

BULLETIN No. 85.

AUGUST, 1897.

ALABAMA

Agricultural Experiment Station

OF THE

AGRICULTURAL AND MECHANICAL COLLEGE,

AUBURN.

JAPANESE PLUMS.

F. S. EARLE, Horticulturist.

MONTGOMERY, ALA.:
THE BROWN PRINTING COMPANY, PRINTERS
1897.

COMMITTEE OF TRUSTEES ON EXPERIMENT STATION.

I. F. CULVER.....Union Springs.
J. G. GILCHRIST.....Hope Hull.
H. CLAY ARMSTRONG.....Auburn.

STATION COUNCIL.

WM. LEROY BROWN.....President.
P. H. MELL.....Botanist.
B. B. ROSS.....Chemist.
C. A. CARY, D. V. M.....Veterinarian.
J. F. DUGGAR.....Agriculturist.
F. S. EARLE.....Biologist and Horticulturist.
C. F. BAKER.....Entomologist.
J. T. ANDERSON.....Associate Chemist.

ASSISTANTS.

C. L. HARE.....First Assistant Chemist.
R. G. WILLIAMS.....Second Assistant Chemist.
T. U. CULVER.....Superintendent of Farm.

The Bulletins of this Station will be sent free to any citizen of the State on application to the Agricultural Experiment Station, Auburn, Alabama.

JAPANESE PLUMS.

No fruits of recent introduction have attracted wider attention and none promise to be more generally useful than the different varieties of Japanese plums. Like most fruits and ornamental plants that come to us from Japan they thrive in all parts of this state, and seem destined here to supersede the plums of native origin. The European varieties of plums do not as a rule do well in the South. The trees are not adapted to the climate and the fruit is so susceptible to the attacks of the curculio and of the brown rot that it seldom reaches maturity.

The Japanese plums are referred botanically to *Prunus triflora*, a species that is not now known in the wild state, but is supposed to have come originally from China.* As a class the trees are strong upright growers when young, but they bear so heavily that growth is usually very moderate in older trees. They come into bearing very early, often showing some fruit at one year from planting, and setting full crops at two and three years. A decided tendency to over bear may be considered one of their greatest faults. Some varieties bloom very early in the spring and are consequently liable to danger from frost; but others bloom with peaches or later and full crops may be expected as often as from the later fruit. In fact this season's experience shows that they are less affected by unfavorable weather at blooming time, since all the Japanese plums in this region were loaded, while the peach crop was very light, owing to the blasting of the flowers caused by warm foggy weather in the spring.

The fruit keeps and ships remarkably well. It will average nearly as large as that of the European varieties, the colors are if anything even brighter and more attractive,

*For the history of the introduction of these plums and for the best general account of them see Bulletins 62 and 106 of the Cornell University Agr. Exp. Station, by L. H. Bailey.

and the quality is good enough to satisfy the most fastidious. While they are subject to the attacks of the curculio and the rot they probably suffer no more from these causes than the inferior native kinds.

With so many points in their favor it is no wonder that the Japanese plums are attracting wide attention and are being largely planted both for market and for home use.

PROPAGATION.

These plums are now usually budded on stocks of the Marianna plum grown from cuttings. Formerly they were often budded on peach stocks but the Marianna root proves to resist borers, and unfavorable soil conditions, better than the peach, and it promotes a stronger growth. Budding on the native Chickasaw stock is not to be recommended as the roots sucker so badly as to be a perpetual nuisance in the orchard.

While the Marianna seems admirably adapted as a stock for these plums, it has proved a disastrous failure as a stock for the peach. This was tried extensively in a neighboring state a few years ago. A number of large orchards were planted with peach trees on Marianna roots. They grew well for the first year or two but the union was not perfect and they uniformly became dwarfed, short lived and unproductive. In no case have profitable crops been harvested from these orchards.

Well grown stocks may be budded in June, in which case the bud will start into growth the same season, and the trees may be planted the following winter. Such trees are known to the trade as "June buds." Though of small size they grow rapidly and usually make fine trees. It is more usual to defer budding till August. Buds set at this season do not as a rule begin to grow till the following spring, and hence are referred to as "dormant buds." Good orchards can be grown by planting these "dormant buds" but it requires more care and attention than planters are usually willing to give. The ordinary custom is to allow them to grow in the nursery row for another year. They are now

known as "one year olds" and it is such trees that are recommended for general planting. A "two year old" Japan plum if well grown is too large to be conveniently or cheaply handled, and if not well grown they should certainly be rejected.

SELECTION AND PREPARATION OF SOILS.

These plums will grow fairly well on almost any well drained soil. Wet, seepy, or sour lands should always be avoided. The trees will, as a rule, be longer lived and healthier on clay than on sandy soils, though a sandy top soil underlaid by a good red clay subsoil is usually a favorable location. Hill tops are to be preferred to low lands on account of greater freedom from spring frosts, and from diseases. Except where soils are naturally very poor, old somewhat worn land is preferable to new land. Rich new soils will produce too rank a wood growth, and induce rotting of the fruit.

The land should be cleared of all stumps or other obstructions, and during the fall should be deeply plowed and well harrowed. When ready to plant lay off the rows with a turning plow, running several times in the same place so as to throw out as deep a furrow as possible. This will save most of the labor of digging holes.

If the land is level enough* to admit of making the trees row both ways, mark the cross rows by dragging a heavy log chain, while walking to guide stakes set at the ends and middle of the field. If the ground is in good fine order the chain will leave a mark that can be plainly seen, and with a little practice a careful man can lay off rows in this way rapidly and accurately.

PLANTING.

The trees should now be brought to the field and be heeled in at convenient intervals so as to be quickly acces-

*It is not advised to plant commercial orchards on lands so rolling as to require terracing. For further discussion of orchard soils see Bulletin 79, pp. 89-90.

sible to the planters. The planting crew will consist of two to three men according to the condition of the soil. If soft and in good condition one man can handle the dirt fast enough for the planter. In hard rough soils he will need two shovelers. The planter should be a careful man with some experience and plenty of good sense; and he should be made responsible for the work of the shovelers. The planter takes a small bundle of trees with him (not over a dozen should be exposed to the air at one time) and with a sharp pruning knife clips off the ends of the larger roots leaving stubs four to eight inches long. This is partly for convenience in planting, and partly because these old roots will be of but little use to the tree except as an anchor to hold it fast in the ground. These old roots have lost their power of rapidly absorbing water and dissolved plant food from the soil. This is only done by the new growth of soft white rootlets, that will push out all the more rapidly and abundantly for having part of the old ones cut away. As the planter cuts back the roots of the tree the shoveler throws out the dirt from the bottom of the furrow at the point where it is crossed by the chain mark. The planter now sets the tree in place, noticing first if the hole is the right depth to leave the tree standing a half inch or so lower than it did in the nursery row. He then sights both ways quickly to see that the tree is in the proper position, and, at the word, the shoveler fills in small shovels full of fine dirt, which the planter packs closely about the roots by tramping it with his feet. This is one of the most important parts of the operation, and the future growth of the tree will depend largely on having the dirt brought in close contact with all parts of the roots, and so packed down that it will not settle away and leave air spaces about them. No clods, rocks or sods should be allowed to go in the hole near the roots, as they prevent the proper packing of the soil. When the soil is mounded about the tree a little above the surrounding level, the planter, placing a foot on either side of the tree to prevent loosening the roots, clips off the top with his knife at a point just above the knee, or say two

feet from the ground. Side limbs, if there are any, which is not usual with one-year-old trees, are cut away and the tree is planted.

Digging great holes and carefully straightening out the long roots and getting them into just such or such position, as has been so often recommended for planting trees, is simply a waste of labor. The only essentials for successful tree planting are first, to prevent the roots from drying out through exposure; second, that they are put in mellow soil that is well compacted about them; and third, that the top is heavily cut back to prevent a too great demand for moisture when the leaves open, and before the new root growth has had time to develop sufficiently to absorb the large amount of water required by the leaves. Two active men can, in properly prepared soil, plant from 400 to 800 trees per day and do the work well. After the trees are planted the furrows should be thrown back with the plow and the ground cross harrowed to prevent washing.

Trees may be planted successfully in this climate at any time from November to March that the soil can be put in good condition. Planting may even be delayed as late as April or May when the trees are kept dormant in cold storage. Late planting is, however, not recommended. Fall or early winter planting will usually give the best results. Root growth normally begins much earlier than leaf growth, and the early planted tree has time to get well established in the soil with its new roots ready to supply the moisture demanded by the unfolding leaves. In the late planted tree the root and leaf growth must begin together, and in dry spring weather this is a severe tax on the vitality of the tree.

The proper distance apart to plant the trees will depend to some extent on the richness of the soil and on other considerations. In most cases sixteen by twenty feet will be found a suitable distance.

CULTIVATION.

Frequent shallow cultivation from early spring till after the middle of summer is necessary for the best success with plums. If the land chosen can be worked both ways, and if it has been cleared of stumps so as to admit of the use of wide cultivators and harrows, this will be simple and inexpensive. Most people will wish to grow some crop between the trees for the first two years. For this purpose nothing is better than cotton. It should be planted a little late so that cultivation may continue as late in the season as possible, and the rows next the tree row should be given a little more space than the others to avoid rubbing the trees in cultivation. Other hoed crops like Irish potatoes may be substituted for cotton, but no crop should be planted that will prevent the frequent stirring of the soil up to midsummer or later. Oats or other small grain crops should be particularly avoided. Nothing is harder on young trees than small grain crops. After the second summer the trees will occupy the land so fully as to make a crop of any kind between them unprofitable. If weeds and grass spring up after the last working they should be allowed to fall down and lie on the ground as a mulch during the winter, and should be plowed under in early spring; or better still, they may be plowed under in the fall and the land at once be seeded to rye or winter oats. Such a winter crop prevents washing and it also takes up the soluble fertilizing elements from the soil and prevents their leaching away during heavy winter rains. This winter crop should be plowed under in February or early March thus returning this fertility to the soil. It should on no account be allowed to mature.

FERTILIZING.

On land that is rich enough to make say half a bale of cotton to the acre without fertilizers no fertilizer will be needed for plum trees; or at least not until after they have borne several heavy crops. On soils so poor as to require

fertilizers to produce profitable crops of corn or cotton the trees will be benefitted by light applications also. For the first two years one or two pounds per tree of some good complete fertilizer may be used. A mixture of 3 parts of cotton seed meal, 3 parts acid phosphate and 1 part kainit is recommended for this purpose. The first application may be conveniently applied just after the trees are planted and before the furrows are filled in. It should be scattered in the furrow on either side of the tree so as to be covered by the plow in filling the furrow. The fertilizer should not be placed in immediate contact with the roots. In subsequent years the fertilizer can be broadcasted about the trees where it will be worked in by the first spring plowing. As the trees reach bearing age increasing quantities of acid phosphate and kainit should be used with a less proportion of cotton seed meal. It is not advisable to use stable manure in the plum orchard. On thin soils it will be a good practice to sow cow peas broadcast at the time of the last cultivation, say about August first. They may be plowed under and the ground seeded to rye or oats in October; or they may be allowed to lie on the ground as a winter mulch. A good growth of peas will add nitrogen enough to the soil so that the cotton seed meal may be largely omitted from the fertilizer.*

PRUNING.

The method of pruning at the time of planting has been already described. It is more essential then than at any subsequent time. Soon after the new growth starts in the spring all superfluous shoots should be rubbed away, leaving three or four of the strongest near the top of the stem to form the head of the future tree. It is usually necessary to go over an orchard two or three times in order to catch all the trees in the right condition for this operation. The shoots that are allowed to remain should preferably be

*For a further discussion of fertilizers for orchards see Bull. 79 pp. 97-99.

scattered a little along the stem. If too near together they will form sharp crotches as they grow older, that split down more easily when the trees are loaded with fruit. They will grow rapidly when the others are removed. When they reach a length of twelve to eighteen inches the tips should be pinched off to make them more stocky, and to induce branching, otherwise these limbs will grow too long and straggling, and too much of the seasons growth must be sacrificed at the winter pruning to bring the heads back to proper shape. The one summer pinching will usually be all that is really necessary, though the careful grower will continue to go over his trees at intervals cutting off a surplus limb here, and pinching back a shoot there, to keep the trees growing into a desirable form. During the first winter, or preferably just before the buds start in the spring, the trees should be again carefully pruned, removing all surplus branches and shortening in the past seasons growth so as to give the tree a symmetrically rounded head. This is an important operation as it is practically the last chance to shape the top of the future tree. The second spring the trees will send out numerous shoots that will make a very rapid growth. At eighteen to twenty-four inches these shoots should be pinched back. This will tend to make them branch and become more stocky, and it will also hasten the development of fruit buds for the next seasons crop. Subsequent pruning must depend on the condition of the tree. If growth is very strong during the summer it should be checked by pinching. Usually after the trees begin to bear this will not be necessary. Every winter the trees should be gone over to remove dead or broken branches, shorten in or remove water sprouts, cut back new growth when it is too long and limber, and, where the tree is evidently over bearing, to head back the old wood. No rules can be given for such work but it must be left to the judgment and skill of the operator. One rule should, however, always be enforced and that is to never cut off a limb unless some good reason can be given for it. A little wholesome neglect in the matter of pruning will do less harm than indiscriminate cutting.

THINNING.

Nearly all tree fruits are benefited by judicious thinning when the trees are carrying a full crop. In no case is this more important than with most varieties of Japanese plums. Fruit buds are produced in the greatest abundance and when the season is favorable the fruits set so thickly as to fairly hide the limb from view. Such crowded fruit must necessarily be small and inferior. Besides, the maturing of so many seeds is a great drain on the vitality of the tree. Another argument in favor of thinning is the lessened danger of loss from rot. Where the fruits are packed closely on the limb a single rotten one will quickly con-



Burbank plum, showing effect of thinning on size of fruit.

taminate all its neighbors; but if part have been removed so that they hang singly, the disease will progress much less rapidly. The effect of thinning on the size of the fruit is well illustrated by the accompanying cut which is a photographic reproduction of two twigs of Burbank plum, one of which has been thinned and the other not. The increased size of the fruit when thinned nearly or quite makes up in bulk for that taken off, and its superior quality largely increases its market value. Do not thrash the surplus fruit from the tree with poles as is sometimes recommended. That is simple barbarism. It should be removed by hand, taking care to pick off all imperfect or inferior specimens, leaving only perfect fruits hanging far enough apart so that no two touch each other. This should be done when the fruit is about half grown and before the stone hardens. It is usually best to go over the trees a second time just before the fruit swells for ripening. Many growers object to hand thinning fruit on account of the expense; but if all the fruits are allowed to remain on the tree they will have to be picked when ripe, so that if it pays better to pick part of them while still green the expense argument fails.

MARKETING.*

Most varieties begin to color some days before they are fully mature. Growers frequently make the mistake of picking and shipping them in this unripe condition. No greater mistake could be made. Such fruit will color after picking, it is true, but it will always be tough and leathery, and will never develop the sweet rich flavor of tree ripened fruit. The only way to retain and build up a market for fruit is to furnish goods that not only look well but taste well. There is less excuse for this green picking with Japanese plums than with most fruits for they are remarkably good keepers, even when tully ripened on the tree.

*For a general discussion of the marketing of fruits and vegetables see Bulletin 79, pp. 103, 110.

Fruit of all kinds should always be carefully hand picked—never shaken from the trees, and should be handled with such care as to preserve the natural bloom and prevent all bruising. If baskets are used for picking they should be lined throughout with cloth to protect the fruit from the sharp edges of the splints. Buckets are usually to be preferred to baskets for picking as they are smoother; and the “emptys” can be conveniently nested for sending back to the field. At the present time the Georgia six-basket crate, holding about three pecks, is probably the best package for southern grown plums. Perhaps the greatest objection to it is its expense. Plums are also shipped in one-third bushel boxes but this package has been used to ship so much poor fruit, that it is no longer considered a high priced package. Refrigerator transportation should be employed where possible, but plums will stand shipment by express or by freight in ventilated cars with greater safety than peaches.

INSECT ENEMIES AND DISEASES.

If it were not for injurious insects and plant diseases, the growing of fruit of any kind would be comparatively easy. These insidious foes meet the grower at every turn and tax his ingenuity and skill to the utmost to overcome them. Successful fruit growing is getting to mean more and more a constant battle with insects and fungi. At first view this seems discouraging, but after all it is the one factor that assures the wide awake industrious fruit grower a fair price for his goods, for the sloven can not control these pests, and must ultimately be forced out of the business. Only the more important of the numerous enemies of the plum and those that are known to be destructive in this state will be considered here.

CURCULIO.

This is the insect (*Conotrachelus nenuphar*) that causes worms in peaches, plums and cherries. It is a curiously shaped grayish brown beetle about the size of a grain of

rice. It passes the winter in the adult or beetle stage, coming out from its hiding places about the time the trees begin to bloom. It feeds sparingly on the young peach and plum leaves as they expand, but does little damage in this way. When the young fruits are formed they are visited by the female, who cuts a crescent shaped flap in the skin and deposits an egg under the flap. This egg soon hatches into a tiny white worm (the larva) which gradually works its way toward the pit of the fruit. When the wormy fruit finally falls to the ground the full grown larva comes out and burrows into the soil where it undergoes its transformations and at length emerges as the fully developed beetle. The damage done by this insect is well known, and it often reaches enormous proportions. Where trees continue to bear crops year after year, the curculio increases so rapidly that the entire crop often proves worthless. A season when all the fruit is destroyed by frost will so diminish their numbers from lack of suitable breeding places, that the following crop will be comparatively free from them. No one should plant an orchard of either plums or peaches who does not resolve to fight this insect by every possible means. The beetle has the habit of folding up its legs and wings and dropping to the ground when it is suddenly disturbed. The usual method of destroying it depends on this

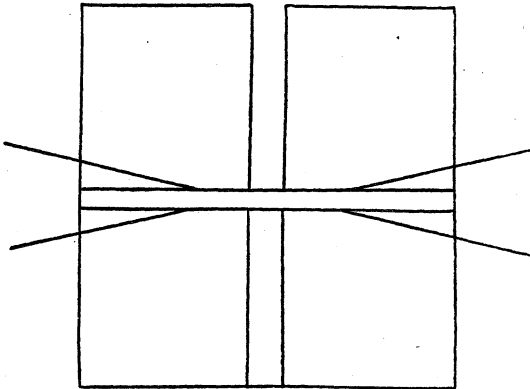


Diagram of frame for a curculio catcher.

seemingly unimportant habit—a fact that well illustrates the necessity for the most careful and painstaking study of the habits and life history of all injurious insects. A frame covered with white cloth, but having an opening in one side to admit the trunk, is placed under the tree, which is then suddenly jarred. The curculio at once “play possum” and drop on to the sheet where they can be gathered up and destroyed. If the land is level and the trees have been specially trained with high heads, the frame can be made in the shape of an inverted umbrella, and be mounted on a wheel, with handles like a wheelbarrow; and one man can roll it about the orchard. Such machines are usually provided with a pan under the center which is filled with kerosene and the insects roll down into it and are killed without delaying the operator. In most orchards a frame like that shown in the cut to be carried by two men will be found more convenient. This is made by taking a piece of 2 by 4 in. scantling 8, 10 or 12 ft. long, according to the size of the trees, and nailing on light cross-bars of the same length, and handles. The cloth is tacked over the whole frame and the side opening cut out. If the trees are small the scantling may be heavily padded at the center, and the trees be sufficiently jarred by swinging the frame against the trunk sharply once or twice. With large trees it is better to strike the separate limbs with a padded mallet. The blow does not need to be heavy but it must be a sharp, sudden jar, not a gentle shake, or the beetles will not fall. After jarring each tree the beetles should be picked up and killed, or they may be dropped in a bottle with a little kerosene in order to keep track of the amount of the catch. The beetles will lie still a longer or shorter time, according to the temperature, but in warm weather they soon jump up and fly away, so that it is necessary to gather them up at once. A modification of this catcher is used by some consisting of two light half circular frames each carried, supported from a strap around the shoulders, by one man. The two men meet under each tree and jar it with mallets, the two half circles thus completing the catcher. This is

probably a little more expeditious as the time lost in approaching and backing away from the tree with the other catcher is saved.

This catching of "bugs" will be looked upon as small business by some, and as tedious and expensive business by others, but it is the price we must pay for sound fruit, except in years when the previous crop has been entirely destroyed by frost. When gone about in a businesslike, systematic manner the trouble and expense is less than would be supposed. Two good men will easily care for 500 trees, and the amount of fruit saved will many times repay the cost. Jarring should begin as soon as the flowers fall. If no curculio are found wait a few days and try again. As soon as they are found in any number each tree should be jarred once or twice daily, until the diminished catch indicates that it is no longer necessary. Usually two or three weeks will serve to catch most of the beetles, but sometimes it will be found necessary to continue the work until the fruit is ripe. The few bearing plum trees on the Station grounds were jarred this year as follows:

April 5 (a part of trees only).....	57	beetles.
April 6 (too windy for good work)...	116	"
April 7 (bright still morning).....	304	"
April 8	145	"
April 12	38	"
April 13	31	"
April 16	11	"

The work should have been begun at least a week earlier, as many of the plums were already stung; but the record shows how quickly the beetles can be disposed of in a comparatively isolated orchard. When a man has to catch his neighbors bugs as well as his own the case becomes more difficult.

Jarring is the most reliable remedy for this troublesome insect, and it should not be omitted under any circumstances; but there are other means for helping to keep it

in check that should also be employed. One of the most important of these is the destroying of all fallen wormy fruit. This is often done by pasturing the orchard heavily with hogs or sheep. These animals will pick up the wormy fruit as fast as it falls. Where this is not practicable all fallen fruit should be picked up by hand two or three times a week, and either be fed to stock or boiled to destroy the worms.

In the early spring the beetles often take shelter under trash of various kinds in the orchard. If the ground is plowed, harrowed, and then dragged smooth with a plank, such shelter will be hard to find; and a few cobs or pieces of bark laid about the trunk will prove attractive to the insects. By turning over these traps every morning considerable numbers can often be killed, and this, too, early in the season before they have deposited their eggs.

The feeding habit of the beetle makes it possible to kill some of them by spraying the trees with Paris green. Plum foliage is not so easily injured by the arsenites as peach foliage, so there is no objection to employing this means of fighting the curculio. It has been found that mixing the Paris green with lime water, or better still with Bordeaux mixture, lessens its injurious effect on the foliage. As the Bordeaux mixture is useful for other purposes also it should be used as the vehicle for applying Paris green to plum trees. Some experimenters* have held that spraying with Paris green would, in itself, give sufficient protection from the curculio. It is not advised to rely on this alone, however, but to use it in connection with the other remedies suggested.

This line of treatment is equally applicable to peaches and the subject is of such importance to the southern fruit grower as to warrant the restating of the proposed treatment in the form of a condensed summary :

*Notably C. M. Weed, see Bulletin 8, 2nd. series, of the Ohio Experiment Station, issued September, 1890.

SUMMARY OF TREATMENT FOR PEACH AND PLUM CURCULIO.

1. When trees are in bloom, trap them under bark or cobs placed at base of tree, the ground in the orchard being first made smooth as possible.

2. Spray three times with 4 oz. of Paris green mixed with a barrel of Bordeaux mixture. Spray first just before flowers open, second just after they fall, and third in ten days or two weeks.

3. Jar the trees, and catch the beetles on sheets, going over the trees every day from the time the blooms fall until the beetles are all caught.

4. Destroy all fallen wormy fruit either by pasturing to hogs or sheep, or by hand picking.

PLUM BORER.

The plum is often attacked by the peach tree borer (*Sannina exitiosa*). A small moth, much resembling a wasp in general appearance, lays eggs on the bark at the base of the tree. When the egg hatches the young larva burrows into the bark and makes long winding tunnels between the bark and the wood. The presence of the borer is usually indicated by masses of gum and sawdust that exude from the wounds. If several borers attack the same tree, they may girdle it, and thus cause its death. It is a serious pest throughout the south, especially on sandy lands. When borers have gained entrance to the tree, the dirt should be pulled away and the borer be cut out with the point of a knife, taking care to injure the live bark as little as possible. If the base of the trunk is kept covered with a wash containing Paris green, the moth will either be deterred from laying the eggs, or the young, when hatched, will be destroyed before gaining the shelter of the bark. The dirt should be hoed away from the trunks in the orchard in early spring and the tree be carefully examined and all borers killed. Before hoeing back the dirt paint the trunks for a foot or more with Bordeaux mixture and Paris green, using about four times the strength that is applied to the

foliage. In four to eight weeks the wash should be applied again. Bordeaux mixture is recommended instead of white-wash since it sticks to the bark so much longer.

PLUM APHIS, LOUSE, OR GREEN FLY.

The plum aphis (*Aphis pruni*) is a large dark colored plant louse, that is sometimes very abundant and destructive in this state. It often occurs in great numbers on the leaves and young shoots. It can be destroyed by spraying with kerosene emulsion, but it is more resistant than most of the plant lice, and a strong emulsion is required. Luckily plum foliage is not easily injured by this spray. The mechanical mixture of kerosene and water, made with the Weed attachment to a knapsack pump, has been used on the Station grounds as strong as one part of kerosene to five of water without injuring plum foliage in the least. A single application of this strength completely destroyed the aphis, though it resisted repeated applications of the ordinary strength, one of kerosene to ten of water.

SAN JOSE SCALE.

This dreaded insect attacks plums as well as most other fruit trees. In fact it was probably first introduced in the east on nursery stock of Japanese plums brought from California. It is unfortunately established in this state at several places and should be carefully looked out for. Methods of treatment, &c., are given fully in Bulletin 77.

PLUM ROT.

The brown rot (*Monilia fructigena Pers.*) is easily our most troublesome and destructive fungus disease of the peach and plum. Its effect on the fruit is too well known to need description. Unseasonably warm, damp, foggy weather at blooming time sometimes induces an early development of this rot fungus that attacks the flowers, causing them to blast. This cause destroyed the peach crop this spring in many parts of the south. Plum flowers

seemed more resistant or perhaps opened at a time when weather conditions were less unfavorable, as the plum crop was not injured. The rot fungus also attacks young rapidly growing shoots causing them to blight and die in a manner somewhat resembling pear blight. When bearing trees are making too great a wood growth this twig blight is often a serious trouble, and injuriously effects the future health of the tree. Bordeaux mixture is now the standard remedy for all diseases of the class to which the plum rot belongs, and it has been used with considerable success for the treatment of this pest by various experimenters.* Its use, however, has not always proved successful, and the brown rot must still be classed among the diseases that are very difficult to successfully control. Among preventive measures may be mentioned the planting of resistant varieties, it is a well known fact that some varieties rot much quicker than others; the selection of high, well drained soil of moderate fertility, and the use of such fertilizers only as will not induce too rapid and succulent growth; checking a tendency to too much wood growth by stopping cultivation, or even seeding an orchard to oats, if on very rich land; training a tree with a somewhat open head to allow free circulation of the air and consequent rapid drying of the fruit, for the disease does not spread while the fruit is dry; careful thinning of the fruit so that no two fruits touch each other; the systematic picking off and destroying of all diseased fruits as soon as possible after the disease makes its appearance; the careful pruning out and burning of all dead twigs and of all mummied fruits during the winter, as these serve to carry over the contagion for another year. The last two are very important. In addition to the above suggestions spray the trees three times with Bordeaux mixture and Paris green as advised in treatment of curculio. For later sprayings Prof. Chester advises using acetate of copper, 6

*F. D. Chester of the Delaware Experiment Station has been particularly successful in the application of fungicides for this disease. See Bulls. 19, 29 and 34 of that Station.

to 8 oz. to the barrel of water rather than the Bordeaux mixture, as the latter will stain the fruit unpleasantly. Farther work is greatly needed in spraying peach and plum orchards under southern conditions, and on a commercial scale, for the prevention of brown rot.

ROSETTE.

This is a disease of the peach and plum that is distinct from, but quite closely resembles, the notorious peach yellows. It takes its name from the tufted growth of the small, curled and yellowed leaves on diseased trees. This peculiarity is so marked that such trees attract attention at a considerable distance. The disease was first observed in Georgia, where it was extensively studied by Dr. Erwin F. Smith of the Department of Agriculture.* He found it to be contagious, and that it could be communicated from tree to tree by inoculation. He was not able to determine the exact cause. No remedy is known except to cut down and burn all diseased trees as soon as detected. While the disease has not spread and become as troublesome as was at one time feared, it should not be neglected, as a more virulent outbreak may occur at any time.

I have observed isolated cases of Rosette at different points in Lee and Chambers counties during the present Summer (1897) so it must be included among Alabama diseases.

BLACK KNOT.

Blackened swellings of the twigs and smaller branches of plum trees caused by a fungus (*Plowrightia morbosa*) often do considerable damage, in some cases even causing the death of the tree. This fungus is quite common on the wild cherry (*Prunus serotina*) and on some of the wild plums in central Alabama. Specimens have been taken on the Japanese plums in Mobile county.

*See Bull. No. 1, of the Division of Vegetable Pathology U. S. Department of Agriculture (1891).

The careful cutting out and burning of all diseased twigs during fall and early winter and spraying the trees in the spring with Bordeaux mixture, as advised for the rot, will serve to keep this disease in check.

OTHER DISEASES.

Various leaf eating insects and leaf inhabiting fungi sometimes attack the plum. No better treatment for them can be given than the sprayings with combined Paris green and Bordeaux mixture that have already been advised.

Large excrescences known as "crown galls" are sometimes noticed on the trunk or main roots of the plum and other fruit trees. They often seriously interfere with the health of the tree. Recent experiments by Dr. B. D. Halsted* indicate that they are communicable. No remedy is known, but nursery stock showing these excrescences should be carefully rejected.

The smaller root knots caused by nematode worms that occur so abundantly on peach roots in infested lands are seldom seen on the plum.

Blisters or pockets filled with gum are sometimes found under the bark on the trunk and limbs. This condition is known as gummosis. It indicates a seriously diseased state of the tree, but cause and remedy are both unknown. In the south many peach and plum trees die from gummosis.

VARIETIES.

For a detailed description of the varieties of Japanese plums the reader is referred to Bulletins 62 and 106 of the Cornell University Experiment Station by Prof. L. H. Baily who is the acknowledged authority on this subject, and to the catalogues of the leading southern nurseries.

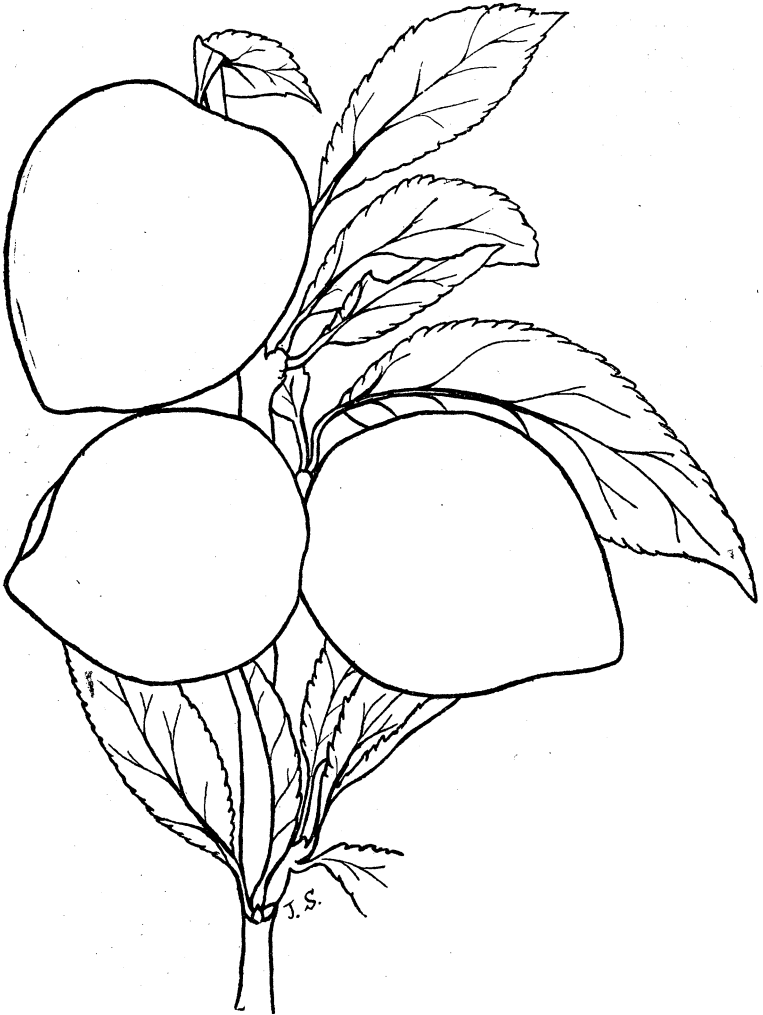
Only such varieties will be mentioned here as have been

*Annual Report of the New Jersey Experiment Station for 1896, p. 413.

fruited on the Station grounds and give promise of being generally useful for home use or market. They will be mentioned in the order of ripening.

KERR.

This fine yellow plum formerly called Hottankio, which is represented exact size in the accompanying figure, has been



Outline of fruit and foliage of Kerr plum, natural size.

the earliest of the Japanese plums to ripen on the Station grounds both in 1896 and 1897. Its good size, fine flavor, and attractive appearance together with its early ripening make it a promising variety both for market and the home garden. It is free from rot and is a rather late bloomer, thus being less liable to injury from frost. It was one of the few kinds that gave a partial crop in the unfavorable season of 1896. The season of 1897 has been rather late, but the Kerr was beginning to ripen by May 26, and was at its best during the first week in June. It does not seem to be as heavy a bearer as some others, but that is not always a disadvantage as it saves the laborious work of thinning.

RED JUNE.

This season's experience serves to emphasize the value of this fine early red plum. It stands on our list as "Red Nagate" but Bailey (Cornell Bulletin 106, p. 24) gives preference, for good reasons, to the name proposed by Stark Bros. It closely follows Kerr in ripening, being ready to pick this season the second week in June. Its fine color, good flavor, firm flesh and fine keeping qualities, together with its freedom from rot, very late blooming habit, and abundant fruitfulness make it one of the most desirable kinds for general planting.

BERKMANS.

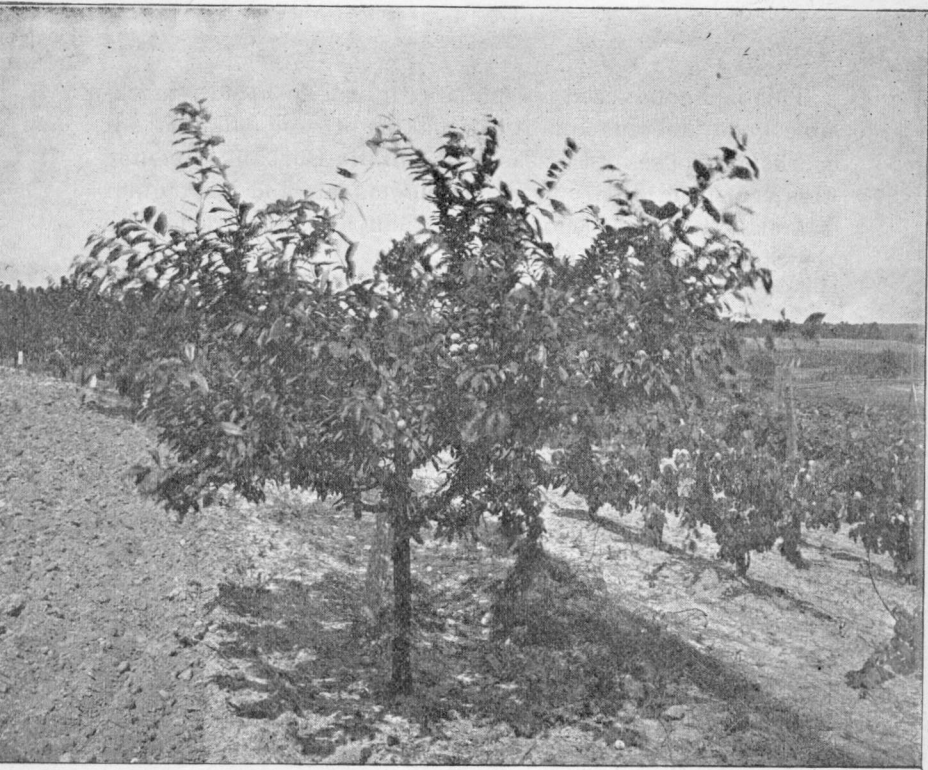
This is one of the varieties that has been confused under the name of Botan. It has been called Sweet Botan or White Fleshed Botan. To my taste it is the finest flavored of the Japanese varieties. Its flesh is juicy and melting so that it probably will not ship as well as the firmer fleshed kinds, and it develops an unfortunate tendency to rot under unfavorable conditions. It should certainly be included in every home orchard, and should not be neglected for market purposes, though it would be unwise to plant too largely of it. In season it comes between Red June and Abundance.

ABUNDANCE.

This is probably the best known and most widely planted of the Japanese varieties. It was formerly known as Botan and as Yellow Fleshed Botan. Perhaps its greatest fault is a tendency to overbear which makes the fruit small and inferior, unless heavily thinned. It is recognized as a standard market plum. It ripened this season the third week in June.

BURBANK.

This fine kind is a marked favorite in most plum growing regions. Unfortunately here it develops an alarming ten-



Tree of Burbank plum showing spreading habit of growth.

dency to rot on the tree. The partial crop set in 1896 was all lost by rot, and in 1897 a larger proportion of the fruit rotted than any other kind except Kelsey. Even on trees that were carefully thinned, and were sprayed two or three times early in the season with Bordeaux mixture, the loss was considerable. Like Abundance it is inclined to overbear and is much benefitted by thinning as is shown in the photograph on page 431. The spreading habit of growth of the tree is well shown in the accompanying photograph. This is strikingly different from the trees of the other varieties mentioned in this bulletin which are all upright growers. The Burbank has a long ripening season, furnishing pickings this year from June 20 to July 4.

CHABOT.

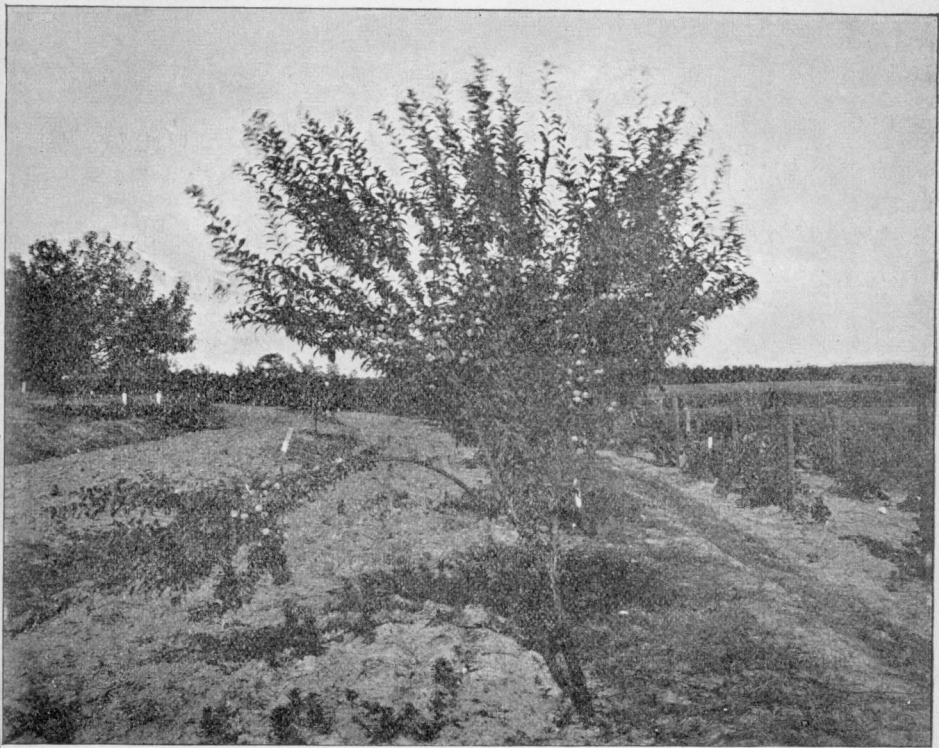
This is a good sized red plum with firm flesh and remarkable good keeping qualities, making it well adapted for market purposes. In season it follows Burbank, ripening this year from July 5 to 10. It blooms late and is a regular bearer. It ripened more fruits than any other variety on the Station grounds in 1896.

SATSUMA.

This fine kind is often called blood plum from the dark red color of the flesh which resembles that of the old Indian cling peach. The flavor is exceedingly rich and fine. It is very desirable for the home garden as the fruit is especially suited to canning, jellies and preserves. When cooked it retains its fine color and flavor to a remarkable degree. As a market fruit it has two serious drawbacks. It blooms very early in the spring and is thus liable to loss of crops from frost; and, though the flesh is so brilliantly colored, the skin is dull and unattractive. It has been accused of rotting badly, but this year it was noticeably free from that trouble. It ripens with the Chabot, and like that variety it is a very long keeper.

KELSEY.

This was the first of these plums to be introduced from Japan. It is also the largest and the latest to ripen. Where it can be safely grown it is a magnificent fruit, but it can hardly be recommended for this state on account of two very serious faults. It blooms even earlier than the Satsuma, in southern Alabama sometimes beginning to open in January, so that full crops are infrequent; and it is more subject to rot than any of the other kinds. The accompa-



Tree of Kelsey plum.

nying illustration shows a Kelsey tree on the Station grounds bending with its load of half grown fruits. This tree was thinned twice and sprayed three times, and the rotting fruits were repeatedly picked from it, but at this writing (July 22nd.) it has lost fully three-fourths of its crop from rot, and it is still an open question whether any perfect fruit will mature. The season of ripening is somewhat uncertain, varying from the middle of July to October according to the condition of the tree and the season.