorts are all inferior in quality to the later kinds, but being early command the high prices of the first market.

The most popular eating cherry is the Black Tartarian, well known. The Governor Wood, Yellow Spanish, Cleveland Bigarreau and others are rather early white cherries, all too soft for successful shipping or canning. Ripening about with the Black Tartarian is the Centennial, a magnificent, firm-fleshed white cherry with a flame cheek. Its only fault is that it cracks on very slight provocation, such as a shower of rain or late irrigation. Black Republican is a late black cherry, very firm and an excellent shipper.

The very popular cherry of the state is the Napoleon Bigarreau, or Royal Ann, as it is known to the trade. This is a white cherry with cheeks of solid color, very hard and firm, shipping well, and most popular with the canners. In large quantities this cherry brings the highest price of any sort. This cherry seems to do well in the mountains where other cherries fail. The Black Tartarian does not do well in the mountains, generally.

The Bing is a cherry first noted in Oregon and giving some promise where introduced in California.

On unsuitable soil the cherry tree does not flourish or bear. It gums, dies back, or proves barren, often to the great disappointment of the planter.

The cherry is shipped to all the California cities and to southern California, and on to the east to Chicago, Boston, New York, Philadelphia, and all important markets.

The first box usually brings a round ten dollars, and the first few hundred boxes rather fancy prices, and then the price goes according to supply and demand, and the condition in which they are received. During the great railroad strike cars of cherries stood in San Jose depot for a full month well iced, and were then opened and the fruit sold here at fair prices.

One of the best orchards in the state is located near San Jose, the property of Mrs. W. Geiger. It was planted by her husband about twenty years ago and has a deep sediment soil. It is thoroughly irrigated in the winter or late spring and again in summer after the crop is off. It consists of about twelve acres, principally of the Black Tartarian and Royal Ann varieties.

For many years it was contracted for five-year terms by a very popular shipper, who made much of his reputation by the good quality of the cherries of this orchard. When the contracts expired after the death of Mr. Geiger they were not renewed, and the fruit was

shipped direct from the orchard under the management of W. R. Geiger, a son. Since the death of her son Mrs. Geiger has herself managed the orchard and directed the cultivation, harvesting, packing and shipping with great success.

She has trusted help in all departments which she secures year after year.

Men with long ladders, tin picking buckets and hooks gather the cherries from the trees. The fruit is then taken to a large packing-shed, and young ladies pack carefully in shallow ten-pound boxes with ventilated tops and sides, and a partition across the middle to check any movement. The fruit is all packed in straight rows and layers, and a neatly packed box presents a beautiful appearance when opened. The great fruit wagons stand under the shed, and large loads are taken to the cars. Sometimes more than 1000 pounds of cherries are gathered from a tree in this orchard.

Cherries generally bring good prices. From four to eight cents per pound is about the range, and the income from a good cherry orchard is often from \$500 to \$800 and even \$1000 per acre, with a good crop and a good market.

PRODUCTION OF CHERRIES.

By E. F. WETMORE, before the East Tennessee Horticultural Society.

We have observed that nursery catalogues state that the cherry will thrive and bear almost anywhere so long as it is planted upon well-drained land. We note that it makes but little difference where these catalogues are published; whether north, south, east or west—all are the same. Our opinion is that the cherry may grow almost anywhere, but to produce successful crops of fruit it has its preference of location and climate. In the extreme north the fruit-buds winter-kill; while south of the latitude of Tennessee the climate is too warm. Even here in this state we find that in some locations they are not productive. This, we believe, is usually the case where they are planted upon heavy red clay soil. Our observation has been that the cherry, where planted on sandy, loamy soil, especially if somewhat elevated, has proved more productive one year with another than on heavy clay soil.

I have a little orchard containing 360 trees, some of which have been planted four years, and some three years. I also have a few trees that have been set ten years. We have had cherries every year without a single exception for the past nine years, the quantity increasing each year with the growth of the trees, until last year, 1897,

when some of the trees, planted then nine years, produced more than two bushels of perfect cherries, free from worms, and fit to set before a king. This year, 1898, the crop was not increased above that of last year, but instead there was a light crop, due to severe freezes, which occurred on April 4 and 5. Ice formed one-half inch thick and the mercury stood at twenty-two degrees. Nearly all varieties of cherries were in full bloom, and most of the fruit was destroyed.

To show the hardiness of cherries in comparison with other fruits, I will state that this freeze killed all the fruit in my peach orchard, and also the greater part of my apples. None of the sweet types stood the freeze well enough to produce fruit. I have planted in my test orchard the following varieties: May Duke, Large Montmorency, Early Richmond, Ostheim, Wragg, Large English Morello, Sudie, Windsor, Yellow Spanish, and Black Tartarian. The three last named are sweet or Bigarreau type. All others bore, some trees quite full, while some only a few.

My elevation is 2300 feet above sea-level, and 1200 feet above the Tennessee river. My soil is a sandy loam.

They should not be trimmed too high—three to three and a half feet is about right. They need very little or no trimming after the first two or three years. Do not form a crotch or forked tree, but an evenly balanced head. If any of your little trees are forked, either cherry or any other kind of fruit-trees, when they come from the nursery (though they should never be), you should cut off one of the limbs, and though it may not make a pleasing sight at the time, it will soon balance up all right.

THE CHERRY.

By S. H. LINTON, Marceline, Mo.

Practical horticulturists are anxious to have all varieties of fruit come up to a standard. From a general view over the country, the cherry is crowded out by other fruits, because the cherry is less understood and therefore less appreciated. Striking a line east and west with the south line of Missouri and another line east and west along the center of Iowa, between these lines, from the Atlantic to the Pacific coasts, Morello cherries give paying crops if planted in ground agreeable to their nature and given proper care. There are many localities within this area that do not produce cherries sufficient to supply their local market. This should not be the case with progressive fruit men. The cherry demands a dry clay soil. They are rather deep rooted and great feeders, and, if given too much humus, will take up

food faster than the tree can digest it. The result is dyspepsia of the tree, and they will soon show the disease in what is called foot-rot. This disease starts in the stalk at the top of the ground and goes up and down. It is most prevalent during warm, wet weather in late spring and early summer. While most fruit-trees are more or less liable to this disease it is the worst with the cherry. But if the cherry is planted on clay land with good drainage, and the tree is not crowded faster than the growth will nicely ripen, there will be but little trouble with foot-rot. The black-knot is troublesome in certain localities, but if care is used in not buying young trees already diseased, there is little fear of this trouble. The cherry is considered by some growers to be short-lived. Even if this be so, there are good profits in growing the cherry if it does not live over ten years. I know cherry orchards that have been in regular bearing ten to fifteen years, and still bid fair to produce many good crops yet.

As to varieties for profit, this depends upon the locality, but for the extreme east and west* of area given, the Duke and Morello, or the family of sour cherries, can only be successfully grown. Sweet cherries are more adapted to favorable localities in the mountain regions and further south. Horticulturists would be truly glad if sweet cherries could be successfully grown and fruited everywhere. Fruit-growers should encourage planting more of the cherry.

NOTES ON CHERRY CULTURE.

By S. H. LINTON, Marceline, Mo.

The cherry fills a gap in the fruit supply that no other fruit can well take, in season or the culinary, the mild subacid flavor, toned with a peculiar agreeableness to the appetite, with a tonic so much desired to cool burning thirst during the hot summer days.

Cherries are divided into two families or groups, the Heart and Bigarreau, or the family of the sweet cherry. This includes all the white, yellow and some of the red and black varieties; all are very rich and high flavored. The Duke and Morello families include the more acid varieties.

There are few more useful trees than the cherry. It may be planted as an ornamental tree, lining streets or avenues, giving touch to the beautiful in early spring, with its banks of snow-white bloom, after which the tree soon changes to red, like the "fiery bush" of old, enticing all to come and partake of its bountiful supply of luscious fruit.

*"Extreme east and west of area given" means on either coast, where sweet cherries grow in abundance.—SEC.

The cherry can be grown successfully on any clay soil with a well-drained subsoil, and if mixed with gravel or shale is all the better. For a family supply it may be planted in the yard or lawn, in which case the ground should be worked around the trees as much as three or four feet the first two seasons after planting to keep down the growth of grass and weeds. This method is much preferred to mulching, as mulching adds humus, which stimulates growth faster than it can ripen its wood.

For a commercial purpose, the location should be selected with two points in view—first, that the entire plat is well drained; second, that the soil is not too full of humus, with a north and east exposure, and a west and north protection. In the absence of natural protection, plant evergreens or some spreading native forest-trees. Plow deep and harrow smooth. Mark off accurately, so as to place the trees twenty feet apart each way. If the surface of the land be level, plow with a back land for each row. Dig holes wide and deep enough to receive the roots without twisting or bending. Have the trees trenched handy, taking out a few, protecting the roots as taken out. Cut back all mutilated roots to sound live wood with a sharp knife; incline the stalk ten to fifteen degrees to the southwest. Set deep enough to bring the budded junction two to three inches under the level of the ground. Fill in with well-pulverized soil, sprinkling on and through the roots. If the dirt is pitched in, a shovelful at a time, it will clog on top of the roots, leaving space underneath without any. Pack or settle the dirt as filled in until the roots are well covered, when the packing should be done with the foot, giving weight and force until satisfied that there are no air spaces left. Finish the filling with loose dirt on top without tramping; this will prevent the soil from baking and cracking. After the planting go over the entire tree cutting off broken limbs, but no other cutting should be done. If possible, before a rain, the cultivator should be run through the orchard, loosening up the ground that has necessarily been tramped and packed in planting.

If the ground is fertile the orchard may be planted to corn, potatoes or any hoed or cultivated crop for first two seasons, and if over-fertile crops should be grown up to the fourth season, when the ground can be sown to clover or left to grow in weeds. In either case the clover or weeds should be mowed from middle to last of June and again from middle to last of August, and in both cases left on the ground. No pruning is required, except to cut out dead or broken limbs, and the best time to do this is at the moment you find the limb dead or broken.

If planted twenty feet each way it takes 110 trees to the acre. The average yield of a cherry tree at five years old is nine gallons; which,

at twenty-five cents per gallon would bring in round numbers, \$247.50 per acre. If planted on suitable ground, and given proper care, a cherry orchard can be depended upon for annual crops for ten to fifteen years.

CHARACTER OF SOILS, LOCATION AND VARIETIES FOR A CHERRY ORCHARD.

By J. J. KISER, Stanberry, Mo.

The character of the soil in northwest Missouri, for which alone I can speak, is preeminently a fruit soil; our subsoil—a deep stratum of from twenty to forty feet of porous joint-clay—can only be equaled if excelled by that formation known as the Missouri river bluff or loess formation. This joint-clay is in reality a soil in which, if brought to sunlight and properly aerated, will grow the finest plants. Add too and over this a layer of from six inches to six feet of vegetable decomposition, mixed with drift soils and sand, for ages forming a loam in which is every element of plant structure. The cherry tree will not live with its feet in standing water, neither ought anything but a willow be planted in such a place. My best growing and bearing trees are on the north side of the top of a small elevation, hardly to be called a hill, though trees are doing well on the south side of the same. Trees set near an artificial pond so that the high-water mark is on a level with the roots of trees, are dead or stunted; while plum trees in the same situation show very little if any damage. The largest and finest specimens of cherry trees the writer ever saw were planted along the upper sides of cuts in roadways and along terraces on mountains and hillsides in Switzerland—trees over two feet in diameter that looked as though they might be a century old.

VARIETIES.—I approach this part of my subject with some degree of hesitation. Differences of soil, climate, and even the markets, may modify the choice of varieties. One of my earliest recollections is a large cherry tree that stood near the homestead in the old "fatherland." How well I remember watching the first burst of bloom in the spring, the development of the fruit, even the counting of the specimens that some day I might reach, the seemingly slow growth, and then, one morning the red tinge on a few of them—how slowly they ripened. Yes, I will confess to putting some of them into my mouth without picking them from the tree—I believe I can taste them yet—and when they did get ripe, great, big, lusciously sweet; they were such as I never expect to see again, for they will not grow in this climate. When I tasted my first cherries this side the Atlantic I thought, oh! how is it possible to like such sour things?

When in Kansas City a few years ago I bought a box of California sweets (?); small affairs they were, but I took them in haste to get once more a realization of my youthful memory. I tried one; two; in surprise I looked at the rest. They all looked alike. Tried another; found that all three tasted alike, and in disgust I consigned the whole lot to the gutter.

But let no one understand that I do n't like cherries, even such as we grow in abundance in northwest Missouri. In getting my allegiance Americanized I have also got my cherry taste adjusted, and to-day I vote the American cherry a grand success. Fully ripe, they are good to eat; mixed with sweet apples, or any kind, for that matter, and sweetened to taste, they make the best pie on earth.

For a market cherry I would place the English Morello at the top of the list. True it went to wholesale destruction last winter; but are we going to quit planting all the kinds of fruit that were injured by that outlandish performance the weather clerk put on the program last winter? I think we will discharge him and the next one may take due notice and govern himself accordingly. Last winter has been called by some a test winter, but I do n't understand it so. It is not to be expected that so many adverse circumstances and conditions will get up another such a combination in the next century.

The next best and very best for home and near-by market is Early Richmond. It must be used soon after picking. A neighbor told me that in canning they had mixed them with one-half strawberries, to the great improvement of both, the combination keeping well, when they had had trouble in keeping strawberries; that it gives a body and substance to that watery fruit that makes it much better. A few years ago I could not sell Early Richmond in my market. Nothing would do but English Morello. Yet to-day people have learned that the Early Richmond is much the better cherry and the demand has increased beyond the supply.

Montmorency Ordinaire, Suda Hardy and Ostheimer have gone to the happy hunting-grounds along with English Morello and some semi-sweets. True they are not all dead, but all more or less damaged; being late, they grew too late, and were not matured to withstand the shock. Dyehouse wintered well and bore a small crop; it does not bear as young as Early Richmond; may do better later. I can see very little difference in fruit, though the trees grow more stocky. Wragg has stood the weather finely; it is small, sour, bitter, and puckery; even sugar fails to make it eatable; not adapted to my situation and I shall grub it out. It is the true Wragg, as I got it from the Wragg nursery.

However, the best variety that has ever come under my observation in this country is one tree that stands in the yard of S. Chamberlain,

in the city of Stanberry, Mo. For years it has yielded its full crops of large cherries, pleasing to the eye and good to the taste, milder yet than Early Richmond and more than twice as large, with smaller pit. It stood last winter without damage and bore a full crop this year.

PRUNING, PLANTING, CULTIVATING, GATHERING AND MARKETING THE CHERRY.

By W. H. SKINNER, Bethany, Mo.

I shall briefly outline the work on the cherry tree, from the time it reaches the premises of the orchardist until its matured fruit is placed in the hands of the consumer, and in the beginning will say that my experience in planting cherries has not been as satisfactory as in planting other kinds of trees, for my losses in planting my cherry orchard of 450 trees has been more than double what I have lost in planting over 2000 other orchard trees. But this I attribute largely to the condition of the trees when received. I believe that if I could get cherry trees that were dug, and immediately shipped, instead of being cellared over winter, there would be less failure to grow, as cherry trees of my own propagation dug and immediately planted have had no loss.

Cherries should be planted in this part of the country only in the spring, as our cold, dry winter winds have a tendency to extract the moisture from the tree, and the roots being short, with but little surface to absorb moisture, the tree is very liable to die back partly, if not entirely, during the winter. They should be planted in the spring, as early as the ground is fit to plow, and if possible before the buds begin to swell. They may be planted even after the buds begin to burst, but I have noticed that the earlier planted trees are more liable to live and make the better growth.

The cherry will grow on almost any kind of soil except a very wet one, but does best in a good sandy clay loam with gravelly subsoil. This seems to furnish the necessary drainage and sustenance to produce the hardiest tree and best fruit. Before planting the ground should be deeply and thoroughly plowed and pulverized. The roots of the trees where cut or broken in digging should be smoothly cut, and the hole in which the trees are planted should be large enough to admit the roots without bending; if it were possible to plow that deep, the hole should not be deeper than the ground is plowed, although I believe that cherries should be planted deeper than apples or pears. The roots should be puddled in soft mud before setting the tree in its place; the tree should be planted so deeply that the bud or graft is at least two inches below the surface when the hole is

filled. The hole should be filled with fine mellow earth, carefully packed and tramped until the roots are well covered, and the earth should then be piled up a little to allow for settling, but the upper two or three inches should not be packed. Greater care is required in planting the cherry than any other variety of fruit I have ever tried.

I do but little pruning at time of planting; I prefer to plant small trees that need no pruning. In March of the following year the trees should be gone over and pruned to shape the head; clip in the ends of the long shoots, keep the heads round, in the case of trees that grow like the Richmond, or conical with trees of more upright growth, and if the branches have not started thick enough to make a good head, cut back heavy enough to make them thicker, the aim being to shape the head as near as possible to the shape of some well-grown tree of the variety. The following March, when the trees are two years planted, they should again be gone over and pruned with the same end in view, that is, to make a well-shaped head, cutting out cross-limbs, heading back too rampant growing branches; and where a branch crooks or grows in a wrong direction it can usually be remedied, if taken in time, by cutting back to a bud that will start and carry its growth in the right direction. The third year the same treatment should be given, after which but little pruning will be needed, except to remove dead limbs, but these should not and, with proper treatment, will not be abundant for many years. In pruning the cherry, like all other trees, no fixed rule can be made that will apply to all, as no two trees are exactly alike; but the cherry being one of the most perverse of all fruit-trees, it is best for the pruner to have a well-grown, full-sized specimen of the variety he is pruning in his mind; this gives him the natural shape of the tree, and he should so train his young sprout as to cause it to assume its natural shape and make a well-formed tree of its kind.

One of our modern horticulturists has said that the shape of the tree makes little difference with its bearing qualities and that each grower may form his own ideal shape of tree, and prune accordingly; but in pruning the cherry I would suggest that the pruner should have many ideals, as it is much more easy to make an ideal to fit a particular tree than it is to make all cherry trees grow to fit a particular ideal. No man should undertake to prune and shape the head of any young tree until he has studied the bud arrangement and growing characteristics of the family of trees to which it belongs, as the shaping of the top depends materially on the position of the upper bud left after the branch is clipped; and in shaping the heads of young trees particular attention should be given that the cut is made

so as to leave the upper bud in a position to start the new branch off in the right direction.

After planting comes cultivation, and this should begin immediately, and should be thorough, going over with a smoothing harrow or some other shallow working tool so as to loosen the ground which has become more or less packed by tramping while the planting was being done; again pulverizing two or three inches of the top soil, thus making a dust mulch to retain the moisture; this cultivation should continue during the summer to keep a dust mulch and keep down the weeds. The number of times it will be needed depends somewhat on the season and the perseverance of the weeds. The cultivation the second and following seasons should be the same as the first, except that the first cultivation should be with a tool going deeper than a smoothing harrow, such as a cultivator or spring-tooth harrow; about the fourth year the orchard should be sown to clover and left to grow during the fifth year, mowing it two or three times and leaving the clover on the ground to keep up the humus; and this will also have a tendency to check growth and bring the trees into bearing. About the last of May (or perhaps earlier) of the sixth year the clover should be turned under by a shallow plowing, after which the cultivation should be kept up with the harrow.

Included with the cultivation and pruning of the cherry orchard should also be considered its care, and whether you class it with the cultivation or with the care makes little difference; but the careful spraying of the cherry is one of the requisites that cannot and must not be overlooked to secure success and keep healthy trees. The leaf spot and powdery mildew are the great enemies of the cherry in this country, and without being in some way prevented are likely to wake up the orchardist some fine spring morning to a knowledge that his cherry trees are all dead. The great loss of cherry trees throughout the Northwest last winter, I am satisfied, was more from these diseases than from the extreme cold of February, 1899. By the middle of August, 1898, many of the bearing cherry trees had lost all their leaves from these diseases. The warm, damp weather of September started a new growth; many trees put out new leaves and some were in bloom, the sap was up; they were in full growth when the snow and hard freeze came, on October 17 and 18, and were killed then. If these trees had been thoroughly sprayed with the fifty-gallon formula Bordeaux mixture when the blossoms fell off, and again as soon as the fruit was gathered, the leaves would have held on until killed by frost, the trees would not have been growing in October, and would not have been injured by the cold. I did not lose a single sour cherry tree last winter.

And now we come to the time of most interest to the cherry grower—the gathering and marketing—in which, especially the latter, I have had but little experience, as my orchard is just beginning to bear. But as I have given some thought and attention to this part of it, and have read everything on the subject I could find, so as to know what to do when I get a crop, I will give an outline of my gleanings from others.

The cherry should not be gathered until fully ripe and then only when it is dry, as, if it is gathered when wet or even damp from rain or dew, it will quickly spoil. In all cases the fruit should be carefully handled, and the stem should be left attached to the fruit, as the removal of the stem from the fruit will break the skin, allow the juice to run out, and quickly injure the fruit. All defective berries should be thrown out, as they will injure the sale of the remaining fruit, and at this time it pays to pack only the best fruit and to put it up in a manner that will be attractive, as there is about as much in the packing of the fruit toward selling it as in the fruit itself, perhaps more. Cherries should be packed in small shallow boxes or baskets, which in no case should hold over one gallon, and handled so that they will not bruise or mash. As to the marketing of cherries away from home, all the questions of freight charges, commissions and commission men, and of markets, applicable to other fruits, apply to cherries. I have given this but little thought, for the reason that our home market has never been half supplied with cherries, and I believe that it will be many years before I shall have to go away from home to find a market for my cherries.

WILL IT PAY TO PLANT CHERRIES?

By G. W. HOPKINS, Springfield, Mo.

Most every one in starting a new place will set out a few trees, but orchards exclusively of cherries are few and far between. There seems to be only two varieties that are worth planting in this locality—the Early Richmond and English Morello. The Montmorency, it is said, does well, but few have fruited it.

Sweet cherries are not worth planting here, as they are very tender in the bud, and possibly one year in ten they may not be killed. If they are not killed in the winter or early spring, when they begin to ripen, the rains will crack the fruit and the birds destroy the crop. The curculio is very destructive to the cherry.

There is no question but cherries will pay well in south Missouri if there was any certainty of a crop. The Early Richmond comes in before strawberries are gone, and we have the whole southern country

for a market. Three years ago I shipped Early Richmond to Memphis, some of which sold as high as \$3.50 per crate.

Of course there is big money in this, but I have not sold a cherry since. Now, there may be some sheltered places in south Missouri where the climatic changes are not so sudden, that cherries may be grown with profit. To those living in such favored places I would say, plant cherries. But after thirteen years of experience and observation in the vicinity of Springfield, I would say it would be rather hazardous to plant orchards of cherries for commercial purposes, unless we could have assurance that the climate and seasons would change for the better.

DISCUSSION.

MAJOR HOLSINGER.—I have several thousand cherries in bearing and have made more money from the cherry than from any other fruit. I favor the Montmorency and if I had to forego any kind it would not be the Wragg. I think the Wragg is better than the Early Richmond. For four kinds, I would take Early Richmond, Montmorency, English Morello, and Wragg. These four make fruit through the season. The Wragg I have were propagated in Alabama, but is the same as the Iowa Wragg. My cherry trees planted in 1876 have paid well. We are burning them this winter for firewood. The first acre of these cherry trees I planted made \$500 per acre each year it was in bearing. If the others will last as long and pay as well I will be well pleased. Some of our cherry trees die in full leaf. I do n't understand the cause.

L. A. GOODMAN.—Of all the fruit I have grown at Westport the cherry has paid me best. Ten or twelve dollars per tree per year is not an uncommon yield. They should be planted in the proper soil and given the best cultivation for four years; after that time the tougher the grass sod the better. Not for sixteen years has the grass been broken. The roots are sensitive to being broken. When they are cut they begin to decay. The soil must be dry and not underlaid with hard-pan.

Question.—"What is the best stock for the cherry?" The discussion showed the Mahaleb to be the stock in common use. Mr. Callaway, of Illinois, said the common Morello was the best [stock]. Mr. Kiser saved his cherries by planting plenty of Russian mulberries for the birds; they much preferred the sweet little berries to the sour cherries. His loss from birds was nothing in his cherry orchard.

Question.—"Is clover a good crop for a cherry orchard four years old? And would you let it stand or cultivate alternate years?"

L. A. GOODMAN.—Clover is good. I would never cultivate after four years.

J. M. IRVINE.—At the last meeting of the Buchanan County Horticultural Society we discussed the cherry. It was said to be the most profitable fruit. Some are growing Dyehouse instead of Early Richmond. It is sometimes earlier and always as early as the Richmond. Montmorency, English Morello and Wragg are also grown.

J. E. MAY.—Is there any difference between the Large Montmorency and Montmorency Ordinaire?

MAJOR HOLSINGER.—None whatever.

MR. BAXTER.—Mazzard stocks sometimes do better than those on Mahaleb stocks.

MR. BUTTERFIELD.—The Mazzard sprouts.

MR. BAXTER.—Morello is the best stock for the cherry.

CHERRIES FOR PROFIT.

By J. P. SINNOCK, Moberly, Mo.

Cherries are something the birds like very much; children also eat them with great relish. When a boy, I remember the old cherry orchard of Morellos, sprouting in every fence corner on my father's farm.

In those days we never thought of selling cherries. They were very plentiful, and the birds had great feasts among the branches; the neighbors also received a great many.

The cherry is propagated by budding on the Mahaleb or Mazzard stocks, which are mostly imported from Europe, planted in the nursery rows, and budded in the following September. The buds take readily on Mahaleb when worked in September. We always use Mahaleb on account of its late growth in the fall, and it never sprouts from the roots.

There is no work in the nursery that I like better than growing the cherry. In these days we grow cherries for profit. If you want to plant a cherry orchard, select a nice rolling piece of land and plow deep about the last of September or the first of October. They will do no good in wet soil. Then select your trees from the nearest reliable nurseryman. Buy nothing but good, No. 1, one- or two-year-old trees—one year is preferred. Buy those budded on Mahaleb stock and you will not be bothered with sprouts.

Select for early fruit, the Early Richmond; medium, Late Duke; and for late, the English Morello. Lay off the land about sixteen feet each way; begin planting early in November. In about three years you can begin picking the fruit. Cherry trees have many advantages over apple and pear; rabbits or borers scarcely ever bother them, and the fruit comes at a time of the year when little other fruit is on the market.

An advantage with the cherry is, you can let them hang on the trees for a week or more after they are ripe; this gives you plenty of time to find a market. You can always find a good market at Omaha or Des Moines, if you cannot at some of your near-by towns, for a large quantity of them at a fair price.

The tree needs but little pruning. Start the head two and a half to three feet high. Keep all broken and dead limbs cut out. Grow potatoes or melons for two or three years and then you can sow clover and plow it under to stimulate the ground.

Pick your cherries with the stems on and put them in quart boxes or baskets, and you will be surprised at the way they sell and the amount 1000 trees will bring you. I have seen the fruit from a single

tree bring ten dollars. My neighbor has eight or nine acres of cherry orchard, four years old, which brought him seventy-five dollars an acre last year. We need more cherries. Plant enough to ship in car lots, like we do peaches and apples. We ought to plant a variety of fruit.

The cherry will fruit as often and bring as much money and pay for itself before the apple begins to bear. When a man talks of planting an orchard, saying: "If it did not take so long for an apple orchard to bear I would plant it," I tell him to plant apples, and also ten acres of cherries to bring money to grow the apple orchard. In planting orchards, if we would pay more attention to cherries, pears and peaches, when the apple crop fails the fruit-grower would have more money. [Good!]

There are many varieties hardly worth planting. The Hearts and Bigarreau varieties will do but little good, as they are usually short-lived and bear but little, and are so good the birds get them all. The Dukes and Morellos are so sour the birds will not bother them if you will plant a few Russian mulberries along the fences. The English Morello bears like the Ben Davis apple. You can stand on the ground and pick most of the fruit and not bother with ladders, and it never dies in debt to you.

We have a neighbor planting a 200-acre orchard. He is planting 5000 cherries and 5000 peaches. I think if more of our fruit-growers would plant cherries, peaches, and pears, as well as apples, they would have fruit to sell every year, and their bank account would hold up better from one apple crop to the next one.

THE CHERRY.

A paper by J. F. CECIL, Topeka, Kan., read before the Shawnee County Horticultural Society.

The growing of cherries in our section of the state is, so far as I am aware, limited to two or three varieties of the sour class. If any one has succeeded in getting a sweet cherry tree into profitable bearing in Shawnee county I have not heard of it. The first obstacle met with in the attempt is the bursting of the bark, which comes from the inadaptation of the tree to the soil and climate. I believe that successful crops have only been obtained from Early Richmond and English Morello, with many hopeful plantings of the Montmorency. The Early Richmond is the earliest, and a hardy, productive tree. Its fruit is usually more free of the curculio, and comes so early that it is seldom harmed by drought. Its fruit is small to medium in size, unless grown under very favorable circumstances. It is the most popular variety in the West: as many trees of this variety are planted

as of all others combined. English Morello makes a small, bushy tree, is an early and abundant bearer, not capable of withstanding as low temperature as the Richmond or Montmorency, but is less susceptible to bark-bursting during a long period of drought. It is very subject to leaf-blight, and easily succumbs to the ill effects of excessive moisture. Fruit medium to large in size, roundish in form, in color almost black when fully ripe, flesh very dark and sour; regarded by some as a good canner. Begin to ripen from the middle to the last of June.

Montmorency is a very large, light-red, long-stemmed cherry, flattened on the ends, flesh more solid than in the Richmond, and of about the same flavor. The tree is a strong, erect and symmetrical grower, and, all points considered, it is with me the hardiest of all. I have found young trees unproductive; but Mr. Bailey, of Cornell, claims it to be a bearer of great crops of fruit, even outdoing the English Morello when in full bearing, which is a year or two later than that variety. He refers to a Mr. Scoon, who considered a crop of eight to ten tons a good one from his 800 trees, and, selling at five cents a pound, brings \$1 per tree or \$130 per acre from trees set eight years. Mr. Bailey thinks this a very conservative estimate. Another case is cited: Mr. Kean, of Seneca, has 200 Montmorency six years set; has had three crops, one of 1400, one of 3000 and one of 3100 pounds, and, at five cents, means \$375 for the three crops. His trees are set 10x12 feet, which allows 360 trees to the acre; this means that \$375 was taken from a little more than a half-acre in three years. Another experience: A Mr. Perkins, with thirty-five trees, eight and twelve years old, yields from \$100 to \$175 a year. All of this is encouraging to me, for, up to this time, my experience led me to conclude that unproductiveness was its only weak point.

Ostheim is of about the character in tree and fruit as the English Morello, probably less acid, and may become more popular when known, but is not very extensively planted at present. Louis Philippe is considered valuable by some growers in the East and has some good points to recommend it for trial by Western growers. A few trees of the Late Duke in my neighborhood have given their owners pleasure and profit. My own profits in cherry growing have come from the English Morello. I had 150 yearling trees set in the spring of 1888, 10x15 feet, among raspberry plants set two years before. In 1891 we picked the first fruit for market, which was thirty-one cases, and sold for \$46.50. Our best crops were had in 1895, 1896, and 1897. The crop of 1895 was 128 cases, and sold for \$228.43. These trees occupied 22,500 square feet—a few feet over one-half an acre. Up to 1891 we were receiving paying crops of raspberries.

In selecting a site for an orchard, care should be had to get a piece of deep loamy soil, free from stagnant moisture; it should be well drained, either naturally or otherwise. No fruit plants, unless it be the grape or peach, will so quickly or effectually protest against the presence of excessive moisture as the cherry. Deep plowing and thorough after-preparation are very essential. Lay the rows twenty feet apart and set the trees twenty feet apart in the row. My first experience was with trees set 10x15 feet, which I found to be entirely too close; a later planting was made in setting 16½x20 feet, and this also is too close for Early Richmond and Montmorency, but probably sufficient for English Morello. Two-year-old trees are usually chosen. But I am of the opinion that a closer and better acquaintance with young trees would lead to a general planting of one-year-olds. It is true that a little care and training would be transferred from the nurseryman to the orchardist, but this will be compensated for by an earlier establishment and fewer losses in transplanting.

When planting one-year-old trees they should be trimmed to a single stem, being careful to rub off all superfluous shoots as they appear, locating the head as desired, and cherry trees should be low-headed. The pruning in after-years should consist of cutting out such branches as interlock, and the successful orchardist will sooner or later recognize the fact that the cherry tree will resent any unnecessary mutilation by a decline in vigor and early decay. Cultivation should begin early in the spring, after planting. Such crops as strawberries and raspberries may be cultivated in the orchard for three or four years. But where this is practiced the loss to the soil should be repaired by applying suitable fertilizers. These should not be too rich in nitrogen but have a large percentage of potash and phosphoric acid. A much better crop for the orchard is soy-beans or cow-peas; in every case it is necessary to keep plenty of fiber in the soil. After the third or fourth year no other crop should be allowed in the orchard, and shallow and thorough cultivation should be commenced early in the season and continued until the fruit is harvested, after which a cover crop should be sowed. I am thoroughly convinced that orchard cultivation should include a cover crop. Indeed, I find that on slope lands it is impossible to cultivate orchards without the aid of cover crops to prevent great losses by washing.

All will concede that most if not all of our fruit plants should receive their cultivation in early spring, and that late tillage in most cases means a late growth that will endanger the succeeding crop, if not the life of the plant. Thus we find it convenient and necessary to sow a cover crop. A variety of plants may be used for such crop, such as cow-peas, oats, sorghum, millet, buckwheat and, if the soil is inclined

to be too wet in seasons of excessive rainfall, rye or winter wheat may be used to take up some of the excess by growth in the spring, care being taken to plow under in time to check any undue loss of moisture by allowing to grow too late. The curculio is the insect that has destroyed some crops of this fruit and is about the only pest it has. In some seasons it becomes a scourge, and jarring onto sheets and destroying it is about the only remedy. Leaf-blight with me has not been serious except in very wet seasons and I am very sure that it can be held in check or entirely prevented by thorough spraying with Bordeaux mixture. I have been able to hold the leaves on nursery trees until late in the season by its use when unsprayed trees in the immediate vicinity were entirely denuded, but the applications were made at the time the fruit was ripening and a little earlier; this would prevent its use in the orchard. I have thought that early spraying for several successive seasons would tone up the trees and carry them through the season unharmed.

Two or three pickings are sufficient to go over the Early Richmond and Montmorency, but the English Morello should have more frequent attention to get the fruit into market at its best. I have marketed all of my fruit in twenty-four-quart cases and paid the pickers from one to one and one-fourth cents per quart, the condition of the crop regulating the price. Some growers use ten- and twenty-pound baskets for marketing, which may do for a near-by market.

THE CHERRY.

A paper by J. W. JOHNSON, read before the Allen County Horticultural Society February 9, 1900.

The cherry is no longer considered simply as a luxury, but as a staple fruit, and few of our orchard products can be served in more varied or tempting forms. But few seem to give it more than a small place in their orchard, many giving it far too little thought. Mr. Wellhouse, in talking of "Apples for Profit," said he plants but few varieties, and these well known as adapted to climate, seasons, and the market upon which he depends for profits. These are essential in the cherry orchard for profit and also for home consumption, and should be incorporated in our plans.

Our suggestions to one contemplating the setting of a cherry orchard for the money profits are to keep in mind these points: Soils adapted to the cherry; care in setting and culture; varieties adapted to your locality; the succession you desire; and the market you can reasonably hope to find.

As to the soil, Downing says that "a sandy or gravelly soil is the

cherry's favorite home"; therefore good drainage should be one especial point needing attention where a compact subsoil is known to exist near the surface, as the cherry is a shallow-rooted tree, and too much moisture about the fibrous roots when the trees are small will greatly lessen the prospects of a vigorous growth. A. N. Swigart, of Iola, suggests the digging of one or more trenches to lead the surplus moisture away from the trees while young, as all trees in this climate that are budded on to the French Mahaleb roots are hard to get started, but if carefully set, cultivated, mulched, watered and protected from surplus water during the first year are usually safe and profitable, and are always non-sprouters — the latter characteristic being a very important one.

Of varieties, we shall mention only those that have been found worthy and proven their merits in the experiences of our members and neighbors. There are three primary varieties that have a part in subject, viz., Dukes, Morellos, and sweet or Bigarreus. Of these the first two are sour, and they have many crosses and do well in our county. Of our succession, the first would be the Dyehouse, which ripens in June; the Early Richmond, a very popular and rich variety, a week later; then Olivet, one of the Morello family, but not so tart as its parents; next Montmorency, of which there seems to be two kinds, early and late. Of the early, Mr. Grosbeck planted four trees in Iola; they were well cared for while young, and now annually produce five dollars' worth of cherries per tree, and one year doubled that yield, we are informed. The fruit is large, rich, and ripens in June. English Morello should not be omitted, as it seldom fails to bear a full crop here; but care should be exercised to select your trees from a good kind of the many Morellos. They are a good cherry for shipping, ripening in August, but will sprout upon the slightest provocation. We have not found the sweet varieties profitable here, and do not advise their culture for profit, but for variety, a few in especially favored localities. Of these Governor Wood has proven the favorite in our locality. It is a cross between the Morello and Bigarreau, in which the former shows in the form of the tree and leaf, but the fruit is a true Bigarreau, except it is of a lighter color. Some scientists claim that our climatic conditions are undergoing a change, and that our fruits are affected less by the drying winds, and that our moisture supply is more sure, which, if true, may give the sweet cherry a hope for success; but of that we cannot now advise.

As to pruning, the cherry should have a symmetrical top started by the judicious grower, and then he should stand back to watch its development and guard it from the youngsters. We are told that in Europe the cherry is planted along the roadside, and cared for and

protected by law, and that the fruit is used by the public. We think the latter part of this arrangement is fully understood by the young American. His by-laws may not be very explicit, but he very promptly incorporates this fruit as a part of his constitution.

Regarding the market, the outlook for a large and brisk demand, unsupplied by home growers, is most promising just now for enterprising and wide-awake producers to secure.

THE CHERRY.

By B. F. SMITH, Lawrence, Kan.

The cherry commonly known in this country originated in Asia. One of the old historians says it was first brought to Italy by Lucullus after his victory over Mithridates, seventy-four years before Christ. Pliny repeats a tradition that it was brought to Rome from Syria. Cherries were extensively grown by the Romans, and it is supposed they introduced them into Britain in the third century. While its history is somewhat enveloped in the fog and darkness of past ages, still we are led to believe that the genesis of the cherry was in the garden of Eden, where doubtless the apple, pear, peach and quince had their origin.

Some authors make four classes, but really there are only two classes, sour and sweet cherries. The Hearts and Bigarreaus are sweet. Trees of the sweet sorts are lofty and rapid growers, with large leaves. The Dukes and Morellos are slow growers, forming low, spreading trees; dark green narrow leaves, and acid or subacid fruit. Sweet cherries are adapted to dessert, and are cooling and refreshing when fresh from the trees. The Dukes and Morellos are too sour for dessert, yet they are most valuable in the North for canning and commercial use.

The cherry does best on moderately dry soil, yet it will thrive on almost any soil where corn and the cereals grow. Some varieties succeed as far north as Norway, sixty-three degrees north latitude. In some parts of Germany the public roads are lined with cherry trees for many miles.

A few kinds are true to the parent and can be raised from the seed, but the most valuable varieties usually have no meat in the seed. Good seedlings averaging eighteen inches high may be transplanted from the seed-bed when a year old, and if well cultivated may be budded the same season. Where the buds fail, grafting may be done the following spring.

The cherry orchard should be well cultivated for at least four years,

or until the trees have borne one or two crops of fruit, after which the cherry orchard may be seeded to clover or blue-grass.

In some localities the sweet or Heart cherries are failures as a commercial product. Yet a few of these may be planted for ornamental purposes. Then, should there come a favorable season, maturing the fruit, they will be found pleasing and profitable. The best of the sweet sorts are Black Tartarian, Napoleon, Windsor, Governor Wood, and Black Eagle.

For all commercial traffic and home consumption acid cherries are in great demand, and they are being more largely planted for profit than sweet cherries. In the selection of a list of sour cherries for market, the time of ripening is an important feature. Early sorts come in about the second week of strawberry picking; hence they do not sell as well as the later kinds. Therefore the writer would not favor the planting of the Early Richmond for market purposes.

The best selling cherries are Ostheim, Montmorency, English Morello and Louis Philippe. Fruit of the Montmorency is light red, flesh nearly colorless. It is largely grown in some localities for canning. The fruit of Louis Philippe is dark red, flesh same color and fine quality. English Morello ripens two weeks later than Montmorency; fruit is a dark red, nearly black when ripe; flesh dark red and very sour; tree is a slow grower but begins to bear when two or three years old. It is a favorite with canning factories. The Ostheim ripens soon after Early Richmond. It is popular, but rather too early for those who demand a late cherry.

Trees should be cut back the first two or three years to make the head spread. At the same time the head is kept low, which serves to shade the trunk from the sun.

It is the custom in our locality to set trees about 12x12 feet, but the writer would plant a cherry orchard 16x16 feet apart.

Cherries are but little affected by insects, however, occasionally the curculio is troublesome, still not to the extent as that of plums. White cherries are not as profitable a fruit for commercial traffic as apples, pears, and peaches, yet the trees are ornamental, the fruit is handsome, pleasing to the eye and palates of children and birds.

Then, with all, a valuable addition may be made to the winter store of canned fruits for farmer and fruit-grower. Therefore a small cherry orchard will add five times its cost to the value of any farm home in the country.

THE CHERRY.

By ALBERT DICKENS, Manhattan, Kan.

Cherries are as nearly sure as any crop we grow in Kansas, yet, while we find the raising of corn, wheat and potatoes profitable, cherries are neglected. The cherry is a rival of the late strawberry and early raspberry, but it has enough merits of its own to entitle it to a place in every fruit garden. There is little danger of raising too many cherries until they are so plentiful that prices on them are quoted by the peck or bushel instead of by the quart; in fact, the vast majority of home-owners raise fruit for the table rather than for market.

We have picked cherries, perfect in every particular, that were borne by trees grown in all sorts of soils, from the high uplands in Scott county, through all the grades of the sandy soils of the Arkansas valley, to the limestone soils of eastern Kansas.

One good crop of cherries will pay for the tree, the trouble, and the rent of the land, so, if the trees are short-lived, we should plant oftener. A few good trees are enough for the family use, and if one plants for the market he must calculate as to the distance to market, the supply of pickers, and his ability to handle the crop. For market, the stem must be picked with the fruit; for home use they are often shaken from the tree and caught upon a sheet. If not picked as soon as ripe they are liable to rot badly. Good cherries are well worth all they cost, they have a place in the fruit list which no other fruit can fill.

Set the best trees obtainable. Our own nurseries quote fine trees at a quarter of a dollar; less money for larger lots. Set as carefully as you would an evergreen, a strawberry plant, or a [helpful] hen. Make the hole large enough to allow the roots a natural position; cut back the bruised roots with a smooth cut on the lower side, cut the top back in proportion to the roots; put good soil around the roots; fill in firmly to prevent drying. If the weather department shortens the water-supply, draw a couple of inches of earth up to form a pool, give the tree a bucket of water, and do not forget to loosen the soil and draw the dry earth over for a mulch. If you are master of your time, it is better to put the water on in the evening and draw the dry earth over in the early morning, before the sun can bake the wet soil and so deprive the tree of its supply of air. Keep the trees well cultivated, and look at them with your best eye occasionally and criticize their forms. Think of the tree as it should appear in a few years, and pinch off a sprout when it is liable to make a branch that will in a short time rub its neighbor.

The sour cherries are most widely planted and most successful.

The Early Richmond and the Montmorency of the light reds and the English Morello of the dark reds are as good as the best. May Duke belongs with the sweet cherries botanically, and is more generally successful than any other of that class. It is nearly as sour as the real sour cherries.

INDIVIDUAL EXPERIENCES.

E. T. Daniels, Kiowa, Barber county.—I have twenty cherry trees in bearing, planted from eight to fourteen years; the Early Richmond and English Morello do best for me. My soil is a dark silt upland, underlaid with red rock at three feet, and a poor location. I plant twelve feet apart. Have grown, budded and grafted my own trees. If planting over, I would set the two varieties named and another which I do not know the name of. My neighbors grow very few cherries. The fruit was troubled with curculio only one year, for which we did nothing. I expect to put out quite an orchard and believe there is money in them. I do not irrigate my trees.

W. G. Osborn, Medicine Lodge, Barber county.—I have about fifty cherry trees in bearing, planted from five to fifteen years. They are May and Morello. My soil is level bottom land. I plant twelve feet apart. Gather when ripe; use them at home. Have never grown, budded or grafted my own trees. Some of my neighbors are growing cherries. I consider them a good paying crop in this locality. They are troubled with birds only: I shoot them occasionally. Do not irrigate my trees.

C. A. Blackmore, Sharon, Barber county.—Early Richmond bears early, but the birds get a good share of the crops. I plant Russian mulberries near by to help keep the birds from the cherries. English Morello is a splendid cherry and a prolific bearer. Montmorency Ordinaire is a very large, fine cherry. Dye-house is yet too young to bear with me. Abbess Sweet Duke, a very rank grower, is now four years old and has not fruited yet. The common Morello falls badly when stung by insects. Early Richmond and common Morello first bloom April 22, are in full bloom April 27, and have fallen by May 2. Montmorency Ordinaire and English Morello first blooms appear April 26, are in full bloom April 29, and have fallen by May 6.

George Ettridge, Roberts, Barton county.—I have Early Richmond and English Morello in bearing—forty trees set two years ago this spring, twenty Early Richmonds and twenty Large Montmorency. Cherries do well here; there are no insects to bother them. I don't think the English Morello is very good for this upland; it is too late ripening. I have about 100 Russian mulberries, and the birds feed on them, and do n't seem to bother the cherries. I have never used any fertilizer until this winter; I am putting stable litter around my trees (not near the trees, over the ground). I always tie hay around the trees early in the fall to keep rabbits from gnawing them. I set out two-year-old trees in the spring: would not take trees of any kind as a gift and set them in the fall. Where I set trees I plow the ground early in the fall, deep as a team can pull the plow: I dig holes sixteen inches square, set the trees a little deeper than they stood in the nursery, trim all roots to about six inches of the body, and cut the top back well. When they are set they look like little sticks stuck in the

ground, ten feet apart, with a few short limbs. When setting I fill the hole with surface soil, put the tree in the hole, put three or four inches of soil in, then half a bucket of water. After a dozen or so are thus set I go back and fill the hole up, making the soil firm with the foot. I never plow much with a stirring plow, but use the two-horse cultivator, and cultivate whenever it is necessary to keep the weeds down; that is generally three or four times. Never let live stock among my trees; do not trim cherry trees much. One of my neighbors who lives on the creek has the largest Early Richmond tree I ever saw. He told me he picked three bushels of cherries off that tree when cherries were selling at three quarts for twenty-five cents, and that tree produced about eight dollars' worth of fruit; and yet some say it does not pay to set out trees in this part of the country. Well, it do n't the way ninety per cent. set them out. In the first place, we people out here are bought and sold and hoodooed with tree peddlers. They generally set out their trees in the fall because the peddler says to. If there happens to be life in any of them the rabbits gnaw them. If some leaf out in the spring, they look the patch over, and say "it do n't pay." The weeds grow up six or seven feet high, and they are disgusted with fruit-trees, and swear they will never buy another one. An Ohio nursery delivered \$3000 worth at Hoisington a year ago last fall. I do n't think one tree is alive. I would not have taken the lot as a gift.

Geo. T. Elliott, Great Bend, Barton county.—I have forty cherry trees in bearing; been planted twelve years; the varieties are Early Richmond, Montmorency, and English Morello. Sweet cherries do not do well here. The English Morello and Montmorency are the best bearers. My soil is sandy, sloping to the east. Plant sixteen feet apart; market in baskets holding from twelve to sixteen quarts, in Great Bend, receiving ten to fifteen cents per quart for them. If planting over, I would put out the three varieties I am now growing: cherries do not do very well here; I think the varieties named are best adapted to central Kansas; they bear every year; would not plant extensively. My trees are troubled with no insects, but gophers bother some, which I trap. I do not irrigate my cherries. It is no trouble to raise cherry trees here in Barton or Stafford county.

J. R. Dunkin, Sharon, Barber county.—This seems to be the home of the cherry; trees grow vigorous, and are as a rule hardy, and bear abundantly unless caught by late frosts. Varieties mostly grown here are Dyehouse, Early Richmond, May Duke, English Morello, Montmorency, Governor Wood, and the old common cherry, known to every boy large enough to climb a cherry tree. There should be more cherries planted. They require little attention, can be set in any old place, and make their own living and produce a crop. The cherry is a good seller here and finds a ready home market.

A. S. Huff, Enon, Barber county.—The cherry is one of the most useful crops in this county, and one that commands a good price and ready sale; a fruit that nearly everybody appreciates for canning; and, like the plum, an every-year crop with me. I would recommend the planting of more cherry trees. There are but few trees in this part of the state, in fact, not enough to supply the home demand, and we cannot get too many. What few trees there are seem a wonderful success in this part of Kansas.

J. B. Saxe, Fort Scott, Bourbon county.—I have thirty cherry trees in bearing; been planted five or six years; they are Black Morello and Early Richmond. Morello is the best bearer. My soil is clay, nearly level. I planted my trees about twenty feet apart. Have grown, budded and grafted my own trees. If planting over, I would set out a half dozen Morello. My neighbors grow a few cherries; I do not consider them a good paying crop in this locality.

S. F. C. Garrison, El Dorado, Butler county.—I have forty cherry trees in bearing; been planted from ten to fifteen years. I find Early Richmond to be the best bearer. My soil is upland, sloping to the east. Plant the trees 12x15 feet. If planting over, I would put out Early Richmond. I do not consider them profitable in this locality. They are troubled with curculio, for which we sometimes spray. I do not irrigate my trees.

Dick May, Elk, Chase county.—I have fifteen cherry trees in bearing, planted ten years; they are Morello, which I find to be a good bearer. My soil is second bottom, sloping to the east; plant my trees fifteen feet apart. Use all the fruit at home. Have never grown, budded, or grafted my own trees. If planting over I would set out Early Richmond. My neighbors are growing cherries on a small scale; I consider them a good paying crop in this locality; they are troubled with no insects. I do not irrigate.

A. D. Arnold, Longford, Clay county.—I have six cherry trees in bearing; been planted ten years; they are Early Richmond, Dye House, and Montmorency. I consider cherries one of the surest and best paying crops in this locality. My soil is a sandy loam, sloping west. I plant twenty feet apart. Have never budded, grown, or grafted my own trees. If planting again I would put out Early Richmond, Montmorency, and Dyehouse. Of these I planted fifty a year ago; they have done extra well. Neighbors grow a few cherries. My cherries are not troubled with any insects. Do not irrigate them.

John Reed, Longford, Clay county.—I have only a few cherry trees in bearing. The Early Richmond seems to be the best cherry for this locality. I would advise all farmers in this vicinity to plant cherries of that variety.

J. H. Bilsing, Udall, Cowley county.—I have sixty cherry trees in bearing, which have been planted eighteen years; they are English Morello, Black Morello, Early Richmond, and Royal Duke. The best bearers are Early Richmond and English Morello. My soil is loam intermixed with sand; it is level. Plant my trees sixteen feet apart. Have grown, budded and grafted my own trees. If planting over, I would set out Early Richmond, Royal Duke, Montmorency, and English Morello. They should be well cultivated for several years after planting. My neighbors grow a few cherries. I consider them a moderately-paying crop in this locality. They are troubled with curculio, for which we do nothing. Do not irrigate my cherry trees.

J. H. Sayles, Norcatur, Decatur county.—I have 600 cherry trees in bearing, planted in 1890, 1893, and 1894; they are Early Richmond, Montmorency, English Morello, Ostheim, Empress, Eugene, and two unknown kinds. Of these the best bearers are English Morello, Montmorency, Early Richmond, Ostheim, and Valdimir. My soil is rolling prairie, 170 feet to water, sloping to the north-

east: planted my trees 16 x 20 feet; pay one cent per quart for gathering them; my family do most of the work; market in crates holding twenty-four boxes: sell at Goodland, Colby, Norton, Oberlin, and the orchard, receiving \$1.85 with stems on, \$2.10 stems off, and \$3 per bushel at the orchard. Have grown, budded and grafted all my own trees. If planting over, I would set out Valdimir, English Morello, Montmorency, Early Richmond, Olivet, Ostheim, Empress, and also a large sweet, luscious late variety [Late Duke], name unknown. My neighbors grow a few cherries, but buy most of them from me. I consider the cherry business "a gold mine" in this locality. They are troubled with no insects. Let my chickens run in the cherry orchard. Never irrigate nor mulch my trees, but cultivate often. We plant yearling trees, by plowing a ditch as deep as can be; then plant trees deep and mulch at once; rains fill ditch; cultivate often; trees bear second year. Young orchard five years old averages a crate per tree, worth \$2; seven-year-old orchard, one bushel each. Trees planted in 1890 are failing, losing vigor. We planted 1000 trees last spring; all are looking fine. Can't supply the demand. Will put out 1000 trees in 1901. [Mr. Sayles sent to this office, on July 18, 1900, some splendid specimens of Late Duke, also fine Morellos, from three- and four-year-old trees.—SEC.]

P. Wagner, Dresden, Decatur county.—Have twenty cherry trees in bearing—fifteen sour and five sweet. Cannot tell which are the best bearers, as they are just coming into bearing. My soil is a clay loam, sloping to the east: plant sixteen feet apart. Neighbors are growing some cherries. I consider them a good paying crop in this locality; they are troubled with no insect. Do not irrigate my trees.

Isaac Clark, Oberlin, Decatur county.—I have seventy cherry trees, planted eleven years, fifty of which are sour and ten sweet varieties; all do well. My soil is sand and clay, with a northern slope. Plant fifteen feet apart: gather the fruit in July; market in boxes, at Oberlin, receiving from eight to ten cents per quart. Have never grown, budded or grafted my own trees. My neighbors grow cherries; I consider them a good paying crop. They are troubled with grasshoppers, but we do nothing for them. Do not irrigate my trees.

I. M. Taylor, Richmond, Franklin county.—I have six cherry trees in bearing, which have been planted twelve years; they are the Early Richmond. My soil is a sandy loam, sloping to the east. Use all the fruit at home. Have never grown, budded or grafted my own trees. If planting over, I would put out Early Richmond. My neighbors grow only enough for home use. I would not consider them a good paying crop in this locality. They are troubled with worms, for which we do nothing.

John Bailey, Harper, Harper county.—I have about twenty cherry trees in bearing, planted from four to ten years. Those bearing best are Early Richmond and Large Morello. My soil is black, sandy loam, level. I plant twenty feet apart. Sell the fruit in Harper, receiving from five to seven cents per quart. Have never grown, budded or grafted my own trees. If doing it all over again, I would plant Early Richmond and Morello, and any other varieties that have proven a success in this county. My neighbors grow cherries. I consider them a good paying crop. Have had very little trouble with insects. Do not irrigate.

D. D. White, Enon, Harper county.—I have twelve cherry trees in bearing, planted ten years. My soil is a sandy loam, about level. Planted my trees twelve feet apart; gather the fruit when ripe; use it all at home. Have never grafted, budded or grafted my own trees. If planting over, I would put out Early Richmond, or May and Black Morello. My neighbors are growing cherries. I consider them a fairly paying crop in this locality. They are troubled with no insects. Do not irrigate my cherries.

F. W. Dixon, Holton, Jackson county.—Of all our fruits the cherry is the easiest grown and most profitable; trees never require any attention after being cared for four or five years. It is true we have failures, but generally get a good crop of salable fruit. Dyehouse is a little earlier than Richmond; tree not as good grower and not as hardy. Early Richmond is a standard early cherry, and so far has proven the best paying. Montmorency is an annual bearer, about ten days later than Early Richmond, but not so prolific. Fruit very large, good flavored, and of fine appearance: tree very hardy, a fine grower, and quite ornamental. Wragg has proven to be inferior in size to English Morello. English Morello is the standard late cherry. Trees were badly damaged by the cold of February, 1899, and are generally short-lived because of their extreme productiveness; we have picked two bushels of cherries from trees so small that fruit could all be picked while standing on the ground. Sweet cherries have not proven profitable. Governor Wood withstood the cold of 1899 all right, but the winds usually manage to get all the fruit before it ripens. Cherry trees generally were badly damaged by cold of 1899, all the older trees being killed. The extreme limit of life of a cherry tree in this climate is about fifteen years. The cherry requires a well-drained soil, and will succeed on no other; a porous clay subsoil is preferable.

H. S. Cutter, South Cedar, Jackson county.—I learned from planting the following varieties of cherries, Early Richmond, Late Richmond, Dyehouse, Early Morello, Ostheim, that for me the Early Richmond is the cherry for this part of Kansas.

F. L. Osborne, Soldier, Jackson county.—I have eighteen cherry trees, planted fifteen years. They are Montmorency, Ostheim, and Richmond; of these the best bearer is the Montmorency, although the other two varieties are good bearers. My soil is a black level loam. I plant sixteen feet apart. Gather them when ripe and sell in the orchard, receiving eight cents per quart. Have never grafted, budded or grafted my own trees. If planting over again, I know of no better varieties than the above-named ones. Would set them in ground free from sod, eighteen feet apart, cultivate well, *not* allowing the weeds to grow.

E. M. Gray, Perry, Jefferson county.—In 1885 I planted a small cherry orchard: varieties were Early Richmond, Montmorency. I planted them on a southern incline, sandy, black soil; have had a good crop every year since coming into bearing, except last year the crop rotted just before ripening; the cause of the rot, I think, was too much wet weather and no cultivation. In 1890 I planted about 200 cherry trees on three different slopes and soils—No. 1 on southern slope, dry, sandy soil; No. 2 on northern, black, wet soil; No. 3 on western slope, a red, dry soil. The varieties were Early Richmond, Large Montmorency, Wragg, Dyehouse, English Morello, May Duke, Ostheim, Sula Hardy. My experience as to soils is that cherries want dry feet—light, dry, loose soils. I had bad success on wet land, and I recommend clean cultivation up to the middle

of August. The only varieties I am planting now are the Early Richmond and Montmorency for commercial purposes. I sell them in berry crates and half-bushel baskets at fifty cents per basket, one dollar per crate. I pay two cents per box for picking.

E. P. Diehl, Olathe, Johnson county.—I have sixty cherry trees in bearing, been planted twenty-five years. My best bearers are Early Richmond, English Morello, and May Duke. My soil is a black loam, sloping north and south [?]; I plant twenty feet apart, and gather the fruit when nearly ripe; market in one-third bushel crates at Olathe, receiving from five to ten cents per quart. Have grown, budded and grafted my own trees. If I had it to do all over again, I would plant Early Richmond, English Morello, May Duke, Montmorency, and Golden Spanish. Some of my neighbors grow cherries; I consider them a good paying crop. The curculio trouble my cherries. I spray for them.

J. C. Beckley, Spring Hill, Johnson county.—Have twelve cherry trees in bearing, planted twelve years. The varieties are Early Richmond, Montmorency, Wragg, and English Morello. These varieties bear about equally. I have twenty trees which are not yet in bearing. My soil is black mulatto, sloping slightly to the west. Plant two-year-old trees in the spring, sixteen feet apart; gather in baskets holding four quarts; market in Spring Hill in baskets, receiving from five to ten cents per quart. Have never grown, budded or grafted my own trees. If planting again, I would put out the above-named varieties in an orchard, sixteen feet apart, and give good cultivation for four or five years: then keep the surface clean under the trees, to prevent insects from harboring there. My neighbors do not grow many cherries. I consider them a good paying crop in this locality. The fruit is troubled with curculio, for which we have sprayed some.

C. H. Longstreth, Lakin, Kearny county.—I have 300 cherry trees in bearing, planted ten years. The varieties are Early Richmond, English and Common Morello. Of these the best bearers are Early Richmond; the others are nearly as good. My soil is a deep sandy loam, very nearly level. I gather by hand, picking with stem; market in crates containing twenty-four quart boxes. Sell at Denver principally, receiving from two to three dollars per crate. Have never grown, budded or grafted my own trees. If planting over, I would put out the varieties I am now growing, and a few other kinds for experiment. My neighbors grow a few cherries; I consider them a fairly good paying crop here. The fruit is not troubled with any insects. I irrigate my trees only when severe drought occurs at time of planting. Cherry trees do better in clay soil, with but little water, to get best results.

Geo. Hildreth, Altamont, Labette county.—I have twenty-five cherry trees in bearing, planted five and ten years ago. Early Richmond is the best bearer. My soil is dark limestone, sloping towards the west. I plant twelve to twenty feet apart; gather when ripe, this year the 28th of May. If I had it to do over, I would plant Early Richmond, English and Common Morello. Neighbors grow some cherries. The curculio troubles them.

N. Sanford, Oswego, Labette county.—I have twenty cherry trees in bearing, planted from two to twenty years; am growing Early Richmond only. I plant in rows thirty feet apart. I use ladders in gathering them, and market in boxes. I sell in Dallas and other points in Texas; usually receive from \$1.25 to \$1.50 per

case. Have never grown, budded or grafted my own trees. My neighbors grow cherries. I consider them a good paying crop in this vicinity. They are troubled with the curculio: we spray with London purple and lime.

D. E. Bradstreet, Dighton, Lane county.—I have ten cherry trees in bearing, varying in age; they are Early Richmond. My soil is a dark loam, about level. Have never grown, budded or grafted my own trees. If planting over, I would set out Early Richmond and English Morello; would plant them between my apple trees. My neighbors grow a few cherries. I consider them a fairly paying crop in this locality. No insects trouble them. I do not irrigate my trees.

W. M. Fleharty, La Cygne, Linn county.—I have forty cherry trees in bearing, planted four years; they are Early Richmond. My soil is black alluvial, sloping to the east. Plant trees twelve by twenty feet. If planting over, I would put out nothing but Early Richmond. I consider them a good paying crop when taken care of. The fruit is troubled with curculio, which I gather and destroy. Do not irrigate my trees.

Dr. J. Stayman, Leavenworth county.—After trying nearly all the popular leading varieties of cherries, the following are the best and most profitable for Kansas: Dyehouse, Early Richmond, English Morello, Wragg, Ostheim, Olivet, Montmorency, Black Tartarian (in favorable locations). For trial: Baldwin, of Kansas; Windsor, of Canada; Mercer, of Pennsylvania.

D. C. Overly, Hartford, Lyon county.—I have 300 cherry trees in bearing, planted nine years; they are Early Richmond. My soil is black loam, sloping to the south. I planted my trees fifteen feet each way, but would plant 15x18 if planting again. Gather them in Lesley (wine measure) boxes, receiving from ten to twelve cents per quart; in 1899 I received ten cents per quart. Market them in twenty-four-box crates. Sell at the orchard and in Emporia. In 1898 I gathered 2000 boxes and sold them at 6½ cents. Have never grown, budded or grafted my own cherry trees. If planting over, I would set out Early Richmond, as it is a sure shot every year, but not a full crop every year; on short crops I get about as much money as on full crops; the longer you are in the business the better prices you get. Do n't plant cherries on level land. My neighbors do not grow cherries. I consider them a good paying crop in this locality. I spray, and have no trouble with insects. I do not irrigate my trees.

J. T. Barnes, Beloit, Mitchell county.—I have seventy-five cherry trees in bearing, planted from two to ten years. They are Early Richmond, Dyehouse, Montmorency, Ostheim, English Morello, Empress, Wragg, and Sweet May Duke: of these the best bearers are Early Richmond, Dyehouse, Early Morello, and Montmorency. My soil is sandy loam, river bottom, sloping towards the southeast. I plant in rows fifteen feet apart, trees twelve feet apart in the row, which is too close. I gather them by hand, with hired help, and market in bulk; sell at home or Beloit for five cents per quart. Have never grown, budded or grafted my own trees. If I had it all to do over again, I would plant English Morello, Early Richmond, and both kinds of Montmorencys, in rows twenty feet apart, with the English Morello and others sixteen feet apart in the rows. My neighbors grow cherries, and we consider them a good paying crop. The fruit is rarely troubled in this section. Do not irrigate my trees, I depend on frequent ultivation.

J. C. Ross, Havana, Montgomery county.—I have 200 cherry trees, planted two, four, and seven years, the varieties are Morello and Early May. Both are good bearers. My soil is sandy, sloping to the south. I plant in spring; gather in June; sell by the quart in town, receiving from eight to ten cents per quart. Have never grown, budded or grafted my own trees. My neighbors are growing cherries, and I consider them a paying crop in this locality. The fruit is often wormy and is stung by some insect; we spray for them.

V. E. Hathaway, Council Grove, Morris county.—My cherry trees were nearly all killed in the winter of 1899. Would plant only English Morello, Early Richmond, and Montmorency. Bring from five to eight cents per quart. My neighbors grow cherries for home use only. They are not a paying crop in this locality. The blue jays and robins trouble the fruit, but I do nothing but get mad and scold. [Try the bell cure.] Do not irrigate my trees.

John E. Sample, Beman, Morris county.—Has 500 cherry trees, planted one, two, three and ten years; they are all sour varieties. The best bearer Mr. Sample has is a variety brought by his ancestors from Scotland and planted in America in the colonial times, before the revolutionary war. He says no one outside of the Sample family is growing this variety. His land is black loam, sloping to the south; planted his trees twenty feet apart. Sells his fruit while on the trees for twenty-five cents per gallon. He has grown, budded and grafted his own trees. If planting over, he would set out the variety he is now growing, grafted on apricot roots; he would also put out a few Early Richmond; expects to plant 400 or 500 next spring. He says: "My neighbors grow a few cherries; I am the only fool (?) in this county." He considers them a good paying crop in that locality. Says they are troubled with no insects. Does not irrigate his trees.

S. J. Baldwin, Seneca, Nemaha county.—I have lived in Nemaha county, Kansas, thirty-three years. I have planted a number of orchards and about twenty or more varieties of cherries. My experience in growing cherries for market began in 1884, when I planted 100 trees—40 Early Richmond, 40 English Morello, 10 Empress Eugenia, 10 Louis Philippe. All did well excepting the latter; they seemed worthless and only lived about four years. The Empress fruited quite regularly, often quite full, but, being very early and sweet, the birds always got fully one-half, and the trees died in eight years. The Early Richmond and English Morello fruited very abundantly almost every year; the severe winter of 1898 and 1899 killed them. In the spring of 1888 I planted 300 more cherry trees in an apple orchard; the apple trees were 32x32 feet, and cherry trees in center of square, all on south slope; they were 100 Early Richmond, 100 English Morello, and 10 each of Dyehouse, Governor Wood, Black Tartarian, Belle de Choisy, May Duke, Olivet, Ostheim, Montmorency, Wragg, and Yellow Spanish. The Yellow Spanish, Choisy, Tartarian and Olivet lived about seven years and produced but few cherries, excepting Tartarian, which had two good crops. Governor Wood and May Duke had fruit about every alternate year, but died at ten years. Early Richmond, English Morello and Dyehouse were all budded on Morello seedlings and produced a full crop of sprouts from roots, as well as fruit every year; they were so injured by cold in winter of 1898 and 1899 that they are most of them dead now. The Ostheim, Wragg and Late Montmorency are still alive and very prolific; but the two former are so dwarfed by overbearing that the trees are scarcely ten feet high now, while the Montmorency trees are large and in fairly good condition and have fruited pretty well generally. In 1892 I

planted 600 cherry trees on new land, north slope, red subsoil, 14x14 feet; 20 Dyehouse, 80 Montmorency, 200 English Morello, and 300 Early Richmond, and got perfect stand and trees did remarkably well, most all on Mahaleb roots, and in two years about all but Montmorency were fruiting. Four years from planting I sold \$100 worth; and in 1898 I sold about \$400 worth of cherries from them; this year (1900) I had about a forty-per-cent. crop on the Dyehouse, Early Richmond, and English Morello, and about a seventy-five per cent. crop on the Montmorency, and sold from this orchard nearly \$400 worth of cherries, and trees are now in a thrifty and vigorous condition, excepting the English Morello, which were injured some by severe cold two years ago. Since 1892 I have planted in orchard about 600 cherry trees, mostly Early Richmond, English Morello, and Montmorency, and 250 Baldwin cherry, a new seedling which I introduced in 1893, and which bears finer, larger, more beautiful cherries and is more productive than any other sort, the tree being a very hardy and vigorous grower. The original tree has fruited very regularly for about ten years and passed through the severe winter of 1898-'99 in fine condition. Hereafter I shall plant all Baldwin. Cherries ripened this year (1900) as follows: Dyehouse, June 9; Early Richmond, June 11; Baldwin, June 17; Montmorency Ordinaire, June 23; Late Montmorency, June 26; Ostheim, June 29; English Morello, July 4; and Wragg, July 7. I cultivate my trees thoroughly every year; do not prune after second year. Employ boys and girls to pick the fruit; use step-ladders; pick with stem on, in quart boxes, carried in baskets which, when filled, are placed in crates. I find a ready home market for all. I have had calls to ship, but never had but few to spare; there seems to be a growing demand for the fruit, yet scarcely any commercial cherry orchards are being planted.

C. D. Martindale, Scranton, Osage county.—I have seventy-five cherry trees in bearing, [planted from three to fourteen years. My sour varieties are Early Richmond, Montmorency, and English Morello. I find the Early Richmond and Montmorency to be the best bearers. My soil is black bottom, gumbo and clay; it is nearly level. I plant in rows twenty feet apart; gather when fully ripe; market in quart boxes; sell at home or in Scranton at five cents per quart. Have never grown, budded or grafted my own trees. If I had to do it all over again, I would plant the varieties I am now growing. I would plant nearly on top of the ground, and cultivate well while young. My neighbors grow only cherries enough for their own use. I consider them a good paying crop in this locality. Have not had much trouble with insects. Do not irrigate my trees, but have a large pond near them.

F. T. M. Dutcher, Phillipsburg, Phillips county.—I have about forty cherry trees in bearing, planted from two to fifteen years. The varieties are, sour, Richmond, Dyehouse, and Leib; semiacid, Montmorency and Ostheim. Of these the best bearers are Richmond and Morello. My soil is sandy loam, nearly level. I plant sixteen feet apart; gather them from June to September; market at home. Have never grown, budded or grafted my own trees. If I had it to do over again, I would plant Richmond, Morellos, and Dyehouse. Would get my trees from some good nurseryman. My neighbors grow cherries. I think them a good paying crop. Am troubled with no insects. Spray my trees. Irrigate sometimes.

Dr. James Myers, Hutchinson, Reno county.—I am most familiar with Early Richmond and English Morello. My opinion is that they only will pay to plant in this section of the country. Many other varieties do well in Eastern

states, but are of little value in the West, especially in the Arkansas valley. My experience with the two varieties referred to has given good satisfaction. I planted 100 of each kind, Early Richmond and English Morello, about ten years ago. The second year they commenced bearing and have fruited every year, with one exception, since, and that was not a total failure. My cherry orchard is on high land, that is, it is forty feet above the river-bed, but I have known the same varieties to fruit equally well on bottom land. I assert that no fruit can be raised in this country with less labor and more profit than cherries. As to which variety I consider best, if I were to plant but one tree, it would be Richmond, but if I should plant more than one, half would be Morellos. The Richmond is a much larger and hardier tree, and lives longer. The fruit is more desirable for canning. Some object to it because it adheres to the stone, but that is an advantage in shipping. The Morello is not of so fine a flavor, is much easier to pick, and parts more readily from the stone; it is also a prolific bearer, and never ceases bearing until dead. My trees have borne as much as five crates each. I have always found a good market at home, at never less than \$1.50 nor more than \$2 per crate. I would earnestly recommend the planting of larger numbers of cherry trees in our state.

John Hinds, Olcott, Reno county.—Have a few Early Richmond cherry trees, just beginning to bear. My soil is a black loam with clay subsoil. If planting over again, I would plant only Early Richmond; think spring planting best. I consider them a good paying crop. They are troubled with a web-worm: we do nothing for them. Do not irrigate my trees.

M. E. Wells, Smith Center, Smith county.—Have fifty cherry trees in bearing, planted seven years, on clay loam resting on yellow silt, sloping to the east. Plant sixteen feet apart. Sell the fruit in the orchard, receiving five cents a quart. Have never grafted or budded my own trees. If planting over, I would put out Early Richmond and some others, in dead furrows, and harrow, cultivate and hoe often, never mulch; leave tops thick. My neighbors grow some cherries. I consider them a good paying crop in this locality. They are troubled with the curculio, which I rub off. Do not irrigate my trees.

D. M. Adams, Rome, Sumner county.—Have eight cherry trees in bearing, planted ten years. They are Morello and Early Richmond; the Richmond is the best bearer with me. My soil is prairie, sloping to the southeast. Grow them for home use only. They are troubled with no insects, but the birds get most of the fruit. Do not irrigate my trees.

E. K. Wolverton, Barnes, Washington county.—Have sixty Early Richmond *cherry* trees in bearing, been planted twenty-five years. My soil is high clay prairie, having a northern aspect; planted twenty feet each way. Sell the fruit in Barnes and Greenleaf, receiving six cents per quart. Have grown, budded and grafted my own trees. If planting over, I would put out none but Early Richmond, budded on Mahaleb roots, 20 x 20 feet, on high ground, as they are better than the English Morello; other kinds do not bear well. My neighbors grow a few cherries. Do not irrigate my trees; it is not practicable.

C. H. Taylor, Eskridge, Wabaunsee county.—I have 100 cherry trees in bearing which have been planted ten years. They are Early Richmond and English Morello, both good bearers. My soil is a clay loam, sloping to the north.

Planted my trees ten by twenty feet. Market the fruit in half-bushel baskets, at home and in Topeka. Receive \$2 per bushel. I always grow, bud and graft my own trees. If planting over, I would set out English Morello, worked on Morello roots, set in deep, rich soil, and thoroughly cultivated. My neighbors grow but few cherries. I consider them a good paying crop in this locality. They are not troubled with insects. I do not irrigate my cherry trees.

Alexander Spiers, Linn, Washington county.—Have about 100 cherry trees in bearing, which have been planted from five to fifteen years; the varieties are Early Richmond, Common, Black and English Morello; the English Morello is a rapid grower but poor bearer; the best for bearing and quality of fruit are Black Morello and Early Richmond. My soil slopes towards the southeast; plant twenty feet apart; sell the fruit in the orchard, receiving from five to ten cents per quart. If planting again, I would set the same varieties I have now, excepting the English Morello, and would cultivate and take good care of them, and would get good returns. My neighbors grow cherries. I consider them a good paying crop; they are troubled with no insects. I do not irrigate my trees.

W. D. Cellar, Edwardsville, Wyandotte county.—I have 600 cherry trees, planted from five to nine years; they are Early Richmond, Dyehouse, English Morello, Ostheim, and Montmorency; of these I find the Early Richmond and English Morello to be the best bearers. My soil is clay, with a clay subsoil, sloping towards the east and south. I plant 15x25 feet; gather fruit in quart boxes, and market in twenty-four-quart crates. Sell in Kansas City, and western Kansas and Colorado towns, receiving, usually, from one to two dollars per crate. I have grown, budded and grafted my own cherries. If doing it over, I would plant Early Richmond and English Morello, 15x20 feet. My neighbors grow a few cherries. I consider it a fair paying crop. The curculio trouble them; we do nothing for them.

Maj. F. Holsinger, Rosedale, Wyandotte county.—Experience says, plant only the Morello varieties, if you would succeed. How much disappointment has resulted in trying to raise the Dukes and Bigarreaus; an impossibility in our climate. "Why?" do you ask? My answer would be, inclemency of winter, and the occasional drought of summer. Be the cause what it may, any attempt must end in disaster—and there you are. Confine your efforts to the Morello and you may have a meed of success. True, the cherry is not a long-lived tree, and disappointments await you even here. If you are guided by the best advice you can still hope for success. In the selection of a location for an orchard, choose only a well-drained soil. The cherry must have dry feet. Any location inclined to be wet must end in failure. Varieties are the next consideration. Of the many Morellos, Dyehouse, Early Richmond, Montmorency, English Morello and Wragg are the best with me. There are new varieties yet not sufficiently tried to warrant their recommendation. The cherry, like other fruits, makes its growth early in the season. The first six weeks of summer is the time. In this time too much cultivation cannot be given. After the tree has gone into rest there is little use for cultivation. By attention to the facts given above, I have found more satisfaction in the cultivation of the cherry than from any other fruit.

Upper figure
Lower figure

al Society,

Total bearing, 1,159,100
Not bearing, 507,356
Grand total, 1,666,456

2,325 Cheyngton. 1,174	13,508 Marshall. 5,948	16,159 Nemaha. 7,715	13,301 Brown. 6,834	7,537 Doniphan. 6,417	
23 Sher 5	13,758 Riley. 3,876	15,987 Pottawatomic. 8,065	11,163 Jackson. 5,613	9,588 Atchison. 4,271	
175 Wallac 420 on. 0	9,282 Gearv. 2,783	11,853 Wabaunsee. 4,571	20,013 Shawnee. 6,959	14,855 Jefferson. 5,321	8,012 Leavenworth. 4,224
178 Greeley. 218 440 ion. 260	11,125 Morris. 3,819	14,498 Lyon. 4,498	18,558 Osage. 5,463	13,578 Douglas. 6,306	10,387 Johnson. 7,534
627 Hamilton 719	6,839 Chase. 1,800		15,885 Coffey. 6,348	9,230 Franklin. 2,116	8,865 Miami. 4,370
127 Stanton. 106	32,764 Butler. 6,082	12,825 Greenwood 4,036	11,260 Woodson. 2,340	10,436 Anderson. 4,249	7,991 Linn. 3,809
191 Morton. X	32,652 Cowley. 6,323	15,262 Elk. 2,171	13,225 Wilson. 2,863	5,989 Allen. 2,460	8,057 Bourbon. 2,482
		12,456 Chautauqua. 2,275	12,539 Montgomery. 3,334	8,404 Neosho. 3,143	9,983 Crawford. 1,791
				15,896 Labette. 3,320	12,006 Gherokee. 3,879

15,67
Wyand
19

CHERRY-TREE STATISTICS, 1900.

Compiled by WILLIAM H. BARNES, Secretary Kansas State Horticultural Society.

Total bearing. 1,159,100
 Not bearing. 507,358
 Grand total. 1,666,458

Upper figures, bearing trees.
 Lower figures, not yet bearing.

STATE CAPITOL, TOPEKA, KAN.

266 Cheyenne. 1,181	806 Rawlins 965	3,633 Decatur. 6,462	7,602 Norton. 10,869	13,069 Phillips. 15,400	24,053 Smith. 15,711	43,245 Jewell. 24,821	24,544 Republic. 7,350	30,325 Washington. 14,174	13,505 Marshall. 5,948	16,159 Nemaha. 7,715	13,301 Sewar. 6,834	7,517 Doniphan. 6,417			
282 Sherman. 583	393 Thomas. 1,927	595 Sheridan. 1,861	1,628 Graham. 4,431	12,579 Booke. 6,716	10,350 Osborne. 9,639	14,655 Mitchell. 6,084	21,842 Cloud. 7,452	18,818 Clay. 5,162	13,758 Riley. 8,876	15,987 Pottawatomie. 8,068	11,163 Jackson. 5,613	9,588 Atchison. 4,271	14,855 Jefferson. 5,321	15,671 Wyandotte. 19,255	
175 Wallace. 420	470 Logan. 649	423 Gove. 2,788	1,157 Trego. 2,974	2,273 Ellis. 3,181	5,736 Russell. 5,273	8,027 Lincoln. 3,775	19,431 Ottawa. 3,499	31,104 Dickinson. 6,310	9,282 Geary. 2,783	11,533 Wabaunsee. 4,571	20,013 Shawnee. 6,959	18,578 Douglas. 6,306	15,012 Lawrence. 4,224	10,387 Johnson. 7,334	
178 Greely. 440	266 Wichita 1,717	1,256 Scott. 1,316	358 Lase. 650	3,046 Ness. 4,484	9,920 Bosh. 7,610	22,265 Bartoo. 10,834	11,355 Ellsworth. 4,659	12,965 Saline. 3,212	28,710 McPherson. 7,153	10,215 Marion. 5,290	14,493 Lyon. 4,494	18,558 Osage. 5,463	15,885 Coffey. 6,348	10,230 Franklin. 2,116	8,865 Miami. 4,370
827 Hamilton. 719	1,240 Keary. 1,093	2,226 Finney. 2,602	375 Hodgeman. 1,764	6,621 Pawnee. 4,511	22,265 Stafford. 14,728	33,787 Rice. 8,027	35,945 Reno. 12,543	16,797 Harvey. 3,417	32,764 Butler. 4,036	12,825 Greenwood. 4,036	15,885 Coffey. 6,348	11,260 Woodson. 2,840	10,436 Anderson. 4,249	7,991 Linn. 3,509	
127 Stanton. 106	207 Grant. 48	272 Haskell. 102	388 Gray. 1,229	4,505 Ford. 7,254	4,252 Edwards. 4,920	8,605 Pratt. 3,585	13,356 Kingman. 5,880	32,617 Sedgwick. 8,826	6,082 Butler. 4,036	15,362 Elk. 2,171	13,225 Wilson. 2,365	9,989 Allen. 2,460	10,436 Anderson. 4,249	8,607 Bonboe. 2,482	
101 Morton. X	361 Stevens. 213	3,120 Neward. 183	1,794 Meade. 1,290	769 Clark. 240	889 Comanche. 822	4,560 Barber. 1,793	11,237 Harper. 4,165	41,703 Sumner. 11,311	32,652 Cowley. 6,323	15,362 Elk. 2,171	12,589 Montgomery. 3,334	15,496 Labette. 3,520	12,008 Oberholser. 3,579		

A PROMISING NEW FRUIT FROM THE PLAINS.

By CHARLES E. BESSEY, Lincoln, Neb.

Upon the plains of Nebraska, one of the small native shrubs which has attracted attention on account of its promising fruits is what has been known as the Sand cherry. Scientifically, it is the *Prunus pumila* of the botanists, and a member of the natural order Rosaceæ, and of the family Amygdaleæ. Its affinities are with the cherries and the plums, native of this country and Europe.

In Nebraska it occurs upon sandy soils north of the Platte river, beginning at about 75 or 100 miles from the Missouri river, and extending thence westward and southwestward to the Colorado line. It appears to prefer the sandier soils; hence its popular name; and over the greater area I have outlined, wherever the soil is sufficiently sandy it occurs in abundance. In these portions of the country the inhabitants have for a long time been in the habit of collecting and using the fruit, and in some cases attempts have been made to bring the shrubs under cultivation.

The fruits are true cherries, occurring usually in pairs or threes (rarely singly) on the last year's wood. The cherries are about one-half inch in diameter, and when ripe are of a deep purple-black color. In shape they vary from flattened spherical (oblate spherical) to spherical, and even bluntly conical. At the base they are slightly indented, and the apex is usually marked by a slight indentation also. The stalk is slender, and from one-half to three-fourths of an inch in length. The stone or pit is slightly elongated, but little compressed, rounded on one margin, and bluntly angled on the other.

The fruits have a colored flesh which possesses in many cases a considerable astringency, but in nearly every clump of bushes one may always find some which have but little if any astringency. I have frequently eaten the fresh cherries while rambling over the plains, and have often found specimens which were fully as palatable as many of the cultivated cherries.

The shrub grows to a height of from one to two feet, or rarely more. Its leaves are of firm texture, oblanceolate in shape, with slightly serrated margins. Their under surfaces are whitish, and they are borne upon short petioles, and stand alternately upon the stems. Under cultivation, the shrubs are much thriftier and the leaves are larger.

From the fact that in a wild state these cherries are so large, and in many cases so palatable, I am led to hope that by cultivation they may be made to yield us a new fruit for our gardens in some portions of the Northern states, especially in sandy soils. I am, moreover,

encouraged in this hope by the fact that experiments upon a small scale, made by persons living in the region where the Sand cherry grows, have given results which indicate that it is readily affected by cultivation.

In closing, I need only to say that the Sand cherry of the plains, while apparently the same botanically as the *Prunus pumila* of the East, possesses well-marked differences: that I am inclined to regard it as at least a good geographical variety. It is from the Western form only that I hope we may derive a new fruit.

DESCRIPTION OF VARIETIES.

DYEHOUSE.

Origin unknown; was introduced by H. T. Harris, of Stamford, Ky., and was found growing in an old Morello orchard on the farm of a Mr. Dyehouse, in Lincoln county, over thirty years since; it is still grown there from suckers, and is claimed to be hardy, moderately vigorous, somewhat spreading, of the Morello type, but partakes both of the Morello and Duke in growth and fruit; a very early and sure bearer; ripens a week before Early Richmond, is about the same size, of better quality, and quite as productive. Fruit medium, oblate or roundish oblate, slightly depressed, without suture; apex slightly depressed; skin bright red, dark red in the sun; stalk of medium length, slender; cavity rather large, smooth; flesh soft, juicy, tender, sprightly subacid, rather rich; pit very small; sometimes the stalk adheres to the pit. (Downing.)

GOVERNOR WOOD.

Raised by Professor Kirtland, Cleveland, Ohio. It deserves a place in every good collection. Tree vigorous, forming a round, regular head; very productive.

Fruit large, roundish, heart-shaped. Skin light yellow, shaded and marbled with bright red. Suture half-round. Stem an inch and a half long, in a broad cavity. Flesh nearly tender, juicy, sweet, rich, and delicious. Very good to best; ripe about the middle of June. (Downing.)

MAY DUKE.

Royale Hative, Cherry Duke of some, Cerise Guigne, Coularde, De Hollande, D'Espagne, Griotte Grosse Noire, Griotte d'Espagne of some, Griotte Precoce of some, Early Duke, Large May Duke, Morris Duke, Morris's Early Duke, Benham's Fine Early Duke, Thompson's Duke, Portugal Duke, Buchanan's Early Duke, Millet's Late Heart Duke. This invaluable early cherry is one of the most popu-

lar sorts of all countries, thriving almost equally well in cold or warm climates. This, the Blackheart and the Bigarreau are the most extensively diffused of all the finer varieties in the United States. And among all the new varieties none has been found to supplant the May Duke. Before it is fit for table use it is admirably adapted for cooking, and when fully ripe it is, perhaps, the richest of the subacid cherries. In the gardens here, we have noticed a peculiar habit of this tree of producing very frequently some branches which ripen much later than the others, thus protracting for a long time the period in which its fruit is in use. The May Duke is remarkable for its upright or, as it is called, *fastigiata* head, especially while the tree is young, in distinction to other sorts, which produce many lateral branches. Fruit roundish, or obtuse heart-shaped, growing in clusters. Skin at first of a lively red, but when fully ripe of a rich dark red. Flesh reddish, tender and melting, very juicy, and at maturity very rich and excellent in flavor. This fruit is most frequently picked while it is yet red and partially acid, and before it attains its proper color or flavor. It begins to color, about New York, in favorable seasons, the last of May, and ripens during the first half of June. May Duke is said to be a corruption of Medoc, the province in France where this variety (the type of all classes now called Dukes) is believed to have originated. (Downing.)

LATE DUKE.

Anglaise Tardive. A very large and fine Duke cherry, ripening later than the May Duke, and therefore a very valuable sort for dessert or for cooking. The tree is of vigorous growth for its class. Fruit large, flattened, or obtuse heart-shaped. Color, when fully ripe, rich dark red (but at first white, mottled with bright red). Stalk rather slender, inserted in a shallow hollow. Flesh yellowish, tender, juicy, with a sprightly subacid flavor, not quite so sweet and rich as the May Duke. Ripens gradually, and hangs on the tree from the middle of July till the 10th of August. (Downing.)

BELLE DE CHOISY.

Belle Audegoise, Ambree de Choisy, Ambree a Gros Fruit, Cerise Doucette, Cerise de la Palembre, Cerise a Noyau Tendre, Schone von Choisy.

In our estimation, there is no cherry for the dessert more delicious than the Belle de Choisy. It comes from the village of Choisy, near Paris, where it was raised in 1760. The habit of the tree is nearly that of the May Duke, the leaves dark, and the head upright. It is hardly a moderate bearer.

Fruit round or slightly depressed. Skin very thin and translucent, showing a net-like texture of flesh beneath; in color, pale amber in

the shade, but in the sun finely mottled with yellowish red, the fruit fully exposed becoming a bright cornelian red. Flesh amber colored, very tender and melting, of a delicate sweet flavor. Stalk rather short, swollen at the upper end. Best. Middle of June or directly after the May Duke. (Downing.)

OLIVET.

A new French cherry, with the following description from the catalogue of Transou Brothers, of Orleans, France :

This sort takes a place not occupied up to the present among the list of early cherries. Nearly all the early sorts we possess are sweet amber or red varieties, with a limited fruiting season. The Olivet cherry is a large, globular, very shining, deep red sort. The flesh is red with a rose-colored juice, tender, rich, and vinous, with a very sweet, subacidulous flavor. It ripens in the beginning of June, and continues until July without losing its quality. It possesses the fertility of the best of the Duke tribe, and is perhaps the largest of that class. A friend writes that it fruited with him the past season, but being very dry the fruit was small; otherwise it sustained its foreign reputation. (Downing.)

REINE HORTENSE.

Monstreuse de Bavay, Belle de Bavay, Lemercier, Seize a la Livre. French origin, of Duke habit. Tree a healthy and handsome grower, productive, and a very desirable variety. Fruit very large, roundish, elongated. Skin a bright, lively red, somewhat marbled and mottled. Suture distinctly marked by a line without any depression. Flesh tender, juicy, very slightly subacid, and delicious; best of its season. Ripe from the middle to the last of July. (Downing.)

BELLE MAGNIFIQUE.

Belle et Magnifique, Belle de Sceaux, Magnifique de Sceaux, Belle de Chatenay, Planchoury. Tree hardy, moderately vigorous, productive; a beautiful and excellent late variety. Useful for culinary purposes, and good table fruit when pretty ripe. Fruit large, roundish, inclining to heart shape. Stalk long, slender, in an open, medium cavity. Skin a fine bright red. Flesh juicy, tender, with a sprightly subacid flavor; one of the best of its class. Ripe from the middle of July till the middle of August. (Downing.)

WRAGG.

Originated in Iowa. Medium to large; stem long; dark purple when fully ripe. A variety well adapted for the high latitude and prairie regions of the Northwest. July. (A. C. Griesa & Bro. Nursery Catalogue.)

PROF. L. H. BAILEY ON CHERRIES.

The older cherry plantations of the state were seldom anything more than scattered settings along lanes and roadsides and about farm buildings. Most of these old trees have now passed their prime. In very recent years a new interest in cherry growing has been awakened by the demand from canning factories, and it has no doubt been stimulated, also, by the abundant sale of California cherries throughout the East. Sweet cherries are yet scarcely planted in western New York in orchard blocks, although there is every reason to believe that there is profit in the fruit if planters are careful to inform themselves concerning it. Sour cherries, however, are now planted to an important extent, particularly about Geneva, and the acreage is bound to increase. The pack of canned sweet cherries is still larger than that of sour cherries in western New York, in average years. The scattered plantings make uncertain crops, and canners cannot buy as confidently as they could if there were more continuous plantations. Consequently the pack varies much from year to year.

RUSSIAN CHERRIES.

Prof. F. A. Waugh gave some notes on cherries, gleaned from the work of the experiment station and from trees sent out by the station. He said that from the distribution of a miscellaneous lot of fruits, largely of Russian varieties, much the larger part of the favorable reports received were from the cherries. There were two reasons for this, both significant. First, the Russian cherries are generally the best of the Russian fruits; and second, cherries, as a class, are better able to stand the neglect of common farm treatment than other fruits. Notes were given on a large number of varieties, among which the following were favorably mentioned: Morello, Montgomery, Brussler, Braun, Bessarabian, Schatten Amarelle, and Wragg, the latter being possibly a synonym of Morello. Others present had good success with Early Richmond, Dyehouse, and Olivet.—*Country Gentleman's* report of Vermont society.

List of varieties of the cherry voted as suitable for Kansas, in the order named, by the State Horticultural Society: Early Richmond, English Morello, Montmorency, Dyehouse, Ostheim, Wragg, Governor Wood, Napoleon Bigarreau.

GROWING BIG CHERRIES.

A writer in the *St. James Gazette*, London, tells how big cherries are obtained in that country. He says: The next and most important point of all now is, how can we improve the size and color of our cherries? We have been told, until we are weary, that the cherry tree does best in sod. We do not believe it, for such a suggestion goes dead against our contention that all fruit-trees are more fruitful when the surface soil above their roots is clean—unoccupied by anything growing, whether it be grass or weeds. We admit that in the summer heat the cherry tree needs water, and a large quantity of it; also, that coolness above the roots is an advantage. We do not mind saying that sod insures coolness to a certain extent, but grass robs the soil of plant-food, and takes what the roots of the cherry trees want and should have instead.

To meet the demands of the cherry tree in summer, or just previous to and in the fruiting season, we prefer to act thus, and find the result more satisfactory by a long way: To insure coolness over the roots use a mulch of stones. They need not be too small; they will answer the purpose much better than either stable manure or sod ever can. They do not keep out the air; they retain the moisture from the morning dews, and act most beneficially. Next feed with liquid manure now and again, after the fruits begin to swell, and then see how they develop. Well, those who have never grown cherries before under this method will, upon testing it, be amazed at the results. One of the finest parcels of big cherries ever marketed came from trees treated thus under our instructions. When they were being put upon the cart one day a passing grower said to the owner of the fruit: "I say, gov'nor, how do you grow big cherries like them?" The owner gave no reply. We give the secret away, if secret it be, satisfied that if the system is adopted it will double or treble the weight of the crop of each tree.

CHERRIES IN DEMAND.

There is a constantly growing demand for well-grown, well-colored cherries of good size, and they bring better prices in the markets everywhere than any other orchard fruit, year in and year out, with the possible exception of apples, when the labor of gathering and marketing is considered. A veteran cherry grower at a recent gathering remarked that, in his opinion, formed from extended observation, there were fewer cherry trees on the farms of the country than any other of our orchard trees of the sorts generally grown. He as-

cribed this to the "laziness of the average farmer, who had n't energy enough to fight off the birds that yearly ate the crop, and the trees were permitted to die out, and were not replaced." There is much truth in the statement. So long as farmers make no effort to circumvent the birds beyond the placing of a scarecrow or two in the orchards, just so long will the birds get the bulk of the cherry crop. One of the finest cherry orchards we ever saw was effectually protected from the ravages of birds in the following manner: The trees were set in the usual way and at the ordinary distance apart, but around the entire orchard was set a double row of trees of taller growing cherries, and the fruit on these was freely given up to the birds. Not a single cherry was ever picked from them except by the birds. There was such an abundance that the birds rarely attacked the fruit on the other or inside trees. After the first season they seemed to realize that they were to have undisputed possession of this fruit. The owner of this orchard claims that he has often observed the birds flying over his cherry orchard, but alighting only on the outer rows, the "birds' cherries." Occasionally he sees a few birds in the orchard proper, but claims that repeated close observation reveals the fact that they are seeking insects and not fruit. Other growers have tried the plan on a smaller scale, and found that it worked to perfection.

The best success with cherries is had in a soil fairly rich, but dry, or one that can be easily drained. Cherry trees are subject to but few diseases; the black-knot, which is confined chiefly to the sweet varieties [??], being the most troublesome. In the selection of varieties the planting should be governed by the demands of the market, bearing in mind that highly colored sweet varieties sell best, although there is always a demand at fair prices for the sour sorts.—*New York Tribune*.

TWO POPULAR CHERRIES.

Cherry growing is a prominent interest in western New York. The two most profitable varieties are the Montmorency and the English Morello. It is a question which is the more popular of the two. The canners give the Montmorency the preference. Both varieties should be grown, as by the time the Montmorency is gone the English Morello is ready for market. The Early Richmond is not in much favor, being small and of poor quality. The Ostheim is very productive, but too small.

A common mistake is made of planting trees too close together; 18x18 feet is the right distance. Five cents a quart is a fair price for the fruit, and at this rate an orchard will net \$100 to \$175 a year per acre.

LARGE CHERRY TREES.

At Monte Rio, five miles southeast of Newcastle, Placer county, California, on the place of Robert Hector, is to be found what are probably the largest cherry trees in the world. There are about fifty of these trees, which were planted in 1853. According to *The Pacific Bee*, Mr. Hector has systematically made inquiry, whenever he heard of a large cherry tree in any place in the world, and all his investigation thus far has failed to find upon this continent, or upon the old continent, trees as large as his own. The next largest tree he has heard of is in Buffalo, N. Y. What is perhaps the largest tree in the lot is a Black Tartarian, and is seventy feet high. Its branches spread over a piece of ground the diameter of which is between seventy and seventy-five feet, and the trunk is between ten and eleven feet in circumference. From one of these cherry trees, in one season, has been taken as high as 3000 pounds of fruit. The trees are really too large to be profitable, for the fruit has to be gathered with the aid of extension ladders securely guyed, by men slung in swings from such ladders or the forks of the trees. The best fruit, of course, is toward the tips of the branches, and, therefore, the most difficult to reach.

HIGH PRICES FOR CHERRIES.

A press dispatch, dated New York, May 6, reads as follows: California cherries have furnished the feature of the fruit market for the last few days, and they have, as a rule, brought excellent prices. The fruit auction company sold fifty-one boxes yesterday at auction, and they were snapped up at prices ranging from \$8.25 down to \$1.75 per ten-pound box. The phenomenal price paid for the choicest lots probably establishes a record. The same company sold twenty boxes to-day at equally fancy prices.

MONEY IN CHERRIES.

The Cloverdale *Reveille* recently printed the following: Farley Abshire has shipped 285 boxes of cherries, each box containing ten pounds. The fruit netted him about one dollar per box. He still has about 3000 pounds of later varieties which he will dispose of to the canneries. He will realize probably \$300 from less than an acre of ground. Who says cherries do not pay?

GREEN'S BLACK TARTARIAN CHERRY.

I have spoken in these columns about the old cherry trees standing near our house at Rochester, N. Y., which have borne heavy loads of the finest fruits regularly each season as far back as the oldest inhabitants can remember. This year these trees have been as heavily laden as formerly, and the fruit has been uniformly of the finest character and free from blemish. This year, as in former years, this fruit has been in eatable condition for about four weeks, and at the present writing, July 5, the cherries are in their prime.

We pick these cherries for market before they turn black, since that is the condition in which the buyers desire them. In this condition they stand shipping well and are in good demand. At five cents per pound, the fruit from these three cherry trees this season will amount to fifty dollars. At this rate, an acre of this variety would yield \$1120 gross. I have stated to my friends that if I had ten acres of cherry trees that would yield like these, I would need no other source of revenue. Cherries this year, 1899, have sold in Cleveland at ten cents per pound wholesale. At Rochester they have been cheaper, owing to the large quantity of cherries growing in this locality.

The Windsor cherry has fruited at Green's fruit farm this year and proved, as usual, to be a variety of extraordinary merit. It is a large cherry, almost black. It is not quite so firm as Black Tartarian, therefore, possibly, not quite so valuable for shipping; but for eating out of hand it is, if anything, superior in quality to Black Tartarian.—*Green's Fruit Grower.*

TO SPROUT CHERRY PITS.

"Please let me know the best way to sprout plum, cherry and peach pits. I am in the nursery business on a small scale, and, although I have always put my seeds in beds in fall, have had trouble to get them to burst in the spring."—H. M. K., Newville, Pa.

Our correspondent's trouble rises, perhaps, from not having the seeds moist enough in the seed-bed. If a seed-bed is too dry and not covered by snow, so that the seeds simply freeze dry, the results are not likely to be good. Stratify the seeds—that is, mix them with soil, or sand—and put into a convenient box, and bury box and all in some situation where they will keep moist through the winter and where they will freeze well. In the spring sift out of the earth, and plant. Some prefer to go over them by hand in the spring and crack with a light hammer any which are not sufficiently opened. This should give the desired result.

THE CHERRY ON DRY SOIL.

The cherry tree needs a dry but rich and deep soil, with enough potash to supply the enormous demand to ripen its crop of seeds and stones. The cherry itself is mainly water, but if the stone cannot be produced the fruit is apt to rot, especially in wet weather about the time of ripening. To make cherries profitable it requires something more than to grow them. A large amount of cheap help must be near at hand. One must also be situated near a market, canning factory, or station to ship the fruit. The fruit must be picked dry and all imperfect specimens thrown out. Unripe cherries will not bear transportation as well as ripe ones; hence they must not be picked too soon. When all the conditions are favorable, there is no crop that pays better and in seasons of scarcity gives a larger profit per acre.

SOUR CHERRIES IN WESTERN NEW YORK.

The growing of sour cherries in western New York is largely confined to two varieties, the Montmorency and English Morello, and it is not yet fully determined which of the two is the more profitable in the long run. The preference has generally been given to the English Morello, as it bears younger than the other, and its dark colored and very acid flesh have made it popular with the canning factories. Just now, however, the canners are calling for the Montmorency in preference, for, whilst not so sour as the other in the natural state, it "cooks sour," and the Morello is apt to develop a bitterish or acid taste in the cans. The Morello is also much subject to leaf-blight, whilst the Montmorency is almost free from it; and the Montmorency is a stronger and more upright grower. The present drift is decidedly towards the Montmorency. The two varieties complement each other, however, for the Montmorency is about gone by the time the other is fit to pick.

This Montmorency of western New York is a very light red, long-stemmed cherry, broad, and flattened on the ends, the flesh nearly colorless and only moderately sour. The tree is an upright, vase-like grower.

Amongst the Griottes, or red-juiced cherries, three have gained some notoriety in western New York—the Ostheim, Louis Philippe, and Morello.

The Ostheim is a very productive variety, ripening about a week after Early Richmond, but it is too small and too early to be valuable for general cultivation here.

The Morello, variously known as English, Large Dutch, and Ronald's Morello, is nearly two weeks later than Montmorency, a bushy and finally a drooping grower, with medium-sized, roundish or roundcordate fruits, which become red-black when fully ripe. Flesh very dark, much sourer than the Montmorency. In western New York the Morello harvest begins from the 8th to the middle of July.

SWEET-CHERRY INDUSTRY.

Unlike most other fruits, the sweet-cherry industry has never attained a prominent position in western New York. There is not an orchard of it west of Albany, so far as I know. Along the Hudson, however, there are three or four orchards. It is on the few trees scattered on every farm throughout the state that the cherry crop is mostly grown. It should not be thought however, that the smallness of the industry follows from a lack of appreciation of this most luscious fruit. It is due to the fact that the cherry is a most difficult crop to handle and market successfully, because of its exceedingly delicate character, and the fungus, which causes brown rot, which spreads so rapidly on the ripening fruit, that the promising crop of to-day may be half rotted to-morrow. The comparative ease of handling and marketing grapes, apples and pears make those fruits universally popular. The cherry is one of the most popular door-yard fruits, and its hardiness, its vigorous upright form, which often attains the height of forty to fifty feet, and its luxuriant, soft, drooping foliage, its hardiness, and the fact that it bears annually when properly treated, make it a most desirable tree for ornamental and fruit-bearing purposes. The tree starts very early in the season and most varieties are harvested by July 1, thus leaving the trees sufficient time and energy to perfect fruit-buds for the coming year; and if the wood is well ripened in the fall the mercury may fall to twenty degrees below zero without injury to the coming crop. There seems to be much inquiry among fruit-growers and farmers regarding the care of cherry orchards, the most desirable varieties, the diseases, the methods of handling and marketing the crop. As these matters are more fully understood, the cherry industry may be expected to reach a prominent position among the other horticultural industries.—*Professor Bailey's Bulletin.*

DRYING CHERRIES.

In picking cherries for the market they should never be taken from the tree right after a rain. Many of them are cracked open, or ready to, and these will spoil the whole crate. Let the sun shine on them again before picking, and even let the birds pick the cracked cherries for their breakfast; these they always prefer. After the sun has been on them a short time the surplus moisture will be dried and they can be picked for market. After picking, rigidly sort, for the best pickers will put in overripe, decayed and stemless fruit. These help rot the others and thus labor is thrown away. Put only the finest cherries in each basket, all of about the same ripeness and size. Many placed on sale show one-half of the cherry dead ripe and the other half green. The appearance, if nothing else, is against them. It is always better for the trees and profitable to the owner to have all the fruit picked from the trees. There will be times when it will hardly pay to ship them to market, and best to dispose of them some other way. Make a platform of boards, in the sun, and dry the surplus. It is easy to pit them, and in half a day bushels could be spread out to dry. Many overripe cherries, that cannot be shipped, can be dried, and the surplus thus preserved. Dried cherries are quoted in the markets now at nine and ten cents per pound, and good qualities bring even more. There is always a demand for them in the winter; they make excellent pies, puddings, and preserves. If there is no other market, many can be eaten at home. It is by means similar to this that the cherry crop must be disposed of; it prolongs the season and brings a fair profit to the owner. Preparations for drying should be made before the crop is ripe, for then other work will demand the attention.—*S. W. Chambers, in American Cultivator.*

HOW TO SAVE YOUR CHERRIES.

Persons having a few trees of cherries they would like to have get thoroughly ripe, and prevent the birds getting all of them, can do so by hanging a bell in each tree—a cow-bell, sheep-bell, or an old school-bell, any of them will do; and they are generally lying around farm-houses. Tie long pieces of binder twine to the handle of each bell, and bring the other ends all together in the direction of the house, and tie all to one strand of twine, so that by pulling it all the bells will ring. Have this line long enough to tie the other end to a nail near the kitchen door, or some convenient place where it can be given frequent pulls. When you ring the bells the birds will leave

in short order. Of course they will return, but you must give them another ring, and keep it up frequently till the cherries are ripe, beginning when the birds begin on the cherries. We have succeeded numerous times in this way, even when the trees are more than twenty rods from the house. Try this plan. Do not shoot your good friends, the birds.

THE CHERRY A NOBLE FRUIT.

This noble fruit has for a long time been kept in the background for the growing of the apple, peach, etc., on account, I suppose, of the inability to market the crop to good advantage; the main reason for which, no doubt, is in not selecting varieties which ripen in succession. The question of growing the cherry into a tree is far less important to the orchardist than the proper selection of varieties, and the care and management of it after it is planted where it is to remain. Within the past few years a number of new varieties have been brought before the public, but most of them have proved to be wanting in hardiness or quality, and were discarded. The Montmorency is perhaps an exception, the tree being hardy and the fruit somewhat better than the Early Richmond; yet we consider the Early Richmond the best all-round cherry, with Montmorency a close second, and have therefore divided our orchard between these two, in order to have a succession of ripening, thus affording greater ease in disposing of the crop. Have tried May Duke, Ostheim, Wragg and Dyehouse without success.

GRAFTING THE CHERRY.

By PROF. N. E. HANSEN, Ames, Iowa, in Nebraska Horticultural Society report.

Root-grafting of the cherry in the house during winter is considered difficult by many, but it has been practiced at the Iowa Agricultural College, at Ames, every winter for many years, with good success. For plums, one-year seedlings of our native northern plum, *Prunus americana*, are used, which are grown from pits of the best cultivated varieties of the same species, such as Wyant, De Soto, and Wolf. Seedlings should not be grown from seeds gathered indiscriminately in the woods, but only from trees growing good-sized fruit. It has been found such seedlings are better and more uniform, and there is less liability to injurious influence of stock on scion. In the last two or three winters we have also used Marianna stocks, grown from cuttings, for root-grafting, and secured a good stand. For cherries, imported Mazzard stocks are used. Both plum and cherry stocks are packed away in thin layers, with earth between the layers, in a

cool cellar. Only one scion is used to each root; piece-root grafting does not give a good stand with the plum and cherry.

The method used is that known as "side-grafting" or "wedge-grafting," and the scion is inserted at the collar. By collar, is meant the neck or line of junction between the stem and root. The scion is cut wedge shaped at the lower end with a perfectly true and straight cut, so it will fit snugly into the incision in the stock. The length of this wedge cut, one and one-half to two inches, depends on the size of the scion, a large scion requiring a long cut. The scion should contain about four buds besides the bud at the base or beginning of the wedge cut. The stock should have a ring of bark left above the incision. No wood is removed from the incision—simply a lateral cut long enough to receive the scion, cutting about two-thirds through the stock; and care is exercised to cut across the grain slightly, so as to avoid splitting the wood. Use a sharp, thin-bladed knife; a common shoe knife does as good work as any. If the incision in the stock is properly made, the scion will be held very firmly by the natural spring or elasticity of the wood. In cutting the scion, make the inside of the wedge cut thinner than the outside, so that the scion will fit neatly; but this is often overdone, so that there is too great pressure on the cambium layer (layer between the wood and bark) for proper union. So, make the inside of the wedge cut *very slightly*, if at all, thinner than the outside. The vital point to be noticed is that the inner barks of the scion and stock must be brought together, so the union can be made when growth begins.

Some device must be used to hold the seedling firmly while making the incision. The most convenient one for the grafting bench is simply half of a barrel stave fastened at the further end with a leather hinge. At the end next the grafter a strong wire is fastened around and passed through a hole in the grafting bench and fastened to a treadle below. In this manner the seedling is held very firmly. To prevent injury to the seedling, put a strip of leather on points of contact on inner edges of the stave and on top edge of grafting bench.

Three men work best together—two to graft, and one to wind, wax, and pack. After grafting, the point of union is wound three or four times at top and bottom with waxed thread, and alcoholic plastic applied with the thumb and finger. The plastic must also be applied to the tip of the scion to prevent drying out. The grafts as waxed are run through sand so they will not stick together, and then packed away in a mixture of about one-half sand and one-half earth, in boxes, in the cellar or cave, same as apple-root grafts, keeping the temperature as near freezing as possible, to prevent injury from the graft-box fungus. Even if frozen in the boxes no harm is done. The waxed

thread is made of No. 18 knitting cotton run through melted wax onto an open drum, or hollow cylinder of wood, with a crank handle attached. The wax is softened with a little linseed oil.

Recipe for alcoholic plastic: One pound white resin, one ounce beef tallow, one tablespoonful turpentine, five or six ounces alcohol. Melt resin slowly; take from fire and add tallow, stirring constantly. When still cooler add turpentine slowly, then alcohol. Wood or methyl alcohol is cheaper than common alcohol, and, as tried at the college, seems to answer the purpose equally well. It is poisonous, and should be so labeled. If the plastic becomes too stiff to work well, put vessel in a vessel of hot water and add more alcohol. The plastic should be of the consistency of thin syrup in order to work well.

The scions are kept in boxes of dry forest leaves in the cellar; the leaves contain sufficient moisture to keep the scions in good condition. The scions must be watched and not allowed to get either too plump or too shriveled, but better a little shriveled than too plump.

With all stone fruits side-grafting is much preferable to whip-grafting. By comparing the two methods it will be seen that the side-graft has two surfaces on the scion to unite by, while the whip-graft has but one. In the nursery the side-graft can be used in the spring in crown-grafting seedlings, where the bud failed the preceding autumn. Side-grafting is also the best for all top-grafting of plum and cherry. For outdoor work, the vessel containing the alcoholic plastic is set in the top of a large lantern-shaped tin box with a lamp inside. The terms "top-grafting" and "top-working" are the same, the latter being more generally used in nursery work. It is most convenient for two men to work together—one to graft and the other to apply the plastic.

Plums and cherries should be grafted before there is the least sign of the buds starting; hence, pleasant days in March should be improved in this manner. However, they may be grafted after the buds have started, provided that the scions have started equally as much. But in general it is best to graft the stone fruits early, before the buds have started. No waxed thread is used in top-grafting. After inserting the scion, apply the alcoholic plastic to the point of union and wrap with a strip of old, thin, white muslin. The muslin will adhere to the slightly warm plastic and no thread is needed for tying. The exposed tip of the scion must be touched with the plastic to prevent drying out. The "robbers" or sprouts appearing on the stem below the graft must be removed from time to time as they appear, so the scion will have a fair chance for vigorous growth. If this is not done

the scion will make but a feeble growth, or perish altogether, from lack of nutriment.

In top-grafting young trees in the nursery it will not do to strip all the leaves appearing on the stem below the graft. All the buds for a short distance just below the point of union should be allowed to expand, in order to "draw up the sap" and cause vigorous growth. If these buds push too strongly, keep in check by pinching. As the graft grows these leaves on the stock can be gradually removed, beginning with the buds next to the graft. In top-working plums and cherries, the outer bark often becomes tough and dry, so it will not expand to make room for the deposit of new wood in June. The graft is then in danger of perishing from tight lacing, and the corset strings must be cut. Do this by slitting the bark lengthwise in several places, taking care not to cut into the wood, as this is apt to cause gumming.

THE CHERRY ORCHARD.

A strong, loamy soil, and one which is retentive of moisture, is the most suitable for sour cherries. The fruit contains such a large amount of water that it is necessary to save the moisture of the soil to the greatest possible extent. Dry clay knolls produce cherries of less size and of inferior quality than the moister depressions between them. Very early and thorough cultivation is essential to this conservation of moisture, and the tillage should be continued at frequent intervals until the fruit is about ripe. In order to be able to cultivate the soil at the earliest moment in the spring, the land should be either naturally or artificially well drained. The crop of even the Morellos is off the trees in July, so that there is abundant opportunity to sow a catch-crop on the orchard for a winter cover, if the manager so desires. A variety of plants may be used for this cover. The best is probably Crimson clover, particularly if the orchard needs more nitrogen or growth; and if American-grown seed is sown by the middle of August in a well-prepared soil, the cover will probably pass the winter safely. Other plants which may be used for cover are rye, winter wheat, vetch, field pea, sowed corn, millet, and buckwheat. Of these, only the two first will live through the winter and grow in the spring. In using cover crops which survive the winter, it is very important that they be turned under just as soon as the ground is dry enough in spring. As soon as the plant begins to grow it evaporates moisture and dries out the soil; and it is more important, as a rule, to save this moisture

than it is to secure the extra herbage which would result from delay. This is especially true with the sour cherry, which matures its product so early in the season, and which profits so much by a liberal and constant supply of soil moisture. Plowing can also be begun earlier on land which has a sowed crop upon it, because of the drying action of the crop. The fertilizers which give best results with other orchard fruits may be expected to yield equally good returns with the cherry.

It is an almost universal fault to plant cherry trees too close together. The Montmorency should not be planted closer than eighteen feet each way in orchard blocks, although it is often set as close as twelve feet. The English Morello is a more bushy grower and may, perhaps, be set as close as sixteen feet with success; but I believe that even this variety should stand eighteen feet apart. The sour cherry orchards in western New York are yet so young that the evil effects of close planting have not yet been made apparent. I find, however, that nearly every shrewd orchardist who has had experience with these fruits is convinced that the general planting is too close.—*From Cornell Bulletin.*

WHERE TO PLANT CHERRIES.

The two great classes of cherries differ widely in their adaptability to the conditions of the climate and soil. The sour class is far the most hardy of constitution, both as to heat and cold. They also flourish on more varieties of soil than the sweet class. The soil and climate that suit the sweet cherries are good for the sour kinds too, but not *vice versa*.

The sour varieties delight in a rich loamy soil that has considerable clay in it and one that does not easily dry out; however, the soil should not be wet. The sweet kinds require a looser and more mellow soil; one that is sandy or gravelly is good if well enriched, but it may be made too rich, and thus induce too late and tender growth. The cherry should mature its wood early.

The sour cherries will grow in almost any climate that will suit the apple, but on the prairies of the Northwest it is only some of the hardiest Russian kinds that can endure the rigors of the winter, and these cannot always succeed. The sweet class find their most congenial climate in North America in the milder regions of Oregon and Washington. In California they also do well. In the foot-hills of the Blue Ridge and Alleghany mountains and along the Hudson river they do best in the Eastern states. In the Mississippi valley they are liable to die early from the effects of the violent changes of

temperature. A mild, equable, moist climate suits them best, but not a hot one.

Twenty-five or thirty feet is none too far for the sweet kinds, but the smaller-growing Amarells and Morellos will do very well at eighteen feet, or even closer in some places where the soil and season do not stimulate a vigorous growth.

It is useless to expect to grow cherries profitably either for market or home use for a long period without giving them thorough and clean cultivation. The soil should be kept as clean as a garden up to the time the fruit is ripe; soon after that their wood is mature and cultivation may be stopped. If the trees lack vigor, a catch-crop of Crimson clover, cow-peas, buckwheat or even rye may be sown, but it must be turned under very early in the spring, and the stirring of the soil resumed. The cherry is very sensitive to severe pruning, and the trees should be well looked after when they are young to get them headed low enough for convenience and properly formed; then little will be needed afterwards. The cutting of large branches is very dangerous at any time.

The universal plan in gathering cherries is to leave the stems attached to the fruit, except, rarely, for local sale or home use. Small packages have proven decidedly more profitable to carry them to market than large ones. Quart berry boxes and shallow trays put up in crates are better than grape baskets, according to the latest experience.—*Prof. H. E. Van Deman.*

THE DYEHOUSE AND EARLY RICHMOND CHERRIES.

The difference in the fruit of the two varieties is not a great deal until both are ripe, though Dyehouse generally ripens a week or ten days in advance of Early Richmond. But the fully ripe fruit of Dyehouse is superior to the fully ripe fruit of Early Richmond. Another difference, as noted by Professor Powell, of the Delaware station (bulletin No. 35), is in the juice of Dyehouse being somewhat dark colored, while that of Early Richmond is colorless. Both varieties are profuse bearers, and Dyehouse is probably the earliest bearer of all fruit-trees; young trees, two years old, quite frequently bear in the nursery rows. Both varieties are valuable for localities in which the sweet cherries are not generally successful; and Dyehouse is valuable for any locality and in any collection, considering its excellence for pies, for canning, and, when fully ripe, for eating right from the tree. It has also the smallest pit of all cherries.

Dyehouse, as many of our readers know, originated in central Ken-

tucky. an accidental seedling in the orchard of the person whose name it bears. This was years ago, when the people there had heard little or nothing about budding or grafting, and increased the stock of their favorite and never-failing cherry by sprouts dug up from the roots of the parent tree. And some prefer these sprouts still, though the reason of their preference is hardly clear. Finally, after thirty years of continuous bearing—every year with one exception, when a late frost destroyed the young fruit, then about the size of peas—Mr. Henry T. Harris, a person who had experience with choice fruits, came across it and introduced it to the public.

Since that time—over twenty years ago—it has demonstrated its excellence in various parts of the country, North as well as South, East and West, even in Minnesota and Canada.

There is one peculiarity attending the propagation of the trees of Dyehouse: the buds frequently do not succeed, failing to become attached to the stock, and consequently dying. Why this is so is difficult to say, but it affects only the nurseryman.

CLASSES AND VARIETIES OF CHERRIES.

Of cherries there are at least three distinct classes: the Morellos, Dukes, and Hearts. The Morellos are all sour and the trees flourish and bear in almost every part of the country. The Dukes are tart in flavor and the trees are quite sensitive to climatic variations, and require a region where the changes are not severe, being neither very hot in summer nor very cold in winter. The Hearts are still more difficult to grow, except where the climate is peculiarly suited to them, which is on the Pacific slope, in the Piedmont sections of the Appalachian mountain ranges, and in the vicinity of the great lakes. In those places they seem to flourish, especially in Oregon and California, where the most productive trees and the largest and most perfect fruit are grown.

Morellos: Dyehouse, Richmond, Montmorency, Philippe, English, Wragg. Dukes: May Duke, Late Duke, Choisy, Olivet, Hortense, Magnifique. Hearts: Black Tartarian, Napoleon, Tartarian, Mercer, Windsor.

Commercial cherry growing is not practiced by many this side of California and Oregon. There is opportunity for much more in that line than is done in the Eastern states; especially is this true of the Heart and sweet varieties, which are well suited to the certain sections already mentioned.

CHERRY ORCHARDS FOR PROFIT.

It is the opinion of Professor Bailey that cherry culture has not received the attention it deserves in this state. It is his opinion that cherry orchards can be made exceedingly profitable here. Professor Bailey laments the fact that there are scarcely any cherry orchards in New York state, and that cherry growing as a business is scarcely known here. He can see, however, a growing interest in cherries, occasioned by the success of California fruit-growers in marketing large quantities of California cherries in our large cities and towns at profitable prices, after paying enormous freight-charges for 3000 miles shipment. In California orchards of 50 to 100 acres of cherries are not uncommon, but who ever heard of such orchards in the Eastern or Middle states; and yet we have land and climate particularly adapted to cherry growing.

Cherry growing in the Eastern and Middle states is often confined to a few straggling trees in the door-yard or along the fence-rows, where they receive no cultivation; the owners at no expense for the cherries thus produced. When the fruit ripens the owners are not informed as to the proper methods of gathering, marketing, or the best packages. The cherries are hastily and roughly plucked from the tree, often with stems pulled out of the fruit, thrown into large baskets, and sold promiscuously without grading, and dumped into the market in this unsightly condition, to bring whatever the shipper may offer. The shipper who buys these ill-assorted and poorly gathered cherries immediately assorts the fruit, packing the best in boxes, similar to those used by the California growers, selling the second grade to local pie makers, and throwing the culls away. Surely all this work should be done by the fruit-grower. If he should properly manage he would realize twice as much profit.

There is a growing demand for cherries for eating out of the hand, for pie making, and for canning. An acre of cherries under cultivation will yield an enormous quantity of fruit. This fruit need not be gathered the day it ripens. The Black Tartarian cherry on my place at Rochester hangs on the tree a month. And yet there is a time when cherries for market should be picked, and that is before they become fully matured or colored.

Many people are deterred from planting cherry orchards owing to the fact that considerable help is necessary to gather a crop of cherries, and yet there is scarcely any locality where sufficient help cannot be secured. All such enterprises as this require business ability in the management of labor, in the production of fine fruit, in suitable packages, and preparation for market. But I doubt if any enter-

prising young man would hesitate to plant a cherry orchard for this reason. One of the good things of our fruit-growing is that it develops business ability.

A BIG CHERRY TREE.

In California there is a Black Tartarian cherry tree, thirty-five years old, that is probably the most productive tree of the kind in the world. The body of the tree four feet from the ground is eleven and one-half feet in circumference, and in one year one and one-half tons of cherries were marketed, and besides considerable fruit was used by the owner and much was given away. The quality of this cherry is excellent. We get this item direct from Rev. R. M. Tunnell, recently from California, who thinks this cherry would do well in this Ozark country.

CHERRIES IN THE WEST.

There is no fruit that gives more satisfaction to the grower than the cherry. True, the sour cherries are the only ones to plant. The sweets and Bigarreus do not succeed in our climate. To plant them is sure failure. I know this by experience, as I have planted hundreds without ever seeing them ripen fruit.

With the sour varieties it is different. I believe there is no place where they do better than here. We have at this time over 4000 planted and are still planting. Of varieties there are a number, and to secure a continuance I would name Dyehouse, Early Richmond, Montmorency, Ostheim, English Morello, and Wragg. All are good and early bearers.

Cherries require dry, good soil. Unless you have well-drained soil it will cause you disappointment. On the proper soils the trees are as long-lived as the apple. I know some trees planted here thirty years ago that are still productive. Do not cultivate after the trees are well established. The fruit sets and ripens in a stiff blue-grass sod as when cultivated. We simply mow the grass, allowing it to rot on the ground. One great mistake in growing cherries is in heading the trees too high. I made this mistake with the first 300 trees, set in 1876. It requires long ladders to pick the fruit. We now try to keep them down to bush form. It is so much easier to pick the fruit and far less liability of breaking the trees. I have named six varieties in their order of ripening. There is a German cherry here earlier than Dyehouse by at least four days. We call it "Jerusalem." It may be identical with Early Morello. A Mr. Saur brought it from "father-

land." Dyehouse originated in Kentucky, and is a week earlier than Richmond. I think it better—its seeds are smaller. The Wragg is an Iowa product, being hardy and bearing young. I had one-year-old trees ripen this variety last year. I think the Dyehouse and Wragg indispensable, as the latter is late and, holding fruit well, it lengthens the season about two weeks.—*Western Fruit Grower*.

CHERRY-ORCHARD EXPERIENCE.

Cherries are usually set when two years old from the bud. The sour varieties are propagated both upon Mazzard and Mahaleb stocks, chiefly the latter, but the comparative merits of the two are not determined. The tops are started about three or four feet high, and the subsequent pruning is very like that given the plum. If the young trees make a very strong growth and tend to become top-heavy, heading in may be practiced; but this operation is not considered to be necessary after the trees begin to bear. Cherry trees require less attention to pruning than apple trees and peach trees do.

The English Morello will bear a fair crop the third year after setting, if two-year trees are planted. The Montmorency is a year or two later in coming into bearing. The Montmorency, partly because of its larger growth, produces much more fruit than the other, when it arrives at full bearing. Individual trees of Montmorency at six years and upwards may bear from thirty to seventy-five pounds of fruit; but eight to ten tons of marketable fruit are an excellent crop on an orchard of 800 Montmorencys eight years planted; that is an average of twenty to twenty-five pounds to the tree. The Morellos, because of their dark color, usually sell better than the Montmorency in the open market, but the reverse is now generally true if the crop is sold to canning factories. This year the factories have paid five and six cents a pound for Montmorencys. It is easy to figure the proceeds of an acre. At 18 x 18 feet, an acre will comprise about 130 trees. If, at eight years, they yield twenty pounds each, the crop would amount to 2600 pounds, which at five cents means \$130. This is a conservative estimate. Benjamin Kean, Seneca, has 200 Montmorency trees six years set. He has had three crops, one of 1400 pounds, one of 3000 pounds, and one 3100 pounds. He sold his entire crop this year for five cents, making a gross income of \$155. His trees are set 10 x 12 feet, which allows about 360 to the acre. In other words, a crop which sold for over \$150 was taken from less than two-thirds of an acre. The soil in this case seems to be unusually well adapted to this cherry and the crops have, therefore, been excellent; but, on the other hand, part of the crop was destroyed this year

by the curculio. C. H. Perkins, Newark, has thirty-five trees, eight and twelve years old, all Montmorency. "They bear," he writes, "from 2000 to 3500 pounds of cherries per year, and the average price that we get for them is six cents. They net us from \$100 to \$175 a year. They are the most regular and sure cropper of any fruit we have ever tried to grow, and the fruit always finds a ready market at a good price." The Maxwell orchard, at Geneva, yielded over eleven tons of Montmorency, this year, from 800 trees.—*Ithaca, N. Y., Bulletin.*

PROFITS OF THE CHERRY CROP.

The profits from the cherry industry depend mainly on the effort of the grower in producing first-class fruit and in placing it on the market somewhat after the directions given. In 1888 an acre of cherry trees, eighteen years old, including Black Tartarian, Black Eagle, Napoleon Bigarreau, Elton, Yellow Spanish, and Downer's Late Red, netted \$380, while an acre of rye netted eight dollars.

The following sample figures are taken from sales from the orchard this season, trees twenty-five years old :

Five trees of Robert's Red Heart averaged 280 pounds per tree; the fruit sold for nine cents per pound, bringing.....		\$25 20
The expenses were:		
Picking.....	\$2 80	
Packages.....	1 40	
Packing.....	1 25	
Express.....	2 80	
Commission.....	2 52	
		10 77
Net profit per tree.....		\$14 43
One tree of Robert's Red Heart yielded 416 pounds, which sold to retail dealers at ten cents per pound at the express office.....		\$41 60
Expenses:		
Picking.....	\$4 16	
Packages.....	1 56	
Packing.....	1 75	
		7 47
Net profit.....		\$34 13
One acre of Windsors, containing seventy trees, eight years old, yielded eighty-four pounds per tree—5880 pounds—which sold at ten cents per pound.....		\$588 00
Expenses:		
Picking.....	\$58 80	
Assorting and packing.....	20 00	
Packages.....	30 00	
Express and commission.....	70 00	
Cultivation (plowed once and harrowed six times).....	3 50	
Fertilizers (300 pounds potash, 100 pounds bone, 15 pounds Crimson clover seed).....	4 25	
Interest on land, at \$150 per acre.....	9 00	
		195 55
Net profit.....		\$392 45

All these figures refer to sales in the open market. There is a good demand for sweet cherries for canning factories. The canners generally prefer the "white cherries"—those with a white juice and rather light-colored skin. The crop of sweet canning cherries in western New York appears to be growing smaller, and the California product has driven out much of the home-made goods. One of the best informed canners in the western part of the state writes as follows concerning the sweet-cherry pack: "Up to six or seven years ago, we handled from fifty to one hundred tons annually. The cherry crop appears to be growing smaller each year, and to be deteriorating very much in quality." The canners tell us, in general, that when they can get good fruit they have no trouble in making a salable product.—*From Cornell Bulletin.*

FOUR PROFITABLE CHERRY TREES.

When we purchased our city place last fall, we were informed by the owner that the four large cherry trees growing there had produced him one crop that yielded seventy dollars, and that one tree yielded twenty dollars' worth of cherries. This seemed to me a very large story, but as he related it after the place had been purchased, I had no reason to disbelieve it. I have had the pleasure to test these four cherry trees. Three of them are Black Tartarian and the other Napoleon, a white cherry, very firm flesh; in great demand for canning and shipping. These trees are loaded down with beautiful cherries; making a rough calculation at the low price of four cents per pound, I should judge that ten dollars' worth of cherries per tree might have been sold from those trees; but aside from the market value of the fruit, these trees were a constant delight to the children and other members of the family for the shade which the broad leaves furnished, the beauty of the blossoms and the display of brilliant fruit as it ripened. I can heartily recommend the cherry tree to any home ground. It succeeds without cultivation, is long-lived, and in every way desirable. Cherry culture for market does not receive the attention in the East which it should. It is clear that any one who has an acre or more of cherries can receive a very nice income from the fruit. It should be taken into consideration that it requires considerable help to pick the fruit. We pay one cent per pound and sell them for four and five cents per pound, but many get them picked for one-half cent per pound or less. One hundred pounds is a day's work. Cherries must not be permitted to get too ripe before picking, if it is designed to ship far.

GREAT CHERRY ORCHARD.

Probably there is no better-known ranch, and certainly there are few larger, in the state of California, than that owned by the Meek estate, says the *San Francisco Wave*. It is situated a little way outside the city of Oakland, and it covers a huge tract of land between San Lorenzo and Haywards. It is spread over 3300 acres of some of the finest fruit-bearing country on the Pacific coast. A thousand acres of this extent is in fruit, for the most part cherries.

The ranch is owned and controlled by the two Meek brothers and their sisters, how skilfully may be known from the fact that, in spite of hard times and a depressed market, there has never been a year when it has not paid, and paid liberally. A full crop of cherries from this wonderful orchard will bring its owners anywhere from \$30,000 to \$35,000.

During the cherry-picking season a little army of pickers toil from tree to tree, stripping the branches like a swarm of locusts.

The sight is picturesque, for the pickers come by families and live in the orchard, in a small village of tents. At the height of the season nearly 150 pickers are employed. They are of all ages and both sexes, as the work is of such a nature that it can be performed as well by women as by men—as well by a ten-year-old girl as by a grown man. The pickers are, of course, boarded at the expense of the ranch, and beside are paid from seventy-five cents to one dollar per day, so that a wife and two or three children can make as much money during the few weeks of the picking season as the head of the house can earn during the entire year.

After the picking, the cherries are taken over to the packing-house and handled at once. The riper cherries are sorted out and put upon local markets, while the more backward are shipped East. The force of packers can dispose of 420 boxes per day. Two thousand boxes go to the car-load and must be hurried to their destination as speedily as possible, for there is no fruit that loses its flavor quicker by over-keeping than the cherry. For the same reason the boxes must be rapidly marketed, for they will not keep many hours in the heat of an Eastern summer. There are plenty of difficulties in the way of getting the California cherry upon the dining table of the Eastern consumer, but, with ordinary care and a fair season, the prices obtainable are not bad. In Chicago a ten-pound box of California cherries can be made to bring a dollar, if properly handled, while in New York, though the Eastern local market comes into competition, the same quality will sometimes sell for twelve cents per pound.

INSECTS ON THE CHERRY.

By PROF. J. M. STEDMAN, of Missouri.

There are not so many insects which prey upon the cherry as upon the apple. The New York weevil and the imbricated snout beetle feed on the young and tender bark and foliage and sometimes upon the buds before they open in the spring. We know little of the life-history of these insects and must fight them upon the tree itself. At a time when the trees are leaved out it is difficult to reach the twigs which are covered with the leaves, but it can be held somewhat in check by spraying with the arsenate of lead.

Tent-caterpillars of both species work on cherry trees, and can be fought as spoken of in the apple. The fall web-worm can be twisted out with a forked stick if you take it in time. The cherry borer is found only in a few localities. It is not general in the state. It is difficult to fight in a very successful way. Use the same wash that I recommended for apple borers.

Cherry leaves are eaten by a number of lepidopterous insects. Spray with arsenate of lead in preference to Paris green, London purple, arsenate of lime, or soda.

To make arsenate of lead, use eleven ounces of acetate of lead and four ounces of white arsenic to fifty or seventy-five gallons of water. This formula is for any biting insects on the cherry. The leaf-crumpler will damage the cherry more than the apple. The canker-worm also feeds upon the cherry. Give all of them the arsenate of lead.

The curculio is difficult to fight; much more so than in the case of the plum. It makes the wormy cherries. These do not drop from the tree like the plum, but hang on and ripen with the good cherries. It is often difficult to distinguish them from the good ones till you eat them. Cherry trees are usually too large to jar successfully. Spraying does not pay, rarely reaching fifty per cent. of them. Birds can keep these insects in check.

A CURCULIO PREVENTIVE.

Clear the ground under the trees of undergrowth of any nature, then stir the soil about one inch deep, and apply on top (in early spring, before any fruit is set, or, if soil will permit the working, before bloom falls) the following: One bushel of air-slaked lime, one bushel of wood ashes, two pounds of concentrated lye, two pounds of copperas, ten pounds of sulphur, one package of salt; mix with a hoe, and apply through an old sieve. Protect the hands while applying it, or they will suffer much.— *Rural World*.

DISEASES OF THE CHERRY.

LEAF-SPOT.—The cherry suffers from a “shot-hole” disease similar to those which riddle the leaves of the peach and plum. Indeed, this identical fungus attacks the plum as well as cherry, though not so badly. Its botanical name is *Septoria cerasina*. This fungus appears on the leaves in early summer as dark brown or blackish circular spots, which soon fall away, leaving the holes. The fungus attacks only the leaves. In central Carolina it usually entirely defoliates the trees by August 1. The spores of the fungus live through the winter in the diseased leaves of the previous season.

Remedies: Gather up and burn all diseased leaves as soon as they fall. Spray in spring just before the buds start, with the copper sucrate mixture. Spray again when leaves are one-half grown, with the liver of sulphur solution. Repeat this in two or three weeks. Preventive treatment is necessary with this pest, and, therefore, the first two treatments must be given in time and with carefulness. It must be remembered that this disease attacks both plum and cherry, and may be communicated from one to the other.

MILDEW OF CHERRY.—The cherry is attacked by two species of mildews, namely, *Podosphaera cerasi* and *P. tridactyla*. They attack the leaves only, producing on one or both sides a white, powdery covering, something like the powdery mildew of the grape. The spores of the fungus pass the winter in the diseased leaves of the preceding season.

Remedies: Gather and burn all leaves as soon as they fall. Spray once before the buds burst, with the copper sucrate mixture. As soon as the leaves are half-grown, spray with the liver of sulphur solution. Repeat in two weeks. This will probably suffice.

 CURCULIO.

From Bulletin No. 65, Utah Experiment Station.

This pest is very injurious to plums, cherries, peaches, and apricots. The mature insect is a dull gray, rough-backed beetle, about three-sixteenths of an inch long. As soon as the tiny fruits are formed the female beetle is on hand to “sting” them. “Stinging” consists of the female puncturing the skin, then depositing an egg in the puncture, and cutting a crescent-shaped slit at one side and beneath the egg. It is then in a little flap and will not be crushed by the development of the fruit. In about a week the egg hatches and the larva tunnels to the pit, where it feeds for from three to five weeks, and then escapes

and enters the ground to a depth of a few inches. Here it transforms to the pupa stage, from which it changes to a mature insect in three or four weeks. The beetle spends the winter under any rubbish or under the rough bark of trees.

Remedy: The universal practice is to catch the beetles by jarring. There are several methods of doing this, the most ordinary of which is to spread a sheet or pieces of canvas on the ground beneath the tree and strike the limbs with a padded mallet. When disturbed the insects play "possum" and drop on the sheet, from which they are readily collected and destroyed.

A more improved method used in commercial orchards is a two-wheeled cart upon which is built a light frame in the position of the ribs of an inverted umbrella. Over this frame is spread a canvas, the center part of which is two or more feet lower than the edge. The canvas has an opening at the center, below which is fastened a zinc box about one foot in length, breadth, and depth. On the front side of the canvas is an opening wide enough to accommodate the trunk when the cart is pushed under the tree. A few jars with a padded mallet dislodge the beetles and they drop on the canvas, from which they are swept into the box below, after which they may be killed in whatever manner is most convenient. The jarring should be begun as soon as the petals fall and be continued as long as any insects are caught. It is best done in the morning while the insects are quiet; later in the day they become active and fly away when disturbed.

Spraying with poisons is also recommended, but with varying results, by different experimenters. Paris green, London purple, or green arsenoid, one pound, with from three to five pounds of freshly slaked lime, in 250 gallons of water, should be applied first when the leaf-buds are opening. The second application should be given as soon as the petals fall, and a third about ten days later. The poison may be combined with Bordeaux mixture at the rate of one pound to 250 gallons when the latter is used against the shot-hole fungus.

CHERRY SLUG. (*Eriocampa cerasi* Peck.)

The pear slug is exceedingly injurious to pear and cherry foliage, eating the upper side and tissue of the leaves. The remaining parts are practically destroyed and soon assume a brown and scorched appearance. The mature insect is a small saw-fly, which might be mistaken for an ordinary house-fly.

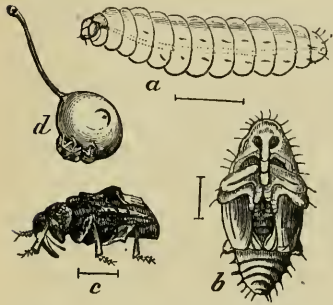
Remedy: In the early part of the season, before the fruit is half grown, green arsenoid, Paris green or London purple may be used, at the rate of one pound to 160 to 200 gallons of water, adding three pounds of lime. After this do not use the above poisons for fear of injuring the fruit for food, but instead apply fresh hellebore, one ounce to two gallons of water. Hellebore may be used any time during the season, even when the fruit is ripening. Spraying must be done often enough to hold the worms in check.

CURCULIO IN CHERRIES.

By H. E. SUMMERS, State Entomologist, Ames, Iowa.

The "white worms" usually found in cherries are the larvæ of the plum curculio (*Conotrachelus nemophar*), which seem to be quite as fond of cherries as of the plum. It does not cause the cherry to drop, however, as is usually the case with the plum, but the nearly full-grown larvæ are found in the ripe fruit when it is picked.

The only treatment is to destroy the beetles before they have laid their eggs in the young fruit. This treatment must be applied not only to the cherry but to the plum, and, to be entirely effective, to the peach, nectarine, and apricot, where these are grown. The tree must be sprayed at least three times, and four is better. The first before the flower-buds open, the second immediately after the blossoms have fallen, the third ten or twelve days later, and the fourth about two weeks later still.



a, larva; b, pupa; c, adult; d, a plum showing puncture and crescent.

For the curculio alone the application may be, Paris green 1 pound, fresh lime 1 pound, water 200 gallons. As, however, cherries are subject to rot and leaf diseases, which may be largely prevented by the use of Bordeaux mixture, it is much better to apply the Paris green in conjunction with this fungicide. The combined mixture consists of copper sulphate 4 pounds, quicklime 4 pounds, Paris green 4 ounces, water (one barrel) 40 to 50 gallons.

Dissolve the copper sulphate (bluestone) by suspending it into a wooden or earthen vessel containing four or five or more gallons of water. Slake the lime in another vessel. If the lime, when slaked, is lumpy or granular, it should be strained through coarse sacking or a fine sieve. Pour the copper sulphate solution into a barrel, or it may be dissolved in this in the first place; half fill the barrel with water, add the slaked lime; fill the barrel with water, and stir thoroughly; it is then ready for use.

Stock solutions of dissolved copper sulphate and of lime may be prepared and kept in separate covered barrels throughout the spraying season. The quantities of bluestone, lime and water should be carefully noted.

ANOTHER CURCULIO CATCHER.

The curculio attacking quinces, plums, peaches and a few other fruits is but little affected by spraying mixtures of any kind. The mouth-parts of the insect are elongated in the form of a beak, and when the curculio damages the fruit, very little if any of the poisonous substances which may have been applied in the spraying solution is taken into the system. The most effective means of combating the insect, therefore, is to take advantage of its habit of dropping to the ground when alarmed. If a cloth is spread under the tree and the limbs struck with some kind of a pole, the insects will drop at once onto the sheet and can be collected and destroyed.

Placing the sheet about the trees is a slow process. Consequently, the Cornell station has suggested a device. It consists of an arrangement built on the plan of a double-wheeled wheelbarrow with much elongated axle. On this are arranged a number of projecting arms radiating from a point midway between the two wheels. A canvas or any kind of cloth is attached to these arms, with an opening on the far side large enough to admit the trunk of the tree. This is very inexpensive and easily built.

The time to begin jarring is still a question, but as the curculio are usually more active in the early morning, possibly the work had best be done then. These beetles begin operations as early as May, and it will not do to delay jarring them much after they appear. Some years they will not appear until the latter part of July. Those who practice this method successfully jar the trees every day until the numbers are so small that they do not affect the fruit seriously. In one orchard, noted by the Cornell station in 1897, 200 curculio were jarred from seven trees, and it is not uncommon to get as high as fifty from one tree at a single jarring. This process involves considerable labor and expense, but it costs only about fifteen to twenty cents per tree for one season. After the insects are captured they can be destroyed by the most convenient method. Some put them in kerosene or boiling water, while others have a charcoal stove built for the purpose, in which everything that falls on the sheet is burned.—
Orange Judd Farmer.

INSECTS AND DISEASES OF CHERRIES.

Insects and diseases are not serious upon the sour cherries. The curculio does not often attack the mid-season and late varieties—such as Montmorency and Morello—seriously, particularly if the number of trees is somewhat large. In occasional years, however, this insect becomes a source. The grower must watch his fruits closely after the blossoms fall, and if the curculio injuries become alarming, he must catch the insects by jarring them onto sheets. There are those who declare that they attract the curculio away from the cherries by planting plum trees in the cherry orchard, but I greatly doubt the efficiency of this procedure. A complete account of the curculio may be expected in a forthcoming bulletin.

The leaf-blight, or shot-hole fungus (*Cylindrosporium padi* or *Septoria cerasina*, the same which attacks the plum), is often a serious enemy, particularly upon English Morello. The leaves begin to assume a spotted character, generally before the fruit is picked; they soon turn yellow and they fall prematurely. Thorough spraying with Bordeaux mixture is as efficient in holding the leaves on the cherry as it is on the plum. The trees should generally be sprayed twice between the falling of the blossoms and the coloring of the fruit. If the cherries are more than half grown when the last spray is applied, the ammoniacal carbonate of copper may be used in place of the Bordeaux, to avoid discoloring the fruit; but it is doubtful if the last spray should be delayed until this time. It may be necessary to spray once after the fruit is off.

CHERRY APHIS. (*Myzus cerasi*.)

This is a black species, and is sometimes found on the cherry tree in enormous numbers, usually on the leaves only, but also attacking the tender twigs. They hatch from eggs deposited the previous autumn on the twigs, and for a few weeks in May and June increase very rapidly. Usually their numerous enemies lessen their numbers so greatly that they may nearly or entirely disappear after three or four weeks. In August they appear again, but usually not in such numbers as earlier in the season. As yet this species does not seem to be abundant in the state, but we have received specimens from nearly every fruit-growing section.

CHERRY APHIS.

This little insect is one family of a large species, commonly known as plant-lice, but are nearly black in color. They appear early in the spring and begin sucking the juice from the expanding buds. They multiply very rapidly, and as growth takes place move to the new shoots and leaves, where they collect in large numbers, especially on

the under side of the leaves, causing them to curl up so as to cover the lice, and thus making it difficult to hit them with a spray after they have become well established. Since these insects suck their food they cannot be poisoned, but must be killed by contact of the insecticide with their bodies.

Remedy.—In fighting these insects close watch should be kept for their first appearance, so that they may be sprayed at once and not allowed to become established. The treatment should be repeated as circumstances require. Kerosene emulsion diluted from twelve to fifteen times is commonly recommended for plant-lice. If the leaves are curled so that the spray cannot reach the inset, dip the infested twigs in whale-oil soap and tobacco tea, or in kerosene emulsion prepared as follows: Dissolve one-half pound of either common salt or whale-oil soap in one gallon of soft water. Heat the mixture, and, when boiling hot, remove it from near the fire and add it to two gallons of kerosene. The whole is now thoroughly mixed by pumping continuously through a small force-pump for from five to fifteen minutes. Mix until the ingredients form a creamy mass that becomes thick when cool and from which the oil does not separate. When using on foliage dilute with from ten to fifteen parts of water; when used as a winter treatment, it may be applied as strong as one part of the mixture to four parts of water. In diluting the stock emulsion, first use three or four parts of boiling water, and then dilute to the required strength. Soak off with paper any free oil that appears on the surface, as it will work injury if applied to the plant. This emulsion is used to kill insects that have sucking mouth-parts; it is not a poison, but kills by contact. The emulsion causes rubber valves to swell and clog the tubes in which they work. Where rubber balls are used for valves they should be replaced with glass or marble balls when using the pumps for kerosene emulsion. The mixture may be poured into shallow pans, and the twigs bent over and dipped into it.

BLACK-KNOT OF THE CHERRY. (*Plowrightia morbosa* Schw.)

The black-knot of the cherry is distinctly an American disease, and is recognized at a glance by the rough, wart-like swellings which cover the branches and sometimes even appear on the trunks of the trees.

Where the fungus is not checked whole orchards soon become affected, and are a serious menace to every healthy tree in the vicinity. The fungus was described about seventy years ago by the mycologist Schweinitz, who thought, however, as many do still, that the trouble was due to insects, from the fact that there is often found the larva of insects imbedded in the galls. But since the very careful and systematic study of the black-knot by Dr. W. G. Farlow in 1886, there is no reason to doubt that it is caused by a parasitic fungus, the spores of which, after ripening, become detached from the knots and are carried by the wind or by insects to healthy trees, where in some manner they penetrate to the cambium layer, where they take root and grow, producing galls similar to the one from which they became detached.

Preventives and Remedies.—As the galls are found on the native cherry growing wild in fence-corners and abandoned places, they should be sought out

and burned. When found on cultivated trees, the diseased portions should be at once cut out to at least three inches below the knot and burned, and the wound treated with a strong ten-per-cent. solution of copper sulphate. If the work is done while the trees are dormant, they can be sprayed with the same solution, which will be likely to destroy any spores resting on the trees awaiting a favorable time for development. Where the knots are cut off, after treating the wound with iron sulphate, cover with a linseed-oil paint.

BROWN ROT.

The cherry, like the plum, only more so, suffers from brown rot, produced by the fungus *Monilia fructigena*. It must be treated as directed in case of the peach.

CHERRY APHIDE.

The worst insect enemy of the cherry in the Carolinas is the cherry aphide or louse, *Myzus cerasi*. This pest resembles the aphides of the apple, peach and plum, and must be treated in the same way. The leaves only are attacked.

THE JUNE BEETLE.

The cherry is also attacked by the June beetle, already treated of, and which must be combated as prescribed for the peach.

THE DOG-DAY CICADA.

The dog-day cicada, *Cicada tubicen*, an annual species, resembling somewhat the seventeen-year periodical cicada, is sometimes troublesome to the cherry by puncturing the small twigs and laying its eggs therein. These eggs hatch and the larvæ enter the ground, but complete their development in one year.

Remedies: Gather and burn all twigs showing the slits or nests of this insect.

THE FRUIT-TREE BARK-BEETLE.

From Kansas Experiment Station Bulletin.

Of the insects that have been introduced into this state during the past few years, none seem to be more destructive to stone-fruit trees than the fruit-tree bark-beetle, or shot-borer, as it is sometimes called, from its peculiar habit of riddling the bark of the trees with numerous small holes. The insect has been found in Riley, Bourbon and Allen counties, and without doubt is present in a large number of the other counties of the state. In Allen county it was very numerous, particularly in an orchard of cherry trees which were suffering badly from the cherry scale (*Aspidiotus forbesi*).

The presence of the pest will probably be first shown by the wilting and falling of the leaves at an unseasonable time. A close examination of the tree infested with the insect will reveal numerous small holes in the bark, from which in the case of the stone-fruit trees, such

as the plum, peach, cherry, etc., there is a considerable exudation of gum. To show how the insect may riddle a tree, a piece of bark less than an inch square, taken from an infested cherry tree, contained nineteen perforations about the size of a pin-head.

The insect that is the cause of the mischief is a small beetle about one-tenth of an inch in length by about one-third as wide. It is black in color, with the exception of the wing-covers and the lower part of the legs, which are reddish.

With the beginning of spring the beetles appear, and commence to bore small round holes through the bark to the sap-wood, where they make a central burrow or brood-chamber, on each side of which little pockets are made, in which eggs are deposited. As the larvæ hatch from the eggs they commence to make burrows away from and at right angles to the brood-chamber, which become larger as the larvæ develop in size.

The larva is a small grub about one-tenth of an inch in length. It is footless and white, with the exception of the head, which is brownish.

When the larva has attained its full growth it makes a slightly enlarged chamber, in which it pupates. Upon becoming an adult, the beetle makes its way out through small holes in the bark, and escapes. It takes about a month for the insect to go through its various stages, so that during the summer there may be several broods. Many of the beetles upon emerging will return and renew their attack upon the tree, thus increasing the damage that has already been done. In time the tree becomes completely girdled by the numerous channels, and dies.

Strong and vigorous fruit-trees may resist for a time the attacks of the beetles through the exudation of the gum, which seems to be obnoxious to both the beetles and the larvæ. But if the attacks are continued for a length of time, the tree may be so weakened that the flow of sap will not be strong enough to repel. In such a case it is not long before the fate of the tree is sealed, unless vigorous and prompt measures are taken for its protection.

To prevent loss from this insect, the tree should be kept in a healthy condition. The stronger the tree the better it can resist attack. Trees that are diseased or are suffering from the attacks of scales or other insects seem most subject to attack.

It is a good practice to remove and destroy all dead wood in the orchard, as it furnishes excellent breeding-places for insects and is a source of danger to surrounding trees.

Badly infested trees should be cut and destroyed. In the early spring the trunks of trees liable to attack should be coated with an alkaline wash, consisting of soft soap reduced to the consistency of

paint by adding washing soda dissolved in water. Enough carbolic acid should be added to give a strong repellent odor to the mixture. Apply the wash with a stiff brush. Several applications should be made during the spring and summer.

MEDICINAL PROPERTIES OF THE CHERRY.

Cherries are an absolute cure for rheumatism. I have never known a person to suffer from rheumatism who ate freely of cherries, and I know of hundreds who have been relieved of attacks by eating them. I have often had cherries ordered two and three months before the season for them opened hereabouts, and to supply the orders have had to send to Cuba and California for them. The ordinary cherry contains an acid which relieves if it does not effectually cure. Of course, it may all be in the season, and that rheumatism would disappear anyhow, but it is safe to say that there is no rheumatism during the cherry season. I don't know of anything healthier, though even the best-tasting, thoroughly ripe and perfect cherries start up very fine cases of cholic and cholera morbus, which are very annoying. The colored people of the South think, and it may be that the same belief exists elsewhere and among others as well, that all the cramp or colic is taken out of the cherry by eating it, swallowing stone and all. That unquestionably was the practice once, but in recent years fears of appendicitis may have changed it somewhat, though for the life of me I cannot understand why it is so dangerous now to swallow apple seed, grape seed, or cherry-stones, when in old-fashioned times it was the rule to do so rather than the exception.

SOME STANDARD RECIPES.

Canned Cherries. Allow three-quarters of a pound of sugar to every pound of cherries. Put into a porcelain-lined kettle; cook sufficient to fill one jar only at a time; bring slowly to boiling-point; simmer until the cherries are soft, without being broken, skim, and can. All large cherries may be canned in the same manner, first pricking the skins to prevent cracking. ("Canning and Preserving," by Mrs. Rorer.)

ANOTHER: Wash and put whole in a syrup made in the proportion of a pint of water and a pound of sugar to every two pounds of fruit; boil for eight minutes; can and seal immediately. (Buckeye Cookery.)

Cherry Charlotte. Stone a quart of ripe cherries and mix them with a pound of brown sugar. Cut slices of bread and butter, and lay them around the sides and in the bottom of a large, deep dish. Pour in the fruit boiling hot, cover the bowl, and set it away to cool gradually. When quite cold, serve with sweet cream. This is very nice in hot weather. (Skilful Housewife's Book.)

Cherry Compote.—Simmer five ounces of sugar with a half-pint of water for ten minutes; throw into the syrup a pound of cherries weighed after they are stalked, and let them stew gently for twenty minutes; it is a great improvement to stone them, but a larger quantity will then be required for a dish.—(Mrs. Hale.)

Cherry Compote of Morellos. Boil together for fifteen minutes five ounces of sugar with one-half pint of water; add one and one-fourth pounds of ripe Morello cherries, and simmer very gently from five to seven minutes. This is a delicious compote. (Mrs. Hale.)

Dried Cherries. Fruits for drying should be perfect and quite ripe. Cherries should be stoned before drying. Spread them in a single layer on boards and stand in the hot sun to dry gradually until they turn leather-colored, bringing in always before sunset, and never put them out in cloudy or damp weather. A piece of mosquito-netting will prevent the flies from reaching them. When dry, put in paper sacks and hang in a dark, dry, cool place. All fruits may be dried in the oven, providing the oven is not sufficiently hot to scorch or scald them. The fruit is dried more quickly, and you escape the danger of its being stung by insects. (Mrs. Rorer, in "Canning and Preserving.")

Dried Cherries.—Cherries are dried as follows: Put in jars first a layer of fruit, then a layer of sugar, in the proportion of a half a pound of sugar to a pound of fruit; let stand over night; place them to boil, skimming off all scum; let boil ten or fifteen minutes, skim out and spread on dishes to dry in the sun or by the fire, turning frequently until dry; then place on pans in the oven, stirring with the hand often until the heat is too great to bear. They may then be placed in jars with sugar or put away in paper sacks, or stone crocks with a cloth tied over the top, and are an excellent substitute for raisins in pudding or mince-pies.

The secret of keeping dried fruit is to exclude the light, and to keep in a dry and cool place. Paper sacks, or a barrel or box lined with paper, are secure against moths. Reheating fruit makes it dark in color and impairs the flavor. Always fill a fruit-can and keep for present use, to avoid opening the large jars often. (Buckeye Cookery.)

Cherry Jam.—Stone four pounds of cherries and put them in a preserving-pan with two pounds of fine white sugar and a pint of red-currant juice: their own juice will do. Boil the whole together rather fast, until it stiffens, and then put it into pots or jars for use. (Mrs. Hale.)

Cherry Jelly. Put the cherries into a stone jar, stand it in a kettle of cold water, cover the top of the jar, and heat slowly until the cherries are soft. Now put a small quantity at a time in your jelly-bag, and squeeze out all the juice. Measure the juice, and to each pint allow one pound of granulated sugar. Turn the juice into a porcelain-lined kettle and stand over a brisk fire. Put the sugar into earthen dishes and stand in the oven to heat. Boil the juice rapidly and continuously for twenty minutes, then turn in the sugar hastily, stirring all the while until the sugar is dissolved. Dip your tumblers quickly into hot water, watch the liquid carefully, and as soon as it comes again to a boil, take it from the fire and fill the tumblers. If the fruit is overripe your jelly will never be firm, no matter how long you boil it. Follow these directions carefully and you will never fail. (Mrs. Rorer, in "Canning and Preserving.")

Cherries—Pickled. Use the common or Morello cherries; pick off the stems, see that they are perfect, and lay them in a glass or earthen jar, with sufficient cold vinegar to cover them, and keep them in a cool place. They need no spices, as they retain their own flavor. (Skilful Housewife.)

Cherry Pie. Stone your cherries, that you may be sure they are free from worms; lay your paste in a deep dish, and add a good quantity of fruit; fill the dish with molasses, with a handful of flour sprinkled over, then a nice paste on top, and bake more than half an hour. If sugar is used, you will need water and flour. This makes the gravy very rich and the pie delightful. (Skilful Housewife.)

Cherry Pie.—Line a pie-tin with rich paste; nearly fill with carefully seeded fruit, sweeten to taste, and sprinkle evenly with a teaspoon of corn-starch or a tablespoon of flour; add a tablespoon of butter cut into small bits and scattered over the top; wet edge of crust, put on upper crust and press the edges closely together, taking care to provide holes in the center for the escape of air. (Buckeye Cookery.)

Cherry Preserves. Choose sour ones—the Early Richmond is good—seed all very carefully, allow an amount of sugar equal to the fruit; take half the sugar, sprinkle over the fruit, let stand about an hour, pour into a preserving kettle, boil slowly ten minutes, skim out the cherries, add balance of sugar, boil, skim, and pour over the cherries; the next day drain off the syrup, boil, skim if necessary, add the cherries, boil twenty minutes, and seal up in small jars. (Mrs. J. M. Southard, in "Buckeye Cookery.")

Spiced Cherries. Seven pounds of cherries, four pounds of sugar, one pint of vinegar, half ounce of ginger root, one teaspoonful of ground cloves, two teaspoonfuls of allspice, two teaspoonfuls of cinnamon, half teaspoonful of ground mace. Do not remove the stones. Put the vinegar and sugar on to boil. Mix the spices and divide them into four parts. Put each into a small square of muslin, tie tightly and throw into the sugar and vinegar. When this mixture is hot, add the cherries; bring to boiling-point, take from the fire, and turn carefully into a stone jar. Stand in a cool place over night. Next day drain all the liquor from the cherries into a porcelain-lined kettle, stand over a moderate fire, and, when boiling hot, pour back into the jar over the cherries. Next day drain and heat again as before; this do for nine consecutive days; the last time boil the liquor down until there is just enough to cover the fruit. Add the fruit to it, bring to a boil, and put in jars or tumblers for keeping. (Mrs. Rorer, in "Canning and Preserving.")

Cherry Syrup. Mash the cherries and stand aside in a warm place for four days; cover to keep out dust and insects; then turn into a jelly-bag and let drip slowly. If you wish it very clear, filter through filtering paper. Measure the juice, and to every pint allow two pounds of granulated sugar. Mix the juice and sugar together until only a small portion settles to the bottom; then pour it into a double boiler, place over the fire, and the heat of the water as it boils around will dissolve the sugar. When this has been thoroughly effected, take it from the fire and stand aside to cool. When cool, put into small bottles, fill them to the top, cork tightly, seal, and keep in a dark, cool, dry place. Be very careful that you use only porcelain or granite articles in the making of syrups, as the acids of the fruits will act upon metal and change the bright-red color to a purple. Use a wooden spoon in stirring. Strong heat or boiling also destroys the color and flavor of syrups. (Mrs. Rorer, in "Canning and Preserving.") —



SUPERB APRICOT.

Originated with A. H. Griesa, Lawrence, Kan.

APRICOTS.

It is hoped that the reader may be favorably impressed with the usefulness and value of the apricot by what is recorded here. The thirty-five Kansas growers who are quoted are scattered over our state, and while all fear late spring frosts yet all declare it a nice fruit for family use and the surplus is always salable at good prices. California has over three million trees, and California apricots are known the world over, either fresh, canned, or evaporated. They form a handsome tree for shade, being very dense, and the acid of the fruit is surely good for the human system in hot weather. Why should Kansans depend on California for apricots? I have eaten as fine apricots in Marion county, Kansas, as I ever saw come from California. If I did not know that Kansans are honest from living thirty years among them, I could readily believe that the best apricots, wrapped carefully and boxed nicely, were grown and packed within the borders of our state. Apricot trees are not costly, can be obtained at any nursery; should be set about eighteen feet apart, with same care as peaches, being trimmed to a stick. As they grow, head them back annually. Cultivate well for six or eight years, until well grown. They do best on strong land. Moorpark and Early Golden are probably best, unless some Kansas seedling (Superb, Home, Remer or others) may be more hardy. Many small plantings should be tried in our state. If our horticulturists say they will grow apricots, they will.—SECRETARY.

WHAT AN APRICOT IS.

Century Dictionary definition: A roundish, pubescent, orange-colored fruit, of a rich aromatic flavor, the produce of a tree of the plum kind, *Prunus armeniaca*, natural order ROSACEÆ. Its specific name is due to the belief that it is a native of Armenia, but it is now supposed to be of Chinese origin. It grows wild in the Himalayas and northwestern provinces of India, where its fruit is gathered in great quantities. It was introduced into England in 1524, by the gardener of Henry VIII. The tree rises to the height of from fifteen to twenty and even thirty feet, and its flowers appear before its leaves.

In cultivation it is often propagated by budding upon plum stocks. There are a considerable number of varieties, some of them with sweet kernels which may be eaten like almonds. The wild apricot of the West Indies is the *Mammea armeniaca*; that of Guiana, the *Cucuroupita guianensis*.

Standard Dictionary definition: A fruit allied to the plum, of an orange color, oval shape, and delicious taste; also, the tree (*Prunus armeniaca*) which bears this fruit. By cultivation it has been introduced throughout the temperate zone.

APRICOTS.

(From Downing's "Fruit and Fruit-trees of America.")

Armeniaca vulgaris, of botanists; *Abricotier*, of the French; *Aprikosenbaum*, of the German; *Albercoco*, of the Italian; *Albaricoque*, of the Spanish.

The apricot is one of the most beautiful of stone-fruit trees, easily known by its glossy, heart-shaped foliage, large white blossoms, and smooth-skinned golden or ruddy fruit. In the fruit-garden it a highly attractive object in early spring, as its charming flowers are the first to expand. It forms a fine spreading tree of about twenty feet in height, and is hardy enough to bear as an open standard south of the forty-second degree of latitude in this country. The native countries of this tree are Armenia, Arabia, and the higher regions of central Asia. It is largely cultivated in China and Japan; and, indeed, according to the accounts of Grosier, the mountains west of Peking are covered with a natural growth of apricots. The names by which it is known in various European countries all seem to be corruptions of the original Arabic term *Berkoche*.

Uses.—A very handsome and delicious dessert fruit, only inferior to the peach, ripening about midsummer, after cherries and before plums, at a season when it is peculiarly acceptable. For preserving in sugar or [canning], for jellies or pastries, it is highly esteemed, and, where it is abundant, it is also dried for winter use. In some parts of Germany, the free-bearing sorts—the Turkey, Orange, and Breda—are largely cultivated for this purpose.

Cultivation.—This tree is almost always budded on the plum stock (on which in July it takes readily), as it is found more hardy and durable than upon its own roots. Many nurserymen bud the apricot on the peach, but the trees so produced are very inferior in quality, short-lived, more liable to disease, and the fruit of a second-rate flavor. Budded on the plum they are well adapted to strong soils, in which they always hold their fruit better than in high, sandy soils. Apricots [trees] generally grow very thrifty, and soon make fine heads, and pro-

duce an abundance of blossoms and young fruit; but the crop of the latter frequently falls off when half grown, from being stung by the plum-weevil or curculio, to which the smooth skin of this fruit seems highly attractive. To remedy this, the same course must be pursued as is directed for the plum. Seedling apricots are usually more hardy and productive here than the finer grafted sorts. This is a favorite tree for training on walls or espaliers, and, in town gardens especially, we often see it trained against the side of brick houses, and yielding most abundantly. It bears its fruit in the same way as the peach, and requires the same management. As the apricot, however, expands its blossoms very early, it should not be placed on an east wall, or in a situation where it is too much exposed to the full morning sun.

Diseases.—When budded on the plum this tree is but little liable to diseases, and may be considered a hardy fruit-tree. In order to render it fruitful, and keep it for a long time in a productive state, we cannot too strongly urge the advantages of the shortening-in system of pruning recommended for the peach.

Downing describes forty-four varieties.

THE APRICOT.

From Thomas's "American Fruit Culturist."

It is remarkable that a fruit of such excellence as the apricot, that ripens from one to two months before the best early peaches, should be so little known. In its natural character it is more nearly allied to the plum than the peach, resembling the former in its broad leaf and the smooth stone of its fruit, but downy like the peach, and partaking largely of its flavor and excellence. The apricot is budded on seedling apricots, and on peach and plum stocks. Plum stocks are preferred, and are more especially adapted to heavy soils; on light soils the hard-shelled almond and the wild plum have proved excellent.

The soil should be deep and dry. Young trees have frequently perished from a wet subsoil, even where the surface is not unusually moist. On suitable soils, the tree is as hardy as most early peaches, but its greatest drawback is that its blossoms open so early and the young fruit is so tender that they are often destroyed by frost. The trees have been commonly planted in the warmest situations, as on the warm side of buildings or other sheltered site, facing the hot sun, where they have blossomed early, and, as a consequence, the crop has not unfrequently been destroyed by vernal frosts. Hence, a northern or more exposed aspect would be far preferable. If trained on a build-

ing, the eastern side should be especially avoided, as a hot morning sun upon frosted buds would be nearly certain destruction.

The liability to the attacks of the curculio, and the very common destruction of the whole crop by this insect, have contributed to the general conclusion that the apricot is not suited to our northern climate. Several cultivators, as far north as forty-three degrees of latitude, by a systematic destruction of this insect, and by selecting a dry subsoil, are said to obtain heavy crops of this delicious midsummer fruit. More recently varieties from southern Russia have been introduced, which, so far as hardiness and vigorous, thrifty growth are concerned, appear to have advantages over the older kinds in cultivation. But thus far, in producing satisfactory crops of fruit for market purposes, apricots east of the Rocky mountains, neither North nor South, have been very successful. By careful management, of which it is surely worthy, sufficient for family use may be obtained wherever the fruit will grow, but that apricots may be expected to be about as productive as the peach, as one eminent authority has recently stated, unless indeed in a few favored localities, is hardly probable.

Thomas describes twenty-nine varieties.

APRICOTS.

By L. H. Bailey, in "Cyclopedia of American Horticulture."

The apricot is a fruit somewhat intermediate between the peach and the plum. The tree is a round-headed, spreading grower, with dark, somewhat peach-like bark, and very broad, or almost circular, leaves. The fruit, which generally ripens in advance of both the peach and plum, is peach-like in shape and color, with a smoother skin, rich, yellow flesh, and large, flat, smooth stone. The flesh is commonly less juicy than that of the peach, and, as a rule, perhaps, of higher quality. The apricots are of three species, all probably native of China or Japan. The common apricot of Europe and America is *Prunus americana*; fruit variable, but smooth at maturity; red or yellow; the sweet and firm flesh free, or very nearly so, from the large, smooth, flat stone; tree with a round, spreading top, and a reddish, cherry-like or peach-like bark; leaves ovate or round ovate, with a short point and sometimes a heart-shaped base, thin and bright green, smooth or very nearly so below, as are the gland-bearing stalks; the margins rather obtusely and mostly finely serrate; flowers pink white and borne singly, sessile or very nearly so, preceding the leaves.

The Russian apricot is a hardy but smaller-fruited race of the spe-

cies. The Japanese apricot, in Japan grown for flowers rather than for fruit, is *Prunus mume*; fruit small, yellowish or greenish, the flesh rather hard and dry, and adhering tightly to the pitted stone; tree like the common apricot, but with a grayer or greener bark and duller foliage; leaves grayish green, generally narrower, and long pointed, more or less hairy along the veins below and on the shorter, mostly glandless stalk, thick in texture and prominently netted beneath; flowers fragrant, borne singly or in twos, and sessile (without stalks). Only recently introduced into this country, chiefly under the name of Bunge plum.

The third species is the purple or black apricot, *Prunus dasycarpa*, which is little cultivated; fruit globular and somewhat plum-like, with a distinct stem, pubescent or fuzzy even at maturity, dull dark purple. the sourish, soft flesh clinging to the plum-like fuzzy stone; tree round-headed, with much the habit of the common apricots, with leaves ovate and more or less tapering at both ends, thin, dull green, on slender and pubescent, mostly glandless stalks, finely appressed serrate, and hairy on the veins below; flowers large and plum-like, blush, solitary or in twos, on pubescent stalks half-inch or more long, and appearing in advance of the leaves. The apricot is as hardy as the peach, and it thrives in the same localities and under the same general cultivation and treatment, but demands rather strong soil. It is grown commercially in New York and other Eastern states.

There are three chief reasons why the apricot has remained in comparative obscurity in the East: Ignorance of the fruit; loss of crop by spring frosts, because of the very early season of blooming of the apricot; the fondness of the curculio for the fruit. To these may be added the fact that we have not yet arrived at an understanding of the best stocks upon which to bud the apricot; but this difficulty may be expected to disappear as soon as greater attention is given to the fruit and our nurserymen begin to propagate it extensively. Aside from the above difficulties, there are probably no reasons why apricots should not be grown in the East as easily as plums or peaches. The varieties of apricots which are chiefly prized in the Eastern states are Harris, Early Moorpark and St. Ambrose for early; Turkish or Roman, Montgamet, Royal and Moorpark for mid-season and late. Of the Russian race, the best known are Alexander, Gibb, Budd, Alexis, Nicholas, and Catherine. The ideal soil for the apricot seems to be one which is deep and dry, and of a loamy or gravelly character. The rolling loamy lands which are well adapted to apples seem to be well suited to the apricot, if the exposure and location are right. The apricot seems to be particularly impatient of wet feet, and many of the failures are due to retentive subsoils.

Particular attention should be given to the location and exposure of the apricot orchard. In the East, the best results are obtained if the plantation stands upon elevated land near a large body of water, for there the spring frosts are not so serious as elsewhere. Generally a somewhat backward exposure, if it can be obtained, is desirable, in order to retard blooming. Apricots will be sure to fail in frosty localities. The apricot should always be given clean culture. For the first two or three years some hoed crop may be grown between the trees, but after that the trees should be allowed the entire land, particularly if set less than twenty feet apart. Cultivation should be stopped late in summer or early in the fall, in order to allow the wood to mature thoroughly.

The trees are pruned in essentially the same way as plums. The fruit-buds are borne both upon spurs, and also on the wood of the last season's growth, on either side of the leaf-bud. Each bud contains a single naked flower. As the fruit begins to swell, the calyx ring is forced off over the top; and the injury from curculio may then be expected. When grown under the best conditions, the apricot may be considered to be nearly or quite as productive as the peach. Like other fruit-trees, it bears in alternate years, unless the crops are very heavily thinned; but it can never be recommended for general or indiscriminate planting. Only the best fruit-growers can succeed with it.

Apricots are to be considered as a dessert or fancy fruit, and therefore should be neatly packed, in small and tasty packages. The most serious enemy of the apricot is the curculio—the same insect which attacks the plum and peach. It seems to have a particular fondness for the apricot, and, as the fruit sets very early, the crop may be expected to be destroyed unless the most vigilant means are employed of fighting the insect. Spraying with arsenical poison is uncertain. The insect must be caught by jarring the trees, in the same manner as on plums and peaches, but the work must be even more thoroughly done than upon those fruits. The jarring should begin as soon as the blossoms fall, and continue as long as the insects are numerous enough to do serious damage. It will usually be necessary to catch the insects for three to six weeks, two or three times a week, or perhaps even every day. The work must be done early in the morning, while the curculio is indisposed to fly. The operation consists in knocking the insects from the tree by a quick jar or shake, catching them upon a white sheet or in a canvas hopper. The catcher commonly used in western New York is a strong cloth hopper mounted upon a wheelbarrow-like frame, and running upon two wheels. The hopper converges into a tin box, into which the curculios roll as they

fall upon the sheet. One man wheels the device by wheelbarrow-like handles under the tree, then drops the handles and jars the tree; or sometimes two men go with a machine, one wheeling it and the other jarring the trees. This device is used extensively by practical fruit-growers for catching the curculio on the various stone fruits.

It is not yet certain what are the best stocks for apricots in the East, in commercial orchards. It is probable that no one stock is best under all circumstances.

The apricot root itself seems to be impatient of our cold and wet soils, which are drenched by the drainage of winter. It needs a very deep and rich soil, but it is doubtful if it is safe for the East. The common plum (not Myrobalan) is an excellent stock for plum soils, and the apricot does well either nursery budded or top-worked upon it. Peach is probably the commonest stock, and, for peach soils, it is probably the best that can be used. If the apricot thrives upon various stocks, it is thereby adapted to many soils. The apricot is often trained on walls, where the fruit reaches the highest perfection. Care should be taken that the wall does not face to the west or the south, or the early forced flowers may be caught by frost. An overhanging cornice will aid greatly in protecting from frost.

THE APRICOT IN CALIFORNIA.

By EDWARD J. WICKSON.

The apricot is one of the leading commercial fruits of California. It was introduced by the mission fathers, for Vancouver found it at the Santa Clara mission in 1792. However, there is no relation between this early introduction and the expansion which quickly followed the American occupation, because the mission fathers had only seedling fruits, while the early American planters, shortly before the gold discovery, introduced the best French and English varieties, and were delighted to find that these sorts, usually given some protection in the old world, grew with surprising thrift of tree and size of fruit in valley situations in California in the open air. Upon these facts the apricot rose to wide popularity. The acreage has steadily increased during the last fifty years, and with particularly swift rate during the last twenty years, until the number of trees at the present date (1899) is about three millions, occupying upwards of 40,000 acres of land. This notable increase, and the present prospect of much greater extension, is based upon the demand which has arisen for the fruit in its fresh, canned, dried and crystallized forms in all the regions of the United States, in England, and on the continent, where, by reason of its superior size and acceptable manner of

curing, it has achieved notable popularity. The year 1897 was the greatest thus far in amount of dried product realized, viz., 30,000,000 pounds. The year 1895 was greatest in amount of canned product, which reached upwards of 360,000 cases, each containing two dozen two-and-one-half-pound cans. The shipment of fresh apricots out of California during the summer of 1897 was 177 car-loads.

The chief part of the apricot crop of California is grown in the interior valleys. In the low places in these valleys, however, the fruit is apt to be injured and sometimes almost wholly destroyed by spring frosts, although the trees make excellent growth. In foot-hill situations adjacent to these valleys there is also serious danger of frost above an elevation of about 1500 feet above sea-level, and the tree is rarely planted for commercial purposes. In southern California the apricot succeeds both in the coast and interior valleys. But along the coast northward, excepting the very important producing regions of the Alameda and Santa Clara valleys, eastward and southward from the Bay of San Francisco, the apricot is but little grown, owing to frost troubles. In respect to these the apricot is somewhat less subject to harm than the almond, but it is less hardy than the peach, and has, therefore, a much narrower range of adaptation. The average date of blooming of apricot varieties is about two weeks later than that of almonds.

The apricot is adapted to a wide range of soils, because to the rather heavy, moist loams which its own root tolerates it adds the lighter tastes of the peach root, upon which it is very largely propagated. However, attempts to carry the apricot upon heavier, moister soils by working it upon the plum root have not been very successful, owing to the dwarfing of the tree: and the movement towards the light, dry loams, by working upon the almond root, has failed because the attachment is insecure, and the trees are very apt to be snapped off at the joining, even though they may attain bearing age before the mishap occurs. The apricot root itself is a favorite morsel with rodents, and is for that reason not largely used. Our mainstay for the apricot, then, is the peach root, and the soils which this root enjoys in localities sufficiently frost free are, therefore, to a great extent, the measure of our apricot area.

Apricot trees are produced by budding on peach or apricot seedlings during their first summer's growth in the nursery row, from pits planted when the ground is moist and warm, at any time during the preceding winter. When there is a great demand for trees, planting in orchard is sometimes done with dormant buds, but ordinarily the trees are allowed to make one summer's growth in the nursery. The trees branch during the first year's growth from the bud, and usually

come to the planter with a good choice of low-starting branches from which to shape the low-headed tree, which is universally preferred. The method of securing such a tree is identical with that already described for the almond, but the treatment of the tree after reaching bearing age, in its third year, is very different from the after-treatment of the almond. The apricot is a rampant grower and most profuse bearer. Unless kept continually in check it will quickly rush out of reach, and will destroy its low shoots and spurs by the dense shade of its thick, beautiful foliage. There is continually necessary, then, a certain degree of thinning of the surplus shoots and shortening of the new growth to continue the system of low branching, to relieve the tree from an excess of bearing wood, and to avoid small fruit and exhaustion of the tree, resulting in alternate years of bearing.

In the coast regions, where the tree makes moderate wood growth, it can be kept in good form and bearing by regular winter pruning. In warmer regions, where the tendency is to exuberant wood growth, the main pruning is done in the summer, immediately after the fruit is gathered. This has a tendency to check wood growth and promote fruit bearing, and where the main cutting is done in the summer winter pruning is reduced to thinning out shoots, to prevent the tree from becoming too dense and to lessen the work of hand thinning of the fruit later on. In addition, however, to the most intelligent pruning, much fruit must be removed by hand when there is a heavy set of it, in order to bring the fruit to a size satisfactory to shippers or canners, and to reach the highest grades, if drying is practiced. California apricot orchards are all grown with clean tillage, for the main purpose of moisture conservation. In regions of good rainfall and sufficiently retentive loams no irrigation is required; good tillage will suffice for the production of large fruit and perfection of fruit-buds for the following year. As the trees are becoming older and bearing larger crops the demand for moisture increases, and the use of irrigation water is growing. In most places, however, one irrigation is sufficient, and that is given after fruit gathering, to carry the tree through the last half of its season's work. In the regularly irrigated regions of the state water is periodically applied through the growing season, in such amount and at such intervals as the local climate and soils require.

Though probably all the good varieties of the apricot in the world have been introduced into California during the last half century, and scores of selected seedlings of local origin have been widely tested, the varieties which have survived the tests and are now widely grown are comparatively few in number. Most of the rejected varieties met their fate because of shy bearing, and those which now constitute the bulk

of the crop are very regular and full bearers under rational treatment. A local seedling, the Pringle, was for many years chiefly grown for the earliest ripening, but this has recently been largely superseded by another local seedling, the Newcastle, which is of superior size and about as early. The European varieties, Large Early and Early Golden, are fine in a few localities where they bear well, and do better in southern California than elsewhere. The universal favorite is the Royal; probably three-fourths of all the trees in the state are of this variety, though recently the area of the Blenheim has been increasing largely. The Hemskirk stands next to the Blenheim in popularity. The Peach apricot is largely grown in the Sacramento valley.

The best apricot grown in California is the Moorpark; in size and lusciousness, when well ripened, it heads the list. It is, however, rather shy in bearing, and is forsaken for this fault in most regions. It shows the best behavior in the Santa Clara valley, and is there retained, in spite of frequent lapses, because of the high prices which it commands at the canneries. About a dozen other varieties are carried in small number by the nurserymen to meet limited local demands. Apricots for canning and drying are graded according to size: Extra, not less than two and one-fourth inches in diameter; No. 1, two inches; No. 2, one and one-half inches; No. 3, one inch. The first three grades must be sound, clean, and free from blemish, and No. 3 must be of good merchantable quality. The shippers and canners require well-colored but only firm-ripe fruit, because both the long rail transportation and the canning process require it; soft, ripe fruit will neither can nor carry. For drying, riper fruit is used, and yet overripeness has to be guarded against to avoid too dark color. For canning, the fruit must be carefully hand-picked; for drying, much is shaken from the trees.

The drying process consists in cutting the fruit in halves longitudinally, dropping out the pit and placing the halves, cavity uppermost, upon light wooden trays. Breaking or tearing the fruit open will not do; it must show clean-cut edges. When the trays are covered they are placed in a tight compartment, usually called a "sulphur box," though it may be of considerable size, and the fruit is exposed to the fumes of slowly burning sulphur, to insure its drying to the light golden color which is most acceptable to the trade. The production of the right color is the end in view, and different dryers regulate the amount of sulphur and the length of exposure according to the condition of their fruit and their judgment of what it needs. The exposure varies from half an hour to two or three hours, according to circumstances. After sulphuring, the trays are taken to open ground, and the fruit is cured in the sun. Only a very small

fraction of the California product of evaporated apricots is cured in an evaporator. It requires about six pounds of fresh apricots to make one pound of cured fruit.

A moderate estimate of the yield of apricots might be placèd at seven and one-half tons to the acre; extreme yields are far away from this both ways. The apricot is, as a rule, a very healthy tree in California. It is, however, subject to injury by scale-insects of the lecanium group in some parts of the state. During recent years there has been increasing injury by a shot-hole fungus, which perforates the leaves and makes ugly pustules upon the fruit. Such fruit is unfit for canning, except the fruit be peeled, which is little done as yet. It also makes low-grade dried product. This fungus can be repressed by fungicides of the copper class.

VARIETIES OF APRICOTS.

ALEXIS.—Large, yellow, red blush; subacid, rich and good. Does well in West. Ripens about July 15. Russian. (Thomas.)

ALEXANDER.—Large, oblong, orange yellow, spotted red; sweet, juicy. Early. Very good; prolific. Russian. (Thomas.)

BUDD, J. L.—Large, white, with fine red cheek; sweet, juicy. Very good. Ripens in August. Russian. (Thomas.)

EARLY GOLDEN (Dubois's Apricot).—Small, an inch and a fourth in diameter, round oval, nearly smooth; suture narrow, distinct; surface wholly pale orange; flesh orange, moderately juicy, sweet, good, free from the stone; kernel sweet. Early, or ten days before the Moorpark. Hardy, very productive, profitable for market. Origin, Dutchess county, New York. (Thomas.)

MOORPARK (Anson's, Dunmore's, Breda, Temple's).—Large, two inches in diameter, nearly round, slightly compressed; surface orange, with a deep orange-red cheek, and with numerous darker dots; flesh free from the stone, bright yellowish orange, rather firm, quite juicy, with a rich, high flavor; kernel bitter; stone perforate, or with a hole lengthwise under one edge, so that a pin may be thrust through. Season medium, or two weeks after midsummer. Requires the shortening-in pruning recommended for the peach. English. Old. (Thomas.)

HARRIS.—Medium, roundish oval, flattened, suture distinct; bright yellow, red cheek; juicy, good. Hardy, productive. Ripens middle of July to first of August. New York. (Thomas.)

ROYAL.—Rather large, round-oval, slightly compressed, suture shallow; dull yellow, faintly reddened to the sun; flesh pale orange, firm, juicy, sweet, high flavored, slightly subacid, free from the large, oval,

nearly impervious stone; kernel bitter. Ripens a week before Moorpark, smaller than the latter, and with a less bitter kernel. French. (Thomas.)

BREDA (Holland, Amande, Aveline).—Rather small, sometimes nearly medium (an inch and a half in diameter), roundish, obscurely four-sided, suture distinct; surface orange, with a dark reddish-orange cheek; flesh deep orange, free from the stone, rich, and high flavored; sweet kernel. Quite early, or a week or two after midsummer. Hardy for an apricot, and very productive. (Thomas.)

ST. AMBROISE.—Large, roundish, compressed, yellow, shaded dark orange. Prolific. Good. (Thomas.)

BERGETTI BLENHEIM.—Large, oval, surface orange; flesh deep yellow, juicy, rather rich; stone roundish, not perforate; kernel bitter. Inferior to Moorpark, but rather earlier. English. (Thomas.)

EUREKA.—Very early; large, fine; prolific.

APRICOTS.

Extracts from a paper by CHARLES E. BESSEY, Ph. D., Nebraska.

The apricot (*Prunus americana*) is a small tree, with a round, spreading top, and a reddish, cherry-like or peach-like bark; leaves smooth, thin, and bright green, ovate or round ovate, with a short point and sometimes a heart-shaped base, obtusely and finely serrate; flowers single, pink white, sessile, or nearly so; fruit globose, smooth, red or yellow, with the sweet, firm flesh nearly or quite free from the large, smooth, flat stone. Original distribution: Northern China, Mongolia, and Manchuria.

In writing about the apricot Professor Bailey says: "It is a prevalent notion that the apricot tree is too tender to be grown in New York state. It will surprise many to learn that the fruit is considerably grown in the state, there being one plantation of many hundred trees. The apricot is as hardy as the peach, and it thrives in the same localities and under the same general cultivation and treatment. There are three chief reasons, I think, why the apricot has remained in comparative obscurity in the horticulture of western New York: (1) Ignorance of the fruit; (2) loss of crop by spring frosts, because of the very early season of blooming of the apricot; (3) the fondness of the curculio for the fruit. To these may be added the fact that we have not yet arrived at an understanding of the best stocks upon which to bud the apricot." The common apricot is usually considered to be less hardy than the Russian kinds, but as to this there is some doubt, and it is very certain that the latter are not as desir-

able as the former. From all that I can learn of the varieties of the apricot, I am inclined to think that in southern Nebraska the common apricot may be grown in favored places, and that the Russian sorts may be grown somewhat further north.

BLACK APRICOT (*Prunus dasycarpa*). A small, round-topped tree, with much the habit of the common apricot; leaves thin, dull green, ovate, and more or less tapering at both ends, appressed serrate, hairy on the veins below; flowers large, white, solitary or in twos, short stalked; fruit globular, somewhat plum-like, hairy, on a short stem, dull dark purple, the red flesh sourish and clinging to the plum-like stone. Original distribution: Not certainly known, but probably in Manchuria. This fruit, which is known also as the Purple apricot, possesses but little merit, but is frequently spoken of in horticultural circles.

JAPANESE APRICOT (*Prunus mume*). A small tree, resembling the common apricot, but with a grayer or greener bark and duller foliage; leaves thickish, grayish green, generally narrower than the common apricot, and long-pointed, more or less hairy along the veins below; flowers single or in twos, white to rose color, sessile; fruit small, yellowish or greenish, the rather hard, dry flesh adhering to the pitted stone. Original distribution: Japan. Professor Bailey, in describing this species, says: "Recently introduced to this country. Its chief representative here is the Bungoume, or so-called Bungo plum. Other forms of this species are Hanahoume, Koume, Gold Dust and Chinese apricots." Of the first variety, he says: "The fruit is small and poor, and I do not see sufficient merit in it to make it worth growing." In Japan it is grown for ornamental purposes.

A KANSAS APRICOT.

By A. H. GRIESA, Lawrence, Kan.

The apricot is not generally grown as a profitable market fruit in this country, owing to its uncertain crop, caused partly by the frost injuring its early blossoms, wind-storms dropping its fruit, and the destructive effects of the curculio.

The Superb is a chance seedling, which was discovered on the grounds of the Kansas Home nursery, at Lawrence, Kan. [A. H. Griesa, proprietor], among hundreds of Russian seedlings; it being one that happened to have a good chance to produce its fine fruit in an out-of-the-way corner, and when found loaded with fruit was a surprise indeed.

It has been grown with the best the world affords, both native and

foreign. Compared with Early Golden, Moorpark, Alexander, Gibb, Budd, and others, it is larger, more hardy, more productive; a spreading tree; has fruited every year since 1890, and is now about sixteen years old.

The fruit is the largest size, except Acme or Shense, which never bore but a few samples. It is beautifully colored; the flesh is yellow, and when broken open is like sparkling crystals and the quality is unsurpassed; it is truly superb.

The trees in nursery row are quite distinct from other varieties—strong, well branched, and are one foot taller than other kinds at one year old. Stark Brothers thus speak of it: "Superb is a seedling from Lawrence, Kan., where we saw it two years in full fruit; has produced more fruit, of larger size, and better, most superb quality, than any other, native or foreign. It is a better and more constant bearer than any hundred others. Exhibited at the Western nursery-men's convention, where its exquisite quality, in comparison with several others, was conceded by all. Superb raises the average in quality and size of this excellent fruit; is worthy of extensive cultivation. Some Eastern firms would make money out of it."

Storrs & Harrison quote it as "A hardy seedling from Kansas. The best flavored, most productive, hardy apricot yet produced. Quality exquisite, medium size, light salmon color."

It was awarded a first-class certificate by that conservative body, the Massachusetts Horticultural Society, at Boston, in 1897.

It is a home production of which we can justly be proud, for it has had nothing but praise from all parts of the country where it has been tried. Every one can enjoy the delicious fruit of the apricot if he will take pains to ward off the attack of the curculio.

THE "SUPERB" APRICOT.*

From the Horticultural Visitor.

This is a Russian seedling, growing and fruiting among hundreds of others—the best the world affords, either native or foreign. Compared with E. Golden, Moorpark, Alexander, Gibb, Budd, and others, it is larger, more hardy and spreading tree, more productive; has fruited every year since 1890. The tree is about twelve years old. The fruit is the largest size, except Acme or Shense, which never had more than a few samples. It is beautifully colored; the flesh is yellow; when broken open it is like sparkling crystals, and the quality

*See plate on page 94.

is unsurpassed; it is truly superb. The trees in nursery row are strong, well branched, and are one foot taller than other kinds.

Others speak of it in high terms, as follows:

"Superb is a hardy seedling from Lawrence, Kan., where we saw it two years in full fruit; has produced more fruit, of larger size, and better—most superb quality—than any other, native or foreign. It is a better and more constant bearer than any hundred others. Exhibited at the Western nurserymen's convention, where its exquisite quality, in comparison with several others, was conceded by all. Superb raises the average in quality and size of this excellent fruit; is worthy of extensive cultivation."

The Superb was introduced a few years since by a well-known Kansas nurseryman who has not pushed it out into the public view as it should have been, for it certainly is a splendid fruit, a heavy bearer, and an apricot that can be grown to perfection. The price is nominal for such a new and splendid fruit. The gentleman who originated the Kansas raspberry, A. H. Griesa, Lawrence, Kan., also did the Superb apricot. Knowing it to be a good thing we have been growing a few, and now have some to sell. They bear young. Try a few.

IRRIGATED FRUIT IN CURING.

In a paper read before the Southern California Pomological Society, at Riverside, J. H. Reed, speaking on irrigation matters, said (in part): It is claimed that there is a larger percentage of shrinkage in drying irrigated fruit, and I must confess this was my own supposition till my experience convinced me otherwise. You perhaps will pardon reference to this experience, as it seems to the point. Our first apricot orchard was interplanted among young lemons. The lemons were to make the permanent orchard, and all treatment was especially with reference to them. We had plenty of water and applied it generously throughout the year, except when winter rains made it unnecessary. The season after the 'cots had been planted two years we took from twenty-five to seventy-five pounds of extra fine fruit per tree. The next season, third year, they returned from 100 to 300 pounds per tree. The present year, the fourth, they promise double these amounts. So much for quantity.

The first season we kept careful account of results in drying, as we were drying for other parties apricots grown without irrigation. Very much to my surprise, we found that of the unirrigated it had taken 5.6 pounds of green fruit to make one of dried, while of our irrigated apricots it had taken but 4.9. A little thought should have

relieved us of our surprise. The water taken up by the roots does not pass direct to the fruit, but goes to the leaves, where its food contents are fitted for the fruit and wood growth and the surplus of water goes into the air.

In the rapid growth of the young tree and early fruitage irrigation is an important advantage. Our irrigated trees had produced more fruit at three and one-half years from planting than trees in the neighborhood without irrigation had in twice the time.

APRICOT PITTER AND SPREADER.

Machinery is being gradually introduced into all the varied operations in canning and curing fruits. It is first, perhaps, a factor of economical handling, but only second to this is the cleanliness which it implies. Among the latest contributions in this direction is an apricot-pitting machine worked out by S. W. Guiberson, of Fillmore, Ventura county. Mr. Guiberson has been experimenting on the machine for three years and has built two which were not entirely satisfactory in results. A third has been completed, too late for the crop of 1898, though it was given a trial, which demonstrated that it was a much greater success than anything hitherto designed for the purpose. The gentleman mentioned, in a letter to the editor of *California Fruit Grower*, says: "My pitting and spreading machine is, I think, a success. I did not get it completed in time for this year's apricot crop, except to give it a trial at the end of the season. It took out ninety-five per cent. of the pits and spread the apricots correctly on the trays. It cuts a sufficient number of apricots to cover a tray full at one stroke and spreads them right side up on the tray in one minute, the tray being 8x3 feet in size. To cut them the proper way for drying they have to be placed in the machine by hand, and this requires three hands and three minutes' time per tray. I claim that three men can cut and load on cars for sulphuring about 150 boxes of apricots a day of twelve hours, and the machine does the work as neatly as by hand pitters."

APRICOT PITS.

The cream of tartar works at Napa has contracted for 400 or 500 tons of apricot pits, which are being crushed in that city and the kernels extracted and dried. Thus prepared, they are shipped to a San Francisco firm and made to yield up their contents of oil, known to the trade and to chemists as almond oil.

BROWN APRICOT SCALE.

At a recent meeting of the horticultural society of Sonoma county, California, a member called attention to the fact that shippers and commission men had decided not to handle any more infested fresh fruit, and referred to the necessity for spraying and discouraging parasites. Speaking of the brown apricot scale, he said very emphatically that it could easily have been checked when first noticed here five years ago, but now it would take a great deal of united and well-sustained work to prevent it from becoming a greater nuisance. Another member mentioned the difficulty of getting men to spray even when the farmers' homes contained papers and horticultural reports that gave the formulæ of the best sprays and full directions for their use. The average fruit-grower, said the gentleman, was too lazy or indifferent to perform the manual labor necessary to rid his orchard of the pests that not only cut down his chance for a profit, but his neighbors' as well.

AUSTRALIAN APRICOTS.

Large crops of apricots have been gathered by orchardists this season in this district, says the *Northern Argus*, Australia. The sample has been a uniformly good one, and markets have been easily obtained. Amongst the largest and best of the sort we have seen is a fine sample grown by Mr. C. H. Beaumont, of Penwortham. The fruit is of unusually large size, as will be seen from the fact that some of the apricots weighed five ounces and measured eight inches around. Any nine weighed two pounds, while fifty apricots taken from one case weighed twelve pounds. Mr. Beaumont has 106 trees six years old, from which was picked nearly 7000 pounds of fruit.

SOME KANSAS EXPERIENCE.

The following individual reports from Kansas fruit-growers convey lots of good ideas on apricot culture :

Ebert Simon, Welda, Anderson county.—I have one apricot tree in bearing, which is prolific every other year; the frost does not catch it in the spring; the fruit is in demand at home for canning and preserving.

C. A. Blackmore, Sharon, Barber county.—Moorpark did the best with me last season; it bore a full crop of very large fruit. Early Golden and Common apricot bore some. Alexis, Alexander, J. L. Budd, Shensi and Superb are too young to bear with me. In planting the foregoing trees I set them in red soil,

two to four inches deeper than they grew in the nursery. In sandy soil I set from four to eight inches deeper than they grew in the nursery. I always cut the trees back when setting, and use a good rammer; it is easier and better than tramping with your feet; if the soil is dry pour two or three gallons of water in the hole when half filled with earth, and when the water has settled away fill up and tramp slightly. I do not plant trees of one variety in blocks; I plant a row of one kind, and then a row of a different kind, and so on, being careful to plant sorts that bloom at the same date. I submit the following as a partial guide, according to my observations: Early Golden and Moorpark, first bloom appears April 11; in full bloom April 15; have fallen by May 22.

J. R. Dunkin, Sharon, Barber county.—The apricot is one of the most loved of fruits that is grown in the orchards and is relished either off of the tree, raw, or served on the table; take them dried or canned, and they are sought after, but are tricky, being so often killed in the bloom, or even after the fruit is set. The tree does n't seem hardy enough to be profitable, and is easy to kill above the ground and below the forks. I have lost over fifty per cent. of my trees that way; the bark, or inner bark or sap-wood, dies from the limbs to the ground, while the tree holds its foliage green for some time, but the sap-wood is dead, black and rotten to the ground. They usually sprout up again, but are of little value. I have almost become discouraged with them and about discarded them. The fruit finds a ready sale, as a rule, at a good price, but I can't say I favor planting them for profit. The varieties generally grown here are Alexis, Alexander, Budd, Moor Park, and Early Golden. There will be a good crop this year, but there are too many failures to recommend planting more than a few trees for variety.

A. S. Huff, Enon, Barber county.—Apricots are shy bearers in this valley. I had good crops for nine years. It is a fine, rich fruit, and commands an extra good price; we cannot raise enough, I know of no other fruit that is as ready sale as the apricot. It seems that there are more people that will buy the fruit than any other kind that grows.

E. T. Daniels, Kiowa, Barber county.—I have one Moorpark apricot tree which bears about every other year and it is never troubled with insects; I would advise new beginners to plant this variety; would plant it for both home and market.

W. G. Osborne, Medicine Lodge, Barber county.—I have eleven large, prolific apricot trees, the fruit of which is not sweet; they are in scattered plantings; they get frosted half the time; we use the fruit in the family; it is in demand, and I think pays. No insect troubles them. I would advise a new beginner to set out an orchard of them and cultivate well.

George T. Elliott, Great Bend, Barton county.—I have fifteen large, sweet, bearing apricot trees; they are prolific in favorable seasons; they are Early Golden and Russian varieties. They are planted in a row in my orchard; they often get frosted in the spring. Sell the fruit to my neighbors; it is in demand, but does not pay. Insects do not trouble them much. Would advise a new beginner to plant only for family use, as they get frosted so often. April 10, 1900, our trees were in full bloom, when we had a snow-storm, and we will have no fruit this season.

George Ettridge, Roberts, Barton county.—I have but five apricot trees. The Russian stand sixteen feet apart each way; set them out and trim the same as other trees. The tree is hardy; makes a fast growth; is lovely when in full leaf. They are five years old and about ten feet high, with spreading limbs; never get any fruit off them, they bloom so early in the spring the frost always catches them. If the ground freezes hard next winter, I am going to mulch heavily with old hay or straw when it is frozen up and see if that will hold them back in the spring. It used to be practiced in Illinois on apple trees and it was claimed to have held the bloom back two weeks. That is, the mulched trees bloomed two weeks later than those not mulched.

F. S. C. Garrison, El Dorado, Butler county.—I have seven large Moorpark apricot trees in bearing, but they are not prolific. They are planted in an orchard. They often get frosted in the spring. Sell the fruit in El Dorado, but it is not in demand. It does not pay. They are troubled by the curculio, for which I spray. Would not advise a new beginner to grow apricots.

A. D. Arnold, Longford, Clay county.—I have twelve large, sweet Russian apricot trees now in bearing; they are not prolific. They are planted in an orchard; often get frosted. The fruit is in demand, but does not pay; I have none to speak of. Are troubled with the curculio; we do nothing for them. I would advise against them.

Mrs. E. O. Beavers, Ottumwa, Coffey county.—Have twelve large Russian apricot trees, just coming into bearing, planted in a cluster; they nearly always get frosted in the spring. Will use the fruit at home. It is in demand, and I think it would pay if we could grow them. Insects do not trouble them.

James Dunlap, Detroit, Dickinson county.—I have about twenty-five Russian seedling apricots now in bearing; some are large; they are very prolific and have borne nearly full crops five times in seven years; some of them are quite sweet. I grow them in an orchard about twenty feet apart; they have been frosted only once before this spring. I sell and can the fruit; it is in demand at one dollar per bushel; they have paid me well; others are not successful; the fruit is troubled with a worm similar to curculio of plum or peach; have done nothing to prevent them. To a new beginner I would advise planting about as many trees as I have, as they are profitable, but would not advise planting a large orchard. My advice is to plant a few, by all means.

J. P. Emery, Cimarron, Gray county.—I have twenty Alexander apricot trees; been planted five years; are large enough to bear; have blossomed two years; but were killed by the late freeze; they are planted in an orchard; the fruit is in demand. I would advise the planting of apricots.

John Bailey, Harper, Harper county.—Have about three apricot trees now in bearing; the rest were killed during the cold winter of 1898 and 1899: do not remember the names of the varieties I am growing. Some of them are large; part of the trees are ten inches in diameter. They are prolific when they do well; some of them are sweet. I plant them in rows. They often get frosted in the spring; I sell the fruit in Harper. It is in demand, but it does not pay. Spray for the insects. I would advise a new beginner to get some late variety that is hardy and will not winter-kill.

C. A. Seaman, Sedgwick, Harvey county.—I have no apricot trees, but the fruit is in demand; they are freer from insects than most fruits. Most all kinds do well here.

F. L. Osborne, Soldier, Jackson county.—I have seventy-five large, sweet, prolific apricot trees in bearing, all named varieties; have them planted in orchard; they do not get frosted in the spring. We find a ready sale for the fruit, as it is in demand, but it does not pay. It is troubled with the codling-moth [?], for which we spray with Paris green. I would advise against the planting of it.

J. W. Williams, Holton, Jackson county.—I have one unnamed apricot tree bearing. It is not large nor prolific. Do not know whether it is sweet or not. They nearly always get frosted. The fruit is in demand, but I have had none to sell. They are troubled with the curculio. We do nothing for them. Some have had good success when planted in orchard.

J. C. Beckley, Spring Hill, Johnson county.—Have three Russian and Golden apricot trees not yet in bearing. Older ones were killed by freeze in 1898 and 1899. They were prolific. Seldom get frosted in the spring. Sell what fruit we can't use at home: it is in demand, and would pay were it not for the insects. The curculio troubles the fruit, for which we do nothing. I would advise a new beginner to plant the Russian and Golden varieties, and go slow.

C. H. Longstreth, Lakin, Kearny county.—Have 250 Russian apricot trees of bearing age but will not fruit this season; the fruit is all large when the trees do not overbear; all are prolific when the season is favorable, but a full crop cannot be depended on oftener than one year in five. My trees are planted in an orchard. They often get frosted in the spring. Sell the fruit at home as a rule. The fruit is in demand but it does not pay. It is troubled with no insects. Would advise new beginners to plant it only as a shade or ornamental tree, they are useless as a fruit-tree, but very good for shade.

N. Sanford, Oswego, Labette county.—I have grown apricots but have none in bearing; they are not profitable. My trees were planted scattering, and not in an orchard; they get frosted often, and there is no demand for the fruit; it does not pay; would advise against planting the apricot.

D. E. Bradstreet, Dighton, Lane county.—I have a few fairly large apricot trees, planted scattering. The buds often get frosted in the spring; the fruit is not much in demand, and we use it at home; it does not pay. No insects trouble them. Would not advise a new beginner to plant apricots.

D. C. Overly, Hartford, Lyon county.—Has 400 apricot trees of Superb [a Kansas variety, see p. 94] and Sunrise varieties. He says the whole secret of growing apricots is in cultivation and spraying. He says: "I can raise as fine apricots as California and receive as good prices." "I gather and pack in half-peck baskets, six dozen in each basket, with tissue paper between the layers. They retail at ten cents per dozen, netting me six dollars per bushel; the demand is great and cannot yet be satisfied." "Plant only Sunrise and Superb, I would not advise the Russian." "If you do not spray well, you will fail." He plants 15 x 20 feet. What more is desired to urge the growth of this choice fruit.

James McNicol, Lost Springs, Marion county.—I have 200 apricot trees now in bearing, they are large and prolific, but are not sweet. Am growing them in an orchard; they get frosted about half the time; I sell the fruit and seed; it is in demand, but is not a favorite; it pays. The curculio trouble them, but I do nothing for them.

O. W. Heckethorne, McPherson, McPherson county.—I have ten Russian apricot trees in bearing; they were killed in bloom by frost this spring; some are large and sweet, but they are not prolific. They are in scattered plantings. They are in demand, but we use ours at home; they do not pay. Worms trouble them, but we do nothing for them.

J. T. Barnes, Beloit, Mitchell county.—I have twenty-eight apricot trees; twelve of them are in bearing; they are J. L. Budd, Catherine, and an American variety, name not known; they are all named varieties excepting two trees. The American and Russian are large and are quite prolific when they set a crop; the Catharine and American are sweet. Have some planted in a row and the balance scattered in the orchard. They get frosted sometimes; were killed this spring by the freeze in April. The fruit is in demand, and pays when we have a crop; we can and use ours on the table. Are not much troubled with insects. I would advise a new beginner to plant the J. L. Budd, Alexis, Alexander, and Catherine in rows twenty feet apart each way.

W. B. Stockard, Beloit, Mitchell county.—I have eight large, sweet, prolific apricot trees now in bearing, in scattered planting; the frost does not catch them in the spring; the fruit is in demand; I think it pays. They are troubled with the curculio, but we do nothing for them. Apricots are just as hardy as peaches; the only difference is in the early blooming; had them bearing when peach was killed. There is no finer fruit for canning, drying, and eating out of the hand. I believe if they were budded on Mariana plum they would be hardier than any peach."

John E. Sample, Beman, Morris county.—I have about twenty large, prolific apricot trees now in bearing; the grafted ones are sweet; they are in scattered planting. Often get frosted in the spring; use the fruit at home, but it is in demand, and it pays. Curculio troubles them, for which we use slaked lime in the morning while the dew is on the trees, by throwing it into the air. I would advise a new beginner to plant pits by the thousand. Would not advise against planting apricots. [Who else has tried air-slaked lime as a dust spray for curculio? SEC.]

James Sharp, Parkerville, Morris county.—I have about 100 apricot trees now in bearing; they are all named varieties excepting one which is very large; have one large one which was grown from California seed; it ripens the 4th of July; is a perfect freestone. They are very prolific and sweet. Have grown them in orchard and scattered; they do not often get frosted. Sell them in Herington; they are in demand, especially the large one, and I am planting it largely; they pay. They are troubled with curculio, but I do nothing for them. I would advise a new beginner to plant large varieties, the same as peach trees.

V. E. Hathaway, Council Grove, Morris county.—I have five or six medium-sized bearing apricot trees. They are Moorpark or the so-called Russian varie-

ties. They are sweet and ordinarily prolific in a scattered planting; they often get frosted in the spring. The fruit is in demand but we eat some and can the balance while fresh. It does not pay; the curculio troubles them, for which we do nothing. I would advise a new beginner to try a few apricots.

H. L. Ferris, Osage City, Osage county.—I have ten large, sweet, prolific apricot trees in bearing; they are named varieties; planted together; they do not get frosted in the spring. Sell the fruit in Osage City; it is in demand, and it paid until a year ago, when it was killed by the cold winter. They are troubled with curculio, for which I do nothing. I would advise a new beginner to plant mostly Moorpark, fifteen feet apart. I am planting again; sold all I could raise at thirty-five cents per peck.

C. D. Martindale, Scranton, Osage county.—I have five apricot trees now in bearing; they are eighteen to twenty feet tall; the varieties are Russian and Early Golden; no sweet ones; they were prolific when young; are in scattered plantings; have been frosted two or three times. We use the fruit at home, and sell the surplus; it is in demand, but does not pay. I would advise a new beginner to plant Early Golden, Robinson, and Moorpark, but would not advise any one to plant on a large scale, as the trees do not do well after eight or nine years.

Howard Morton, Tescott, Ottawa county.—I had eight Russian apricot trees, but they are all dead now; they were large, but never bore a full crop. I grew them in orchard rows; they often got frosted in the spring. They were troubled with the curculio; sprayed for them, but it was not well done. Would not advise the planting of apricots.

F. T. M. Dutcher, Phillipsburg, Phillips county.—I have about nine apricot trees now in bearing. They are about six inches in diameter and not very prolific; none of them are sweet. Grow them in rows; often get frosted in the spring. Use the fruit in the family; it would be in demand if we had any to sell; does not pay. Have never been troubled with insects; I spray. Would advise against them.

John Hinds, Olcott, Reno county.—I have a few apricot trees, but they do n't do well here, as the frost gets them at blooming time.

H. C. Hodgson, Little River, Rice county.—I have fifteen apricot trees now in bearing. They are the Russian and not named, not prolific nor sweet; have them among apple trees. They often get frosted in the spring. Use the fruit in the family. They are troubled with the codling-moth, for which I have sprayed. I would advise against planting them.

D. M. Adams, Rome, Sumner county.—I have two sweet, prolific apricot trees in bearing; they are ten feet high; but they are not sweet. The fruit is in demand, but we use it at home. They often get frosted in the spring; they do not pay in a commercial way; no insects trouble them.

M. E. Wells, Smith Center, Smith county.—I have six bearing apricot trees. The apricots are the size of a small peach and about as sweet, and are prolific in favorable seasons. They are planted scatteringly and get frosted about half the

time. The fruit is in demand and I think it pays; they are troubled with no insects. The apricot is as sure a crop here as the peach; would set them twenty feet apart.

C. H. Taylor, Eskridge, Wabaunsee county.—I have twenty-five sweet, prolific, medium-sized apricot trees now in bearing: they are planted scatteringly: seldom get frosted in the spring. Use all the fruit we can and sell the balance in the local market; it is in demand, and pays. The same insects trouble it that trouble the peach; I destroy the windfalls and spray to prevent them. I would advise a new beginner to plant 10x20 feet apart and cultivate thoroughly, separate from peach.

Alexander Spiers, Linn, Washington county.—I have five unnamed apricot trees in scattered planting; they often get frosted in the spring. The fruit is not in demand; it does not pay. They are troubled with no insect.

APRICOTS FOR THE TABLE.

We append here a few good recipes for preparing apricots for table use:

Canned Apricots.—One pound of sugar, four pounds of apricots, one quart of water. Take fine ripe apricots, pare, core, and throw them into cold water. When you have sufficient to fill one or two jars, lift them carefully from the water, weigh, and put them in a porcelain-lined kettle; cover with boiling water, bring quickly to the boiling-point, and then stand them over a moderate fire, where they will scarcely bubble, until tender. While they are cooking, put the sugar and water into another kettle, stir with a wooden spoon until the sugar is thoroughly dissolved, then with a skimmer lift the apricots from the water, drain a moment, then slide carefully into the boiling syrup; continue until the bottom of the kettle is covered; boil until the apricots are sufficiently tender to admit a straw, then lift them carefully one at a time into the jar, and seal. (Mrs. Rorer, in "Canning and Preserving.")

Preserved Apricots.—Pare, cut into halves, and remove the stone. Weigh, and to each pound of apricots allow one pound of sugar and half a dozen apricot kernels. Put a layer of the apricots in a bowl or jar, then a layer of sugar, then a layer of apricots, then a layer of sugar, and so on until all is used. Cover and stand aside over night, add the kernels, and bring quickly to a boil: then simmer until the apricots are tender and clear. Lift carefully, one at a time, and put in glass jars or tumblers. Stand aside to cool, pour over the syrup, and tie up. Nectarines may be preserved in the same way. (Mrs. Rorer, in "Canning and Preserving.")

Apricot Marmalade.—Rub the apricots, to remove the fuzz, but do not pare them. Cut in halves, remove the stone, and to every pound of apricots allow a half-pound of sugar. Put the apricots in a porcelain-lined kettle, add sufficient water to cover the bottom; cover, and heat slowly to boiling-point; then stir, and mash until fine; add the sugar and three or four kernels, blanched and pounded to a paste, to every quart of marmalade. Boil and stir continually for fifteen minutes, then stand over a moderate fire, and cook slowly twenty minutes longer.

Stir occasionally, that it may not scorch. Put away in stone jars. Plum marmalade may be made in the same way. (Mrs. Rorer, in "Canning and Preserving.")

Compote of Green Apricots.—Wipe the down from a pound of quite young apricots, and stew them very gently for nearly twenty minutes in a syrup made with eight ounces of sugar and three-fourths of a pound of water, boiling together the usual time. (Mrs. Hale.)

Drying Apricots.—Allow the fruit to be as well ripened as possible without being mushy. Cut the fruit clean in halves, not half cut and half break. Get the trays in the sulphur box as soon as possible after spreading, or spray or sprinkle them a little before putting in. Expose to sulphur fumes an hour or more, the object being to keep the cured fruit the same color as the natural, fresh-cut fruit. Apricots blacken in drying unless sulphured. When nearly dry the trays may be stacked and the curing continued in the shade. There are fruit graders which grade the cured fruit very accurately, except that slabs and discolored pieces must be thrown out by hand.

Apricots make good pies.

Dried apricots are good simply stewed and sweetened.

NECTARINES.

We have been able to find but few nectarine growers in Kansas, and the few quoted do not speak very encouragingly of its value. Personally we believe it susceptible of profitable culture to add to the variety of home fruits. Possibly some of our horticulturists will take it in hand and produce varieties suited to our state. It ought to be as good as the peach, and freedom from fuzz, velvet or down must surely be a pleasing and valuable characteristic. If it is simply a "peach with a smooth skin," then why is it not as worthy as a "peach with a fuzzy skin"?

Downing mentions thirty-one distinct varieties.

DEFINITIONS.

Century Dictionary: Sweet or delicious as nectar. A variety of the common peach, from which its fruit differs only in having a rind devoid of down and a firmer pulp. Both fruits are sometimes found growing on the same tree.

Standard Dictionary: A smooth-skinned variety of peach. Spanish nectarine, the plum-like fruit of the West Indian tree, *Chryso-balanus icaco*; also called cocoa plum. It is made into a sweet conserve which is largely exported from Cuba.

THE NECTARINE.

From Downing's "Fruit and Fruit-trees of America."

The nectarine (*Persica vulgaris*) is only a variety of the peach with a smooth skin (*Pêche lisse*, or Brugnion, of the French) in its growth, habit, and tree. The fruit, however, is rather smaller, perfectly smooth, without down, and is one of the most wax-like and exquisite of all productions for the dessert. In flavor it is perhaps scarcely so rich as the finest peach, but it has more piquancy, partaking of the noyau or peach-leaf flavor. The nectarine is known in northern India, where it is called *moondla aroo* (smooth peach.) It

appears to be only a distinct, accidental variety of the peach, and this rendered quite certain since there are several well-known examples on record of both peaches and nectarines having been produced on the same branch—thus showing a disposition to return to the natural form. Nectarines, however, usually produce nectarines again on sowing the seeds; but they also occasionally produce peaches. The Boston nectarine originated from a peach-stone. The nectarine appears a little more shy of bearing in this country than the peach, but this arises almost always from the destruction of the crop of fruit by the curculio, the destroyer of all smooth-skinned stone fruit in sandy soil. It is quite hardy here wherever the peach will thrive, though it will not generally bear large and fine fruit unless the branches are shortened in annually. With this easy system of pruning, good crops are readily obtained wherever the curculio is not very prevalent. The culture of the nectarine is in all respects precisely similar to that of the peach, and its habits are also completely the same.

Thomas's "American Fruit Culturist" says: "The nectarine being nothing more than the peach with a glossy skin, the same rules for cultivation will apply equally to both, with the exception that, as its smooth surface renders it eminently liable to the attack of the curculio, special attention must be given to the destruction of this insect. The nectarine is usually inferior, and has more of the noyau flavor than the peach, and the shoots are of smoother and more compact growth." Then follow descriptions of freestones, pale flesh, six varieties: freestones, deep yellow flesh, three varieties: clingstones, pale flesh, two varieties; clingstones, yellow flesh, one variety.

James Alexander Fulton, who wrote a standard work on "The Peach," says: "There is abundant evidence that the nectarine is a mere accidental production of the peach. The general characteristics are identical, while the difference is but slight, and consists principally in the presence or absence of the pubescence on the skin. The nectarine, both in tree and fruit, is not so vigorous, hardy or durable as the peach; it is more easily affected by disease and the attacks of insects; sheds its fruit more easily, and oftener fails to produce a crop."

WHITE NECTARINES.

Regarding the nectarine, a fruit that is not near so highly appreciated in this country as it is in Europe, the Hanford (Cal.) *Sentinel*, two or three weeks ago, said: After a successful run of about two solid weeks' picking, cutting and drying white nectarines, A. W. Lane, whose ranch is near Grangeville, reports that he has cleaned up and sold his crop, and that the same has netted him \$150 an acre.

Mr. Lane is one of the most intelligent of our orchardists, and runs his place on practical plans. He is perhaps the largest grower of white nectarines in the valley. He states that the nectarine is a more sure bearer than the peach, apricot, or prune, and is more profitable from the fact that the nectarine resists the early frost better, requires less pruning, and holds a larger weight of fruit without breaking down.

The cost of putting the cured white nectarine in the market is about thirty-five dollars per ton, or about the same per ton as apricots; and nectarines dry away about five to one, or a little less than some peaches.

SOME KANSAS EXPERIENCES.

C. A. Blackmore, Sharon, Barber county.—Nectarines seem to be too tender in fruit-bud to escape the [spring] frost, although they bear some every year.

J. R. Dunkin, Sharon, Barber county.—The nectarine has n't been planted to any great extent here yet—only a few trees here and there; they seem to do well in this vicinity. Some think they are not profitable; others think they are. Can't say what their future popularity may be, but think they should be more extensively planted. I favor giving all kinds of fruit a fair and impartial trial, to test their qualities, and give them our favor.

S. F. C. Garrison, El Dorado, Butler county.—I had a few nectarine trees, but they are now all dead; they were not prolific; they got frosted often in the spring. We did not use the fruit; there was no demand for it. The curculio troubled them. Would not advise a beginner to try nectarines in this locality.

John Bailey, Harper, Harper county.—Have grown nectarine trees in scattered plantings, but have none now in bearing; all are dead. Would not advise any one to plant them.

J. C. Beckley, Spring Hill, Johnson county.—Have one nectarine tree, which is not very prolific; they get frosted about as often as peaches do. Use the fruit at home; have never sold any; don't think it would pay. They are troubled with the curculio, but we do nothing for it.

C. H. Longstreth, Lakin, Kearny county.—I have three nectarine trees, not bearing; they are named varieties; they often get frosted in the spring. Do nothing with the fruit; it is troubled with no insects. Would advise new beginners to let the nectarine alone.

James McNicol, Lost Springs, Marion county.—Has grown nectarines on the same principle as peaches, but thinks the peach far preferable, as it is not so liable to be stung by the curculio.

James Sharp, Parkerville, Morris county.—Has three nectarine trees now in bearing; they are not very large; he does not know the names of them; they are about as prolific as the peach. Do not get frosted in the spring; uses the fruit at home; does not pay. They are troubled with the curculio; he does nothing for them. Would not advise any one to plant it.

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