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Agricultural Experiment Station

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AGRICULTURAL AND MECHANICAL COLLEGE,

AUBURN.

ORCHARD NOTES.

BY

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ORCHARD NOTES.

The season of 1900 has been on the whole a favorable one for the orchardist. At Auburn the earliest blooming plums and peaches were killed by a sharp freeze on Feb. 18, when the thermometer dropped to 12°. The latest blooming plums like Wayland and Golden Beauty were injured by continued cold rains during the last of March that prevented pollination, causing the first nearly complete failure of the crop on these kinds in five years. The medium blooming plums and peaches set heavy crops notwithstanding a cold snap on March 17, when the thermometer dropped to 28°. It was 30° the morning of the 16th and had dropped to 32° by 9 p. m., so that the open flowers were exposed to a freezing temperature for at least ten hours. Many blossoms were killed but as stated, enough survived to make a very full crop. Unusually rainy weather during June and July caused serious loss from brown rot in peaches and plums, the falling of grape foliage from the attacks of downy mildew, and a more than usually heavy loss from summer rot of apples.

APPLES.

The condition of the new orchard (planted 1897-1900) continues to be very satisfactory. Our experience proves that it is entirely possible even on such thin drouthy land as ours to grow thoroughly thrifty, vigorous apple trees. Part of the land was seeded to hairy vetch in the Fall of 1898 and the remainder was seeded to vetch and oats in Oct., 1899. In March a strip three or four feet wide was plowed on each side of the row and was culti-

vated after every rain so as to keep a dust mulch about the trees. The middles were not plowed till the first of June in order to allow the vetch to ripen its seed so as to re-seed the land. Frequent cultivations were continued till the middle of July when peas were broadcasted and cultivated in. The peas made a good growth during the late Summer and Fall and have been allowed to lie and rot on the ground. As the peas begun to die down the self-sown vetch seed began coming up and by spring the orchard will be a solid vetch field. The same treatment will be continued another year, plowing strips next the trees in March, allowing the vetch to stand in the middle till the seed is ripe and then cultivating the entire land thoroughly till middle of July and again broadcasting to peas. By this method two crops of rich leguminous vegetable matter are added to the soil each year so that it is rapidly gaining in fertility. The mechanical condition is already greatly ameliorated. Last Spring each tree was given two pounds of fertilizer consisting of a mixture of five parts each of cotton seed meal and acid phosphate to one part of muriate of potash. The soil is now so much improved and the trees are growing so rapidly that no more fertilizer will be required until the orchard comes in to heavy bearing.

The bearing orchard received the same treatment as the growing orchard except that each tree was given ten pounds of the mixed fertilizer and it was sprayed twice with Bordeaux mixture, once on April 13 and again on April 28. At the last spraying one-half pound of Paris green per barrel was added to the Bordeaux mixture. At the time of the first spraying many of the trees were in full bloom and a number of the flowers were killed, showing that it is not advisable to spray during the blooming season. The first spraying should have been done earlier but pressure of other work prevented. The

treatment served to lessen the number of wormy apples very noticeably and it held the rot in check till about the first of July. After that owing to continued rains it developed rapidly and finally destroyed a large proportion of the crop on many of the trees. Two or three additional later sprayings would probably have partially prevented this trouble but it seems doubtful if, in unfavorable seasons like the present, it would have entirely prevented it. This rotting of the fruit on the trees before maturity seems to be the most serious problem that confronts the apple grower in this latitude. It will probably have to be met by more frequent sprayings than are necessary at the North, and especially by the selection of resistant varieties. Among the kinds fruiting at the Station this year, the following were comparatively free from rot: Carter's Blue, Horse, Pine Stump, Red June, Steven's Winter, Thornton's Seedling, and Terry's Winter. Those noted as rotting very badly were American Golden Russet, Ben Davis, Elgin Pippin, Golden Pippin, Kittageskee, Oconee Greening, Romannite, Shannon Pippin, Summer Red and Winesap.

Apple Leaf Rust (Roestelia): Notes taken on Aug. 1, show the following varieties to be more or less effected by this disease.*

Carter's Blue, slightly.
 Chattahooche, slightly.
 Cooper's Red, moderately.
 Dam, slightly.
 Equinettelee, slightly.
 Ey. Red Marguerite, badly.
 Family, very badly.
 Hames, slightly.
 Horse, moderately.
 Jonathon, very badly.

* For these notes and for other help in preparing this Bulletin, I am indebted to my assistant, Mr. C. F. Austin.

Mamma, slightly.
 Red June, slightly.
 Rhodes' Orange, slightly.
 Rome Beauty, moderately.
 Sabadka, slightly.
 Santa, badly.
 Senator, badly.
 Shockley, moderately.
 Texas Red, slightly.
 Thornton's Seedling, slightly.
 Wealthy, slightly.
 Winesap, slightly.
 Yahor, slightly.
 Yopp' Favorite, slightly.

The following kinds were entirely free from rust: Aikin, American Summer, Apple of Commerce, Arkansas Black, Babbitt, Benoni, Ben Davis, Black Ben Davis, Bledsoe, Bradford, Buncomb, Champion, Carolina Greening, Cooper's Early, Duchess, Early Harvest, Elgin Pippin, Fall Pippin, Fanny, Grimes' Golden, Gravenstein, Hews' Crab, Jefferson Everbearing, Jennings, Julian, Kinnard's Choice, Limbertwig, Maiden's Blush, Mam. Black Twig, Mangum, Mavarack Sweet, Moultries, Oszi-vaj, Pear (or Palmer), Rawls' Janeton, Red Astrachan, Red Beitigheimer, Red Limbertwig, Saxon Priest, Sekula, Selymes, Shackleford, Summer Cheese, Summer King, Summer Queen, Sweet Bough, Taunton, Tuscaloosa, Yates, Yellow English, Yellow Horse, Yellow Transparent, York Imperial.

This agrees very well with last year's experience (See Bull. No. 106, p. 168) but American Summer and Moultries that showed rust last year escape, while fourteen kinds are affected this year that escaped last. A few of the Hungarian kinds are slightly affected this year for the first time, but in the main native American kinds

are more susceptible than foreign kinds. This is rather anomalous since the disease is indigenous, occurring freely on our wild crab apples.

Green Aphis of the Apple—In Bulletin No. 106 p. 166, it was noted that after being very abundant and troublesome the aphids suddenly disappeared during a period of heavy rains in August. The circumstances were such as to suggest that they had been carried off by some epidemic disease, but unfortunately no proof of this was secured. In any event the disappearance was so complete that in the Spring of 1900 the trees were almost clear of them and they have caused less damage than at any time in five years. Their numbers gradually increased so that by Fall they were again quite abundant but as the growing season was over they did comparatively little harm.

A new treatment was tried this season that proved much more satisfactory than the strong kerosene emulsion used last year, since it was equally effective in killing the insects and did no harm whatever to the foliage. Though home made decoctions of tobacco were unsatisfactory (See Bulletin 106, p. 164), the commercial product known as "Rose Leaf" proves to be by far the best insecticide yet tried for controlling this aphis. It is best used at a strength of one part to fourteen of water and should be applied as a very fine spray. Since it is impossible to reach all the lice at a single spraying on account of the shelter furnished by the crumpled leaves it is always best to spray two or three times at intervals of four or five days, since in that time those that escaped the first spraying will have moved out of their shelter seeking a fresher food supply. Three such sprayings within two weeks time should clear even badly infested

trees. Whether it will pay to go to this expense must be determined by the condition of the trees and the abundance of the lice.

It was hoped that spraying the trees with crude petroleum in winter might destroy the eggs of this insect. On March 12, a number of young trees that had been badly infested the year before were thoroughly sprayed with crude petroleum taking pains to direct the spray against the ends of the twigs where the eggs are usually deposited. The buds were still quite dormant. No injury resulted to the trees. The effect on the lice, if any, was obscured by the general scarcity of them during the early part of the season. By the first week in May a few lice could be found on each of these treated trees though none of them were badly infested. It was much later than this before they became numerous in any part of the orchard, so the treatment seems to have had no result so far as the aphids are concerned.

The question of varietal resistance to this pest is still an open one but as was noted last year, kinds with thick, hairy twigs seem to be less infested than those in which the young twigs are slender and comparatively smooth. Notes taken on Aug. 1, show the following kinds to have been more or less infested with aphids:

- Apple of Commerce, badly.
- Bledsoe, badly.
- Chattahooche, slightly.
- Jennings, badly.
- Mamma, moderately.
- Maverack Sweet, moderately.
- Oszi-vaj, moderately.
- Pear (or Palmer), moderately.
- Red Beitigheimer, moderately.
- Rhodes Orange, badly.
- Summer Queen, badly.
- Sweet Bough, moderately.
- Tuscaloosa, badly.
- Yellow English, badly.

By Nov. 13, the following additional kinds were more or less infested: Black Ben Davis, Bradford, Buncomb, Carolina Greening, Carter's Blue, Early Harvest, Equinettelee, Family, Fall Pippin, Gravenstein, Hominy, Jeffries, Limbertwig, Magnum, Mam. Back Twig, Moultries, Nickajack, Pasman, Rawl's Janeton, Santa, Senator, Shackleford, Shockley, Summer Cheese, Tull, Wine-sap, Yakor, Yates, Yopp's Favorite. Of these kinds 21 have smoothish twigs, 16 are medium, and 10 rather hairy. Of the kinds not infested with aphids, 8 have smoothish twigs, 18 medium and 28 hairy twigs.

This list does not coincide very closely with that given last year, showing that infestation or immunity is in part at least accidental.

A List of Hardy varieties.—The following kinds have been entirely free from rust, aphid and leaf spot and have made a perfectly satisfactory growth both in 1899 and 1900. Aiken, Babbitt, Hyari Piros, Magyur, Maiden's Blush, Metel, Ponyike and York Imperial. It is interesting to note that of these eight kinds four are among the new Hungarian varieties sent out by the Department of Agriculture that have not yet fruited in this country. Of the other kinds in last years' select list, Arkansas Black, Duchess, Fanny, Haywood, Milalyfi, and Thornton's Seedling lost some foliage from leaf spot late in the season, while Carolina Greening was slightly attacked by aphid, and Hames developed a little rust. Among the kinds not included in the above list that are in very satisfactory condition this Fall may be mentioned Battvani, Benoni, Bledsoe, Buda Summer, Carter's Blue, Champion, Elgin Pippin, Hames, Herschal, Cox, Horse, Julian, Kesket, Kinnard's Choice, Limbertwig, Red Astrachan, Red June, Saxon Priest, Summer Wafer, Texas Red and Yellow Transparent.

Promising New or Little Known Varieties. For the

last three years an effort has been made to secure trees or grafting wood of all promising local seedlings in the hope of finding kinds better suited to our conditions than those now in general cultivation. A number of such kinds have been secured and the Station earnestly request all who are interested in apple growing in this State to co-operate by reporting any promising kinds that may come to their notice.

Among little known kinds deserving of special mention are the Hackworth and Herschal Cox. The Hackworth originated in North Alabama and has been grown there locally for twenty or thirty years. It is a vigorous, erect growing tree with large, healthy leaves. The fruit ripens in August. It is large subconic yellowish white, heavily striped with red. It seems to be free from rot and to be a very desirable late Summer apple. Herschal Cox is of the Romanite type, small and not of the best quality, but the latest keeper we have in North Alabama, surpassing even the Shockley in this respect. The tree is a better grower than Shockley and it should perhaps replace that variety for general planting.

Revised List of Apples for General Planting in Alabama:—The following list named in the order of ripening will give a good succession of fruit from the first of June till early winter. Yellow Transparent, Early Harvest, Red June, Red Astrachan, Horse, Hackworth, Carter's Blue, Thornton's Seedling, Kinnards Choice, York Imperial, Yates, Shockley, Herschal Cox. Unfortunately few, or perhaps none, of the above are fully satisfactory under our conditions and it is hoped that in the future better kinds may be substituted for them. Yellow Transparent is a poor grower and the foliage is somewhat subject to leaf spot. It is an abundant and early bearer and the handsome yellow fruit is free from scab and rot. For market it is the most promising of

the very early kinds. Early Harvest is rather better quality than the above and is nearly as early. It is to be preferred for home use. The tree is a fairly good grower but often suffers severely from aphids, and it is not free from leaf spot. Red June is a strong growing thrifty tree but unfortunately late in coming in to bearing and subject to rust. The fruit ripens through a long season and it is one of the most desirable for family use. On young trees and with good care and cultivation it is a fine market apple but with age and neglect it is too small for market. It should be in every family orchard. Red Astrachan is a vigorous, healthy, strong growing tree that comes early into bearing. The fruit is large and showy but too acid to suit most tastes, and is inclined to rot badly. Where this trouble can be controlled it is one of the most profitable of the early market apples. At Auburn it begins ripening about June 10 though some specimens can be gathered earlier. It does not all ripen at once like the Yellow Transparent but the trees need to be picked over several times. The Horse is a well known kind doing well in all parts of the South. The tree is healthy and a free grower. The large greenish yellow fruits are too sour for eating out of hand but are excellent for cooking. At Auburn it begins ripening early in July. The Hackworth has been mentioned on a previous page. It is unknown outside of Alabama, but seems very promising here. It ripens through a long season beginning the last of July and continuing throughout August. The tree is very thrifty and the large handsome fruits are of good quality and attractive. It is recommended for both home use and market. Carter's Blue is also an August apple, but averages a little later than Hackworth. It is a large green apple with dull red stripes and a heavy white bloom. It does not rot badly. The tree is healthy and a vigorous grower.

It is one of the few kinds that succeeds well at the far South. Thornton's Seedling is a good sized greenish apple with red stripes ripening in September. It is of good quality and its comparative immunity from rot marks it as valuable for an apple ripening at this season. The tree is healthy and productive. Kinnard's Choice has not been fruited at the Station but in North Alabama it is one of the most satisfactory kinds for late Fall and early Winter. The trees in the young orchard here are remarkably strong and healthy. York Imperial has also not been fruited here but it has made a good record in North Alabama and it is one of the few kinds in the young orchard that have been spotless and free from enemies of all kinds during the last two seasons. It is confidently expected that this will prove one of our very best late market apples. Yates is a favorite apple with many growers especially in Chambers, Tuscaloosa and Clay Counties. It is a good keeper and of the best quality but is too small for general market purposes. The tree is only a medium grower and is subject to leaf spot and to injury from green aphid. Shockley; this well known kind is valued chiefly for its keeping qualities. The apple is small and of rather poor quality and the tree is apt to be rather short lived. It is attacked badly by both rust and aphid and is only retained in the list for the want of something better that will keep as long. Herschal Cox is included here with some doubt. It is a better tree than Shockley but the fruit is about equally poor. However it keeps perfectly all winter in North Alabama which is a point of prime importance. It has not been fruited here.

It will be noted that Ben Davis Winesap and Limbertwig have been omitted from the above list although included in the list given in Bulletin 98, p. 265. It is

thought that Kinnard's Choice and York Imperial will fully take their places and be better suited to our conditions.

As a result of several years observation and study it seems prudent to strongly urge the increased planting of apples in Middle and Northern Alabama. It must be fully understood, however, that apples will succeed here only with the best and most intelligent care and cultivation.

FIGS.

The following eleven kinds fruited on the Station grounds this season:

Adriatic. Large, yellowish white, flesh light red, late, beginning to ripen middle of August and continuing till frost; tree vigorous, fairly hardy, starting rather late in Spring. While not as sweet as Celeste it is pleasant in flavor and its large size makes it very attractive. It should be more widely planted.

Black Ischia. Large roundish, shinning black, flesh deep red, season last of August. Of no special value.

Brown Turkey. Small, light brownish, sweet, ripening during a long season. A fairly good fig but not equal to Celeste. With us the tree is feeble and a poor grower.

Brunswick. Large, pyriform, greenish yellow, nearly overspread with dark brown, flesh reddish brown, rich, season middle of August till frost, tree fairly vigorous and productive. With us this year the last of the crop did not ripen well. Not fully satisfactory.

Celeste (or Celestial). Small, pyriform, light brown, often with purplish tinge, flesh reddish, soft, very sweet, season July, tree thrifty, very hardy, starts early in Spring. This is by all odds our best early fig and the one in most general cultivation. On vigorous trees it

often sets a small late crop but these late fruits are inferior and many of them fail to ripen.

DuRoy. Small, much like an inferior Celeste. This much advertised kind has nothing to recommend it. Our trees were from Mr. Normand, the introducer.

Green Ischia. Medium size, rounded, yellowish green, skin thin, flesh deep rich red, sweet, high flavor, tree thrifty, fairly hardy, very productive, season last of August till frost. This is our best and most reliable late fig and should be widely planted. It does not begin ripening till the main crop of Celeste is entirely over.

Madeline. Large, light yellow, flesh yellowish white, rather soft, sweet, rich, reason last of July and August, trees fairly vigorous and productive. This is a good fig and is valuable as ripening between Celeste and Green Ischia.

New French. Small, rounded, white, of medium quality, rather firm, tree a fairly good grower. It will take farther experience to decide whether or not this kind has any special merit.

White Nerii. Large, roundish, greenish yellow, flesh reddish, rather soft, good quality, begins ripening middle of August, tree feeble, not very productive.

White Smyrna. Medium and large, somewhat flattened, greenish white, overspread with a tinge of brown, flesh light red, firm, sweet, rich, season middle of August till frost, tree only moderate grower but fairly productive. This is a good fig and keeps remarkably well after picking.

Recommended for General Planting: Celeste, Green Ischia, Adriatic, White Smyrna and Madeline.

KAKI (JAPANESE PERSIMMON).

As was noted in Bulletin 106, p. 171, the freeze of February, 1899, killed these trees all to the ground. Part were killed outright and part sprouted from the crown. The following kinds were sufficiently recovered to bear some fruits this season: Tabors No. 23, Tabors No. 72, Tabors No. 129, Tane Nashi, Yeddo Ichi.

This fruit is well adapted to the conditions in South Alabama and should be more generally planted in that region. The trees often begin bearing the year after they are planted and the crop is a very sure one. The fruits are large and handsome. Though too rich for some tastes most people are fond of them and they are gradually winning a place in the large markets.

ORANGES.

Mr. H. J. Webber of the Department of Agriculture, Washington, has succeeded in making a number of hybrids between the cultivated sweet oranges and the hardy, deciduous hedge orange, *Citrus trifoliata*. His hope, of course, is to find among them some kinds that will combine the hardness of the one parent with the desirable fruit of the other. As these interesting productions have not yet reached bearing age it is impossible to foretell the result. Wishing to test their hardiness in this latitude the Department sent trees of fifty-one of these hybrids to this Station last Spring. They have nearly all made a very vigorous growth during the Summer but at this writing (Jan. 3) there has been no cold sufficient to test their hardiness. It is interesting to note that of these kinds three have died, thirty have small trifoliate, deciduous leaves like the hedge orange, only nine have large simple, evergreen leaves like the

sweet oranges, while nine have larger, variously modified trifoliate leaves that are evergreen. Their continued behavior will be watched with great interest.

PEACHES.

The co-operative experiment orchard planted in 1898 bloomed abundantly but for some reason set a very light crop. The few older trees planted in 1896 bore heavily but the fruit rotted very badly on account of continued wet weather during the ripening season. Owing to the exceptional character of the season, it is thought best not to express an opinion as to the merits of the different varieties at this time. Notes on the season of blooming are given below. This subject is not as important with peaches as it is with plums as all the varieties are supposed to be self-fertile, but since a difference of even a very few days in the blooming period may decide the safety or loss of the crop from cold it is a matter worthy of consideration.

Notes on the blooming of peaches in 1900.

Varieties.	Feb. 18. Thermometer 12°.	March 6.	March 10.	March 14.	March 17. Thermometer 28°.	March 25.
Matthews' Beauty..	.....	.....	buds pink.....	first blooms...	.....	full bloom.....
McKinney	Buds of all varieties slightly swollen except as noted below.		nearly dormant.	buds pink.....	Over half the open flowers killed except as noted. When petals have fallen they are killed as badly as the freshly open flowers. No unopened buds killed. No striking difference in the different varieties or races.	first bloom.....
Marks.. .. .			nearly dormant.	buds pink.....		full bloom.....
Ovido		first blooms....	nearly full bloom	full bloom and falling....		mostly fallen.
Gray			buds pink.....	first blooms ..		past full bloom.
Reeves			buds swollen .	first blooms ..		full bloom.....
Carmen			buds swollen..	first blooms ..		full bloom.....
Chinese Cling ..			buds swollen, some pink.....	first blooms ..		full bloom....
Elberta.			buds pink.....	first blooms ..		past full bloom.
Mamie Ross.....			buds pink	first blooms...		full bloom.. . .
Pallas			buds pink.....	first blooms ..		full bloom.....
Tabor		buds pink.....	blooming.....	full bloom.....		
Honey.....	much swollen, not show'g pink	first blooms....	nearly full bloom... .. .	full bloom.....	mostly fallen...	

Notes on the blooming of peaches in 1900.

Varieties.	Feb. 18. Thermometer 12°.	March 6.	March 10.	March 14.	March 17.	March 25.
Peento.....	full bloom.....		leaves 1 in. long			
Angel.....	first blooms....	blooming.....	full bloom, ¼ crop left...	bloom falling.		leaves half grown.....
Waldow.....	first blooms....	blooming.....	full bloom, nearly full crop.	bloom falling..		leaves half.....
Old Mixon Free			buds swollen ..	first blooms ..		full bloom .. .
Mt. Rose			buds swollen...	first blooms....		full bloom. ...
Alexander.....			nearly dormant	pink.....		first blooms ..
Onderdonk		first blooms....	blooming.....	blooming.....		past full bloom
Cobler's Indian			buds pink	first blooms....		full bloom.....
Imperial			first blooms....	full bloom.....		past full bloom.
Victoria.....			first blooms....	blooming.....		full bloom..... nearly full bloom
Triumph... ..			buds swollen...	buds pink		nearly full bloom.....
Sneed.....			buds pink	first blooms....		nearly full bloom.....
Old Orchard— Lady Ingold.....			swollen, some pink.....	first bloom....	buds ½ open. flowers 50 % k'd.	.....

Notes on the blooming of peaches in 1900.

Varieties.	Feb. 18, Thermometer 12°.	March 6.	March 10.	March 14.	March 17.	March 25.
Tillottson	swollen, some pink	first blooms ..	buds $\frac{1}{4}$ open. flow's 10-20% k'd	.....
Early Crawford	swollen, some pink	first blooms	1% open, flow- ers half killed	.....
Hale's Early	buds swollen.	buds hardly pink	none opened, none killed...	.....
Mt. Rose	swollen, some pink	first blooms	buds $\frac{1}{4}$ open, flowers 40 % k'd	.....
Alexander	nearly dormant	buds hardly pink	none open, none killed ..	.....
Stump	swollen, some pink	first blooms	very few open, 40-50 % killed ..	.....
Elberta	swollen, some pink	blooming	buds $\frac{1}{4}$ open, flow's 20-40% k'd	.....

Classified according to the season of blooming we have the following:

Earliest Blooming:—Peento, Angel, Waldow, all of the Peento type.

Very Early Blooming:—Ovido, Honey, Onderdonk, of the Honey and Spanish types.

Early Blooming:—Imperial, Victoria; Spanish type.

Medium Blooming:—Matthews Beauty, Gray, Reeves, Carmen, Chinese Cling, Elberta, Mamie Ross, Pallas, Tabor, Old Mixon Free, Mt. Rose, Coblers Indian, Sneed, Lady Ingold, Tillottson, Ey. Crawford, Stump; including all of the North China type, most of the Persian and representatives of the Spanish and Honey types..

Late Blooming:—McKinney, Marks, Triumph, all Persian.

Very Late Blooming:—Alexander, Hales Early, both Persian.

The varieties of the Peento race all bloom so early as to be practically worthless for planting in any part of this State. They are the best peaches for the orange belt but should not be planted much farther North. Some at least of the varieties of the Honey and Spanish types bloom late enough to be comparatively safe and there is no question but what in South Alabama the trees will be found thriftier and better adapted to the soil and climate than most varieties of the North China and Persian types. Unfortunately as yet we have no varieties among them fine enough to compete in market with Elbertas and Crawfords and none as early as Alexander. A race of peaches combining the thriftiness and fruitfulness of the Honey with the late blooming of Alexander and the fine market qualities of the Elberta would indeed be a boon to the Southern fruit grower. Such a combination of characters is not beyond possibility to the skillful plant breeder and our originators of

new varieties should set themselves the task of producing it.

PEARS.

Kieffer pears in the old orchard bore a heavy crop, while the LeContes made less than half a crop. Only a portion of the trees in the new orchard fruited.

In Bull. 106, p. 173, it was noted that one result of the February freeze (1899), which killed all the bloom buds was almost complete immunity from blight during that season. This immunity was so complete that the disease seemed to have entirely disappeared from the Station orchard. This Spring the Kieffers and LeContes although blooming very heavily were entirely free from blight. A few Bartlett trees blooming two or three weeks later received the contagion from some source and nearly all the flower clusters developed the blight so virulently that notwithstanding repeated prunings the trees were nearly killed before it could be checked. These blighting Bartletts caused a few "growing tip" infections in the Kieffers and caused the blighting of some clusters of apple blossoms.

PLUMS.

Most of the varieties of plums in the Station orchard bore a full crop this year and it is now possible to form an estimate as to their value for this region. Some light has also been obtained on the vexed question of the nomenclature of the Japanese varieties. The trees for this orchard were obtained from a number of prominent nurseries in different parts of the West and South and in Bulls. 98 and 106 the names under which they were purchased were used in all cases. It now appears that as represented here (trees purchased in Jan. 1896), the following are all Abundance:

Botan from T. V. Munson & Son, Denison, Tex.
 Yellow Fleshed Botan, P. J. Berckmans Co., Augusta,
 Ga.

Berger, from Stark Bros., Louisiana, Mo.

The following while differing slightly among themselves are for all practical purposes the same as Chabot. This kind like Abundance is quite variable and seems to be represented by more or less distinct strains.

Babcock, from G. L. Tabor.

Baileys Japan, from G. L. Tabor.

Hattankio, from T. V. Munson & Son.

Munson, from P. J. Berckmans Co.

Yellow Japan, from G. L. Tabor.

Red Nagate, from G. L. Tabor seems to be the same as Red June from Stark Bros; and Botan of Tabor is the Berckmans.

As plums are now usually classified our varieties belong to five different races or types, the Japanese and four natives. These are the Americana type, the Wild Goose type, the Wayland type and the Chicasaw type. The domestica type which includes the European plums and prunes does not succeed here and none were planted.

The Americana Plums: The plums of this type have been developed from the wild plum of the North and East. They are useful for planting at the far North on account of their great hardiness to cold but they are not at home here. So far as we have tried them the trees are poor growers, very short lived and unproductive.

At present they are represented in the orchard only by Hawkeye and Rockford though several other kinds were planted that have since died. Although blooming very late long after danger from frost is over, they bore no fruit at all this season. The planting of varieties of this type is not advised for this State.

The Wild Goose Plums: The ancestry of this group of plums is still a matter of doubt. Some authorities have supposed them to be hybrids between the Americans and Chicasaws but there is no proof of this theory except their somewhat intermediate characters, and on the whole it seems more probable that they are descended from some of the Southern wild plums. The native plums of our Southern woods have been strangely neglected by botanists and as yet we have very little knowledge of their number or relationships. It is certain that in the red clay soil of the granitic hills north of Auburn, a wild plum occurs abundantly that has all the characteristics of this group of cultivated kinds. Botanists to whom specimens of it have been submitted unite in pronouncing it *Prunns hortulana*, the supposed hybrid parent of the Wild Goose plums, but there is no conceivable reason for supposing that this commonly occurring native plum is a hybrid. It has so far been impossible to determine its true botanical position.

Before the introduction of the Japanese kinds this race of plums was our chief dependence at the South for market sorts. While they have been largely supplanted in popular favor by these new introductions they have some very good qualities and should not be overlooked in planting for home use and local markets. For distant shipment they are doubtless inferior to the best of the Japs, still they are likely to long continue to hold a recognized place in the market. As a rule they bloom rather late so as to be comparatively free from injury from frost. They succeed admirably in Middle and North Alabama, but are not so well adapted to the coast region. The following kinds are in the Station orchard: Charles Downing.—This is a medium sized plum of very fine quality, fairly productive, late, ripening July 10 and a very late bloomer. Unfortunately the tree is rather

a feeble grower and it does not seem quite at home. It would succeed better farther North. It is worth planting for home use on account of its fine quality and because it extends the season for this class of plums.

Milton: This is a fine plum blooming a day or two later and ripening three or four days earlier than the Wild Goose. This season the first picking was on June 9. It is an oblong plum, darker, richer red than Wild Goose and marked with large white dots. The flesh is firmer and it hangs on the tree better than the Wild Goose. It is clearly superior to that well known kind and is, every thing considered, the best variety of its class that we have tested. It was one of the very few kinds carrying a full crop in 1899.

President Wilder: This is a high flavored, medium sized red plum, ripening late in June. It does not seem to be very productive and like Charles Downing would probably do better farther North. It can not be recommended here except, perhaps, to keep up a succession and fill the gap between Wild Goose and Charles Downing.

Whitaker: This is much like Wild Goose and ripens at about the same season, possibly averaging two or three days later. It is hardy and productive, bearing a full crop in 1899 and also this season, but it is so much like Wild Goose that there is no need to plant both kinds. It will take farther experience to decide which of the two is preferable.

Wild Goose: Too well known to require extended comment. It succeeds well in Central and North Alabama and is very prolific when planted near other kinds. It requires cross pollination and does not bear well if planted by itself. It begins ripening here early in June in ordinary seasons and continues in season for nearly three weeks. It failed to bear in 1899 though others of this class carried a full crop.

Wooten: A small oblong red plum, ripening ten days later than Wild Goose. It has little to recommend it except hardiness and productiveness as the quality is poor. It ripened a full crop in 1899.

The Wayland Plums: These resemble the Wild Goose type somewhat closely but they bloom later and ripen decidedly later than most of those kinds and seem adapted to a range of country a little farther South. What wild species they are descended from is uncertain. They cannot be recommended for shipment but are desirable for the home orchard on account of the sureness of the crop, an entire failure being almost unknown, and because of their late ripening which will prolong the plum season till the first of September. In quality they are not equal to the best kinds of the Wild Goose type, but they are useful for canning, jellies and preserves. They are represented in the Station orchard by two kinds, Wayland and Golden Beauty. The former is bright cherry red, and rather milder in flavor and is probably preferable where only one is to be planted but the Golden Beauty is very prolific and it is a few days later. Both kinds ripen in August, often lasting to early September. The crop was lighter this year than it has been in five years owing to heavy and continued rains during the blooming season that prevented pollination. A failure from Spring frosts is almost or quite unknown.

The Chicasaw Plums: The varieties of this type in cultivation are simply selections from the best of our native "old field" plums and have little to recommend them for general planting. They mostly bloom so early as to be in great danger from Spring frosts and they are too soft and small to be of much value for shipment. A few trees of the earliest kinds may be useful in the home garded as they ripen before the other kinds. They are

represented in the Station orchard by the following three kinds:—Emerson: A small red plum, very early but of no great value. This season the crop all rotted when half grown. Lone Star: Much like Emerson of no value. Transparent: A medium sized yellow plum of nice sweet, delicate flavor. It is the best of the lot but cracks badly in wet weather.

The Japanese Plums: This is by far the most important type of plum for this region. For commercial orchards they are second in value only to peaches and with properly selected varieties the crop is surer than peaches, being less liable to injury from Spring frosts and from rot. There has been much confusion in regard to the names of the varieties and as noted on page 175, several of the supposed kinds in the Station orchard prove to be identical. The following sixteen kinds seem to be sufficiently distinct. They are mentioned in alphabetical order.

Abundance (this equals Botan of some, Yellow fleshed Botan, and in our orchard Berger): This is the best known and most widely planted of any of the Japanese plums. It blooms with peaches but usually holds a number of buds in reserve that open if the first blooming is killed so that an entire failure of the crop is rare. It is a handsome red plum with clear transparent skin that is yellow under the red, of very fine sweet flavor, the flesh becoming soft and juicy when fully ripe. Picked when still firm it ships well. It began ripening this year the middle of June and lasted two weeks. It is usually free from rot. Perhaps its greatest fault is a tendency to overbear, making it necessary to thin freely to secure good sized fruit. It is the best plum of its season and is strongly recommended for general planting.

Berckmans (Botan of some): This is another large

red plum very similar to Abundance in tree and fruit. It was formerly confused with it under the name of Botan. The color is a little duller, being underlaid with green instead of yellow, the size averages a little larger, but the quality is not so good. It ripens at about the same season. It is a plum of some merit but not so good as Abundance.

Burbank: This contests with Abundance for the first place in popularity as a market plum. It is a little larger and even richer in color, has firm, high flavored flesh and ripens an average of a week to ten days later than Abundance, although occasional specimens ripen nearly as early as that kind. The tree is thrifty with a spreading habit of growth quite different from that of most of the Japanese plums. Like Abundance it is a great bearer and needs heavy thinning. In some seasons it rots badly which is its only fault. It is recommended for general planting.

Blood plum No. 4: This is of the Satsuma type but inferior to that kind. It is not worth planting.

Chabot (Babcock, Bailey, Hattankio, Munson and Yellow Japan of our orchard belong here): This is a large red plum with yellow under-color. It is late, ripening here about July 10. It is a good shipper, having firm flesh of fairly good quality and it is usually free from rot. The tree is a good grower. It is recommended for general planting though possibly it should be replaced by Orient.

Hale: Young, only two years planted, but they did not fruit well this season. The few fruits secured were rather disappointing. Final judgment will have to be suspended.

Kelsey: This is the largest and in some respects the finest of the Japanese plums but it has two such serious faults that its planting cannot be advised in this State.

It blooms so early that the crop is usually killed, and it rots very badly. Its season is late, middle to last of July.

Kerr: This is a remarkably good plum whose valuable qualities seem to have been overlooked by nursery men and orchardists. It is the earliest of our really good plums ripening here about the first of June. It is large, rich yellow, with firm flesh of high quality. It blooms rather late and the tree is a good grower. It is strongly recommended for both home use and market.

Long Fruited: This is a small red plum with very firm flesh. It ripens a few days earlier than Kerr. The tree with us has not been thrifty. The quality is fairly good but the size is too small for market.

Maru: This is a red plum about the size of Abundance and ripening a few days later. The quality is poor and it rots very badly. It is not worth planting.

Normand: This is a large yellow plum of good quality, ripening the last of June or first of July, between Burbank and Chabot. Its color is somewhat against it for market, but it is useful in filling the gap between these two kinds, and it is in every way worthy of planting.

Orient: This is very much like Chabot but it seems to be distinct, and to be an improvement on that kind, being brighter colored, slightly larger and two or three days earlier. It is strongly recommended especially for market planting.

Red June (Red Nagate of some): This is a very showy, handsome red plum ripening at least a week earlier than Abundance. It is a good shipper and very free from rot. It is not as good in quality as the Abundance but it combines more desirable qualities for a market plum than any of the others. It blooms late and the tree is vigorous and productive.

Satsuma: This is a large plum with dull red mottled skin but bright blood red flesh. When fully ripe the quality is very fine. It cannot be recommended for market on account of its early blooming habit which makes the crop too uncertain, but it should be included in plantings for home use on account of its superior quality especially when cooked. It is one of the finest fruits grown for canning and for jelly on account of its brilliant color and peculiarly rich, pleasant flavor. It ripens about the first of July.

Willard: This plum has nothing to recommend it but earliness. With us it is no earlier than Kerr and not nearly as good. The tree here is a poor grower and unproductive.

Yosebe: This is the earliest Japanese plum we have tested, ripening a few days earlier than Keer and slightly in advance of Longfruited. It is a small bright red plum with firm flesh, free from rot and of very fair quality. The tree blooms late and is thrifty and productive. It is probably too small for a profitable market fruit, yet its earliness, high color and other good qualities make it at least worth a farther trial.

Hybrid Plums: The following kinds are hybrids between the Japanese plums and some of the other races. While they are very interesting and suggest great possibilities for future improvement it cannot be said that any of them fully come up to the standard for a market plum.

Golden (Gold of Stark Bros.): This is a hybrid between the Japanese and the Chicasaw plums. It turns golden yellow long before it is ripe and the loaded trees are very showy and beautiful. When ripe it is a light bright red at least on the side toward the sun. The quality is poor and watery, and this season much of the crop was lost through sunburn and rot. On the whole it is a disappointment.

Excelsior: Said to be a hybrid between the Japanese and Wild Goose races. It is a good sized, early, dull red plum of better quality than Golden. The tree is a fine grower and very productive. It is said to do well at the far South. It is perhaps worthy of farther trial. The Wild Goose characteristics seem to predominate in the fruit of this plum as the Chicasaw does in that of Golden.

Wickson: A hybrid between Kelsey and *Prunus Simmoni*, which latter parent the tree greatly resembles. This is truly a magnificent plum, larger and handsomer than any of those mentioned above. Its one great fault is that it blooms too early for safety. It ripens about the first of July, but this year there were only two or three specimens to the tree. In fact we have never secured a full crop from it.

Lists of Plums for General Planting in Alabama. As a short list including only the very best plums for market we suggest the following mentioned in the order of ripening. They will cover the period from the first of June to the middle of July with a short break about the first of July. Kerr, Red June, Abundance, Burbank, and Orient. A large orchard of these five plums, if properly managed, could hardly fail to be profitable. Abundance and Burbank bloom together and should be planted near each other in order to secure cross pollination, while Kerr, Red June and Orient all bloom about together but a few days later. For a longer list add Yosebe for very early, Berckmans, Normand and Chabot.

For a full list for home use and local market, plant all of the above and add Transparent, Milton, Wild Goose, Satsuma, Wickson, Wayland and Golden Beauty.

The Blooming Season of Plums: As has been noted in previous Bulletins the blooming season of plums is especially import since many, or perhaps most, of the

varieties are infertile to their own pollen and require cross pollination in order to bear fruit. For this reason plums should not be planted in large blocks of one variety but rows of one kind should be alternated with rows of one or more others, taking care to mate together kinds that bloom at approximately the same season. The notes given below on the blooming season for 1900 show a rather close agreement in the sequence of varieties with observations recorded for other seasons at this place, indicating that there is but little variation in this respect from year to year, although the actual season of blooming varies quite widely in different seasons. The sequence observed here however is not the same that is recorded for the same varieties in more northern localities, (see particularly the Vermont Bulletins and Reports). It is hard to see what should cause this difference in the comparative behavior of varieties in the two sections.

Notes on the blooming of plums in 1900.

	March 6.	March 10.	March 14.	March 25.	March 29.	April 6.
Abundance	buds white	full bloom	Mostly fallen ..	.....	.....
Babcock*	buds separated ..	full bloom	falling .....	.....	.....
Bailey*	buds separated ..	full bloom.	falling .....	.....	.....
Berckmans	buds white	full bloom.	falling .....	.....	.....
Berger †	buds white	full bloom ...	mostly fallen...	.....	.....
Blood No. 4	first blooms....	nearly full bloom	flowers falling.	fallen .....	.....	.....
Potan (Tabor) ‡	buds white	full bloom.	fallin ? .....	.....	.....
Botan (Munson) †	buds white	full bloom.	mostly fallen...	.....	.....
Burbank	first blooms ...	blooming.....	falling.....	.....	.....
Chabot	buds separated. nearly	blooming.....	falling .....	.....	.....
Chas. Downing	dormant.	buds separating	buds separated	first blooms....	full bloom.
Earliest of all.....	dormant.	nearly dormant. ...	first blooms....	nearly full bloom .....	.....
Emerson	first blooms...	full bloom.	falling	fallen, fruits setting.	.....	.....
Excelsior.....	first blooms....	full bloom falling.	fallen .....	.....	.....

Golden—(Gold)		buds separated.	blooming	mostly fallen		
Golden Beauty		dormant	buds separating	buds separated.	buds white	blooming
Hale		first blooms	nearly full bloom	mostly fallen		
Hattankio*		buds separated	blooming	mostly fallen		
Hawkeye		dormant	dormant	dormant	dormant	nearly dormant
Kelsey	first bloom badly killed in Feb.	nearly full bloom	nearly full bloom	fallen		
Kerr		buds separated	nearly full bloom	full bloom		
Lone Star		buds white	full bloom	fallen		
Long fruited		dormant	dormant	first blooms many buds still dormant	first blooms	full bloom
Maru		dormant	dormant	nearly dormant	first blooms, most buds not separat'd	nearly full bloom
Milton		nearly dormant	buds separating	first blooms	full bloom	
Munson*		buds separated.	blooming			
Normand		buds white	full bloom	falling		
Orient		buds separated.	first blooms	mostly fallen		
Pres. Wilder		nearly dormant	buds separating	first blooms	blooming	full bloom
Red nagate		nearly dormant	buds white	full bloom	full bloom	first blooms

Notes on the blooming of plums in 1900.—Con'd.

	March 6.	March 10.	March 14.	March 25.	March 29.	April 6.
Rockford	dormant	dormant	dormant	dormant	nearly dormant	first blooms
Satsuma	first blooms badly killed in Feb.	nearly full bloom	full bloom and falling	leaves half grown . . . . .	. . . . .	. . . . .
Transparent . . . . .	. . . . .	buds separated	first blooms	mostly fallen . . . . .	. . . . .	. . . . .
Wayland . . . . .	. . . . .	buds separated	buds separated	first blooms	first blooms	full bloom
Whitaker . . . . .	. . . . .	buds separating	buds separated	nearly full bloom	full bloom . . . . .	. . . . .
Wickson	first blooms badly killed in Feb.	. . . . .	full bloom	fallen . . . . .	. . . . .	. . . . .
Wild Chicasaw	first blooms	nearly full bloom	full bloom and falling . . . . .	. . . . .	. . . . .	. . . . .
Wild Goose . . . . .	. . . . .	buds separating	buds separated	nearly full bloom	full bloom . . . . .	. . . . .
Willard . . . . .	. . . . .	nearly dormant	nearly dormant	nearly dormant	first blooms	blooming
Wooten . . . . .	. . . . .	buds separating	buds separated	nearly full bloom	full bloom . . . . .	. . . . .
Yellow Botan † . . . . .	. . . . .	buds white	nearly full bloom	falling . . . . .	. . . . .	. . . . .
Yellow Japan * . . . . .	. . . . .	buds separated	blooming	falling . . . . .	. . . . .	. . . . .
Yosebe . . . . .	. . . . .	dormant	dormant	first blooms, most buds not separated	first blooms	nearly full bloom

* Equals Chabot.
 † Equals Abundance.
 ‡ Equals Berckmans.

SAN JOSE SCALE.

In Bulletin 106 it was noted that in the plum orchard planted in 1896 two trees proved to be infested with scale, and that from this center of infection it was slowly spreading to other trees in the orchard. At the close of the growing season of 1899 it had developed sufficiently to conspicuously whiten large areas on the trunk and larger branches. It had not spread to the twigs and smaller branches and it had so far interfered but little with the growth and vigor of the trees. During February, 1900, this entire orchard was thoroughly sprayed with a 20% mechanical mixture of kerosene and water. A little later one of the originally infested trees was again sprayed with undiluted crude petroleum. The crude petroleum was also applied to two infested peach trees and to a number of apple trees. In no case did it do any injury.

The result of this treatment simply goes to confirm the truth of the following two propositions: 1st, that when a tree is once infested with scale it is almost impossible to entirely eradicate it. 2nd, that by spraying with kerosene or crude petroleum its numbers can be so reduced that it does the trees no harm. The spraying has probably not exterminated the scale on a single tree where it had gained a lodgment, but there are left only a few scattered individuals on any of the trees. These facts have come to be quite widely recognized and they should be made the basis for the treatment of every outbreak of the scale. When it is first discovered in a new locality, if it is confined to a few trees or even to one or more entire orchards, by all means cut them out at once and burn them, for this is the only sure way of stamping out the pest. On the other hand in communi-

ties where it is known to occur somewhat widely it is needless to cut down infested trees for if taken in time the scale can be so controlled by annual or even biennial sprayings that it will do little if any harm. Of course the spraying is a rather heavy expense and the occasion for it should be avoided by taking every precaution to keep the premises clear of this pest.