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Plums in South Dakota

N.E. Hansen
South Dakota Agricultural College

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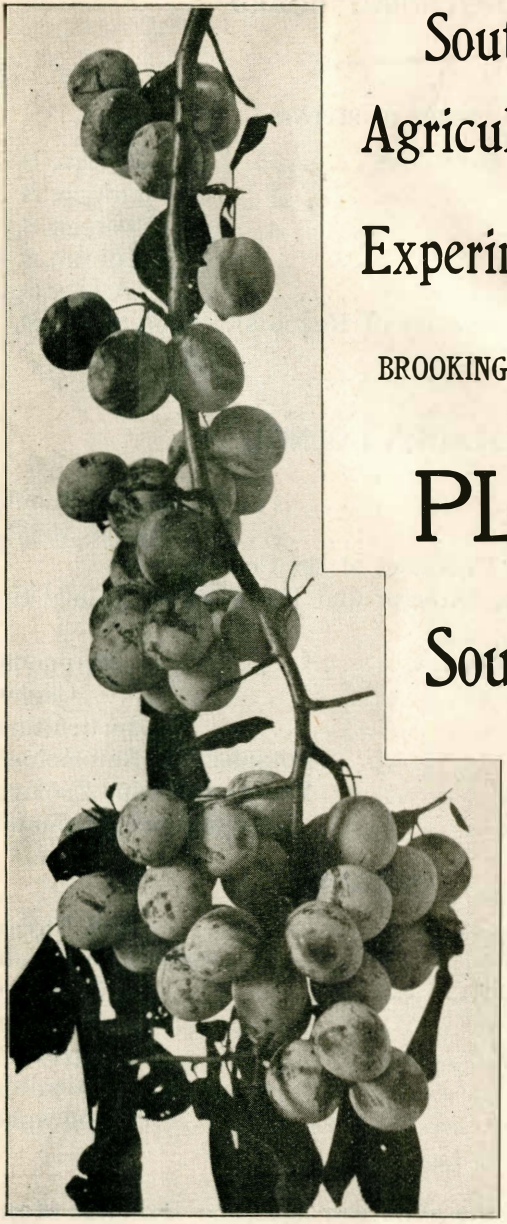

Illustrating Productiveness of South Dakota Plums.

South Dakota Agricultural College

Experiment Station

BROOKINGS, SOUTH DAKOTA.

PLUMS

IN

South Dakota

N. E. Hansen

Department of Horticulture

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Plums in South Dakota.

N. E. HANSEN.

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Introduction.

It has been definitely established that plums of large size and excellent quality can be raised in great abundance in all the farming regions of South Dakota. And in the grazing regions it is simply a question of furnishing the necessary irrigation. There is nothing in the soil or climate of this state to prevent the successful cultivation for home use and market of this luscious fruit, providing suitable varieties are selected and the proper care given. It may be safely said that no farm

home is complete at least without a small plum orchard, and even in the back yard of a small town lot a few plum trees may be successfully cultivated.

Against the above statements may be cited the well known fact that many thousands of plum trees have been planted in this state that never bore a plum, being killed the first or second winter. Three main reasons for this failure are: 1st, the wrong varieties were selected; 2nd, the trees were grafted or budded on tender stocks or roots that could not endure the winters; 3rd, lack of care on the part of the planter who permitted the trees to be choked by the heavy sod or tried to raise cattle and plums on the same trees and the cattle came out ahead every time. Plum trees and poultry go well together but larger live stock should be excluded. Grass ruins a young orchard, as the growth is stunted.

During the past generation what Professor Bailey has called "the battle of the plums" has been going on over a wide area of the prairie northwest. Hundreds of varieties have been brought from western and eastern Europe, from Japan, China, Persia and other parts of Asia, from the Gulf and Atlantic regions of the United States. All have proved their inability to withstand the vicissitudes of the climate. The native wild plums remain undisputed possessors of the field. By this is meant those native to the vast region from Iowa, Nebraska, northward through Minnesota, Wisconsin, the Dakotas, Manitoba and Assiniboia. Every one who has gathered wild plums in this region has noticed the great difference in the size and quality of the fruit. No two trees are exactly alike in this respect. If we find an especially large and choice plum tree and transplant it to the garden we get the same fruit; the sprouts from its roots may also be taken up and transplanted, giving us what is called "own-rooted trees" or "trees on own roots." But if the seed is planted we will get a different kind of plum, sometimes better but more often poorer than that of the parent tree. The only way to get more trees of the same variety is by grafting, budding or root sprouts, as already indicated.

In the course of the past fifty years thousands of people have hunted for choice wild plums in the woods, and the sorts now in cultivation are the result of such work. Some of these

varieties are described in this bulletin, but the list is by no means complete. It is doubtless true that many of those named and brought into cultivation are too small in size and inferior in quality or have some other fault which will prevent their more general introduction. Such sorts should now be dropped from the list. Others again were good at the time they were introduced but have been superseded by better varieties introduced later. Each year marks an advance. A study of the plum exhibit at the state fairs of the states mentioned will show the gradual change for the better that is taking place in the size and quality of our native plums. The rapid development of our native plums during the past generation forms an extremely interesting chapter in our prairie horticulture and the work of evolution is by no means complete. People interested in this work should be on the lookout for choice wild plums in the native thickets; if they wish to experiment many seeds from the best specimens should also be planted. If only the commercial phase of the work interests you, take advantage of the exploration work already done and plant the varieties already in cultivation and recommended by the various state horticultural societies and experiment stations. Raising new varieties of plums from seed is to a certain extent a game of chance or lottery and many failures must be expected. At the South Dakota experiment Station many thousands of plums seedlings are being raised to fruiting age. The best few are selected for further experimenting and the rest are grubbed and burned; a "tree digger" drawn by four horses quickly prepare abundant material for a huge bonfire. In other words, instead of resting content with testing hundreds of varieties picked up from everywhere, some new varieties are being originated here. Various parts of the state are being explored from time to time for wild plums worthy of cultivation. The endeavor is also being made to cross the native plums with those from Europe and Asia and the milder regions of the United States.

It was learned that our native plums improved under cultivation and that from such trees seedlings could be raised showing still greater improvement in size and quality of fruit. Here and there a few specialists made wonderful progress in this manner. It was also discovered that native plums could be crossed with

Japanese and European plums and with other species, such as the western sand cherry. It may be fairly said that the work of evolution has but barely begun and that a generation hence the present varieties now on the lists recommended for general cultivation will be superseded by representatives of this multitude of new varieties now being bred.

Classification.

It is not the purpose of this bulletin to attempt a systematic review of the genus Prunus to which botanists refer all the plums, cherries and peaches. Recent publications favor the division of these fruits into two or three separate genera. The following brief sketch may assist the beginner in understanding the relationship of the varieties mentioned in this bulletin.

Prunus Americana.—This species includes the northwestern wild plums and their cultivated descendants, and occurs from New Jersey westward to Montana and Colorado; ranging southward it runs into the variety *mollis*, represented by the Wolf plum. Ranging northward it appears to run into the early flowering form, *Prunus nigra.*

Prunus nigra, or **Prunus Americana nigra.**—This may be regarded as the northern form of Prunus Americana and occurs wild from Newfoundland west to Assiniboine river, Canada. Cheney and Aitkin are two of its cultivated representatives.

Prunus hortulana.—This is a very extensive group of hybrid origin and is still a subject of study and controversy. It is divided by various authorities into several groups such as Miner group (*Prunus hortulana Mineri*); the Wayland group; Wildgoose group. In a general way it may be stated that in the area where the wild plums from the far south met the wild plums from the far north, in the Mississippi valley especially, many varieties have appeared which probably are hybrids of the two races. As a class none are hardy in this state with the exception of the Miner, which is raised in the southern counties along the Missouri river; and the Surprise, originated under cultivation in Minnesota and which is probably a seedling of the Miner.

Prunus angustifolia.—This is the Chicasaw plum of the southern Mississippi valley. It ranges from Texas north to

Missouri and east to the Atlantic coast. None of the cultivated varieties, such as Pottawattamie, have been found hardy at the north. The Sandhill plum of Kansas and southeastern Nebraska formerly known as Prunus Watsoni is now regarded as a sub-species (*Prunus angustifolia Watsoni*).

Prunus maritima.—This is the Beach plum found along the Atlantic coast from New Brunswick to Virginia. This species appears to be of no promise for the Northwest at least as represented by the cultivated variety, Bassett.

Prunus Besseyi.—The Western Sand Cherry, known as *Prunus Besseyi* or *Prunus pumila Besseyi*, ranges from Kansas to Manitoba westward to the Rocky Mountains. This was introduced into cultivation from Colorado as the Improved Dwarf Rocky Mountain Cherry. The fact that this dwarf bush grafts or buds readily on plums and also hybridizes with them freely, while it unites with great difficulty in grafting or budding with the cultivated cherries, indicates its plum-like affinities.

Prunus domestica.—This includes the common cultivated plums of Europe; in the South Dakota markets are often known as California plums, being shipped in great quantity from that region. A few of the hardier varieties of this species are grown to a limited extent in South Dakota, but in an amateur way only. For commercial purposes the European plums are not adapted to the Northwest. None of the varieties are found on the recommended fruit lists of the South Dakota and Minnesota State Horticultural Societies. However, in parts of the Black Hills region of this state some European plums have borne a number of good crops.

Prunus triflora.—This includes the Japanese plums. They are noted for large size and fair quality and are often found in South Dakota markets under the general name of California plums, being shipped extensively from that state. None of the Japanese plums should be planted in this state with any expectation of raising profitable crops. Southern Iowa would about represent the northern limit.

Prunus Simonii.—An apricot plum from China. Not hardy in this state.

Description of Varieties.

The aim of these pages is to determine the value of each variety for South Dakota, hence, in giving the experience with each variety the results of trials elsewhere in the state have been included as far as practicable. A. Norby, Madison, Lake county, and H. C. Warner, Forestburg, Sanborn county, have tested a large number of varieties for a series of years and their notes are included, also the experience of many other plum growers, due credit for which is given in each case.

Aitkin, *nigra.*

HISTORY.—A wild variety from Aitkin county, Minnesota, found by D. C. Hazelton. Introduced in 1896 by the Jewell Nursery Company, Lake City, Minnesota. At first this variety was known as Itasca. At the Minnesota fair this variety when first introduced was distinguished as being about the largest variety on exhibition.

In the orchard of this Station it appears to be of value only for its earliness. The past season in common with other varieties of the Nigra type, such as Odegard, the fruit was badly spotted with scab. The flesh is firm and fairly sweet, but the pit is large. Ripe August 24th. The tree appears to be considerably affected with plum pocket.

A. Norby, Madison, writes: "The first variety to open its blossoms was the Aitkin, on May the 2nd. Set a small crop; ripe August 17th; size large; of fine color, soft, rather poor in quality; too much subject to the plum pocket fungus. Tree a slow grower." (1902) "Too much subject to pockets and unproductive to be of any value here. Ripens from August 10th to 20th. This variety is also subject to scab." (1903) "Tree a slow grower, not very productive. Fruit large, of poor to fair quality; ripens here August 12th to 20th, according to the season, or about with the Odegard and Compass Cherry. Not free from scab and too much subject to pockets to be of any value here." (1904.)

American Eagle, *Americana.*

HISTORY.—Prof. Waugh writes: "Introduced by Osceola Nursery Company, Osceola, Missouri, 1889. One of the best varieties in this group."

The two young trees at this Station have been productive

and overbore the past season. Ripe 1903, September 9; 1904, September 10. Fruit large, dark red; handsome, resembling Wolf but larger.

A. Norby, (1903.) "Much like the Clingstone Wolf, perhaps inferior in quality, first fruit last year." (1904.) "Has fruited two seasons and seems almost identical with the Clingstone Wolf."

Ames, *Americana X triflora.*

HISTORY.—This variety was produced by Prof. J. L. Budd, of the Iowa Experiment Station, by using pollen of a large Japanese plum received from Oregon, on De Soto. It was first named DeSoto X Oregon No. 3.

A young tree of this variety has been a fair bearer of large to very large fruit of excellent quality and a remarkably good keeper after picking. Tree very strong and healthy with heavy dark green foliage; fruit ripe September 7, 1903; September 8, 1904. The fruit round, dark red, skin a little tough; runs even in size all over the tree and ripens evenly. Worthy of general attention from nurserymen and planters.

Baldwin, *Americana.*

Received in 1896 from L. O. Williams, Mills county, Iowa.

Eight trees planted in 1896 have proven very productive and over-bore the past season. Quality fair, keeps long after picking. Evidently a good shipper. Ripe September 4 to 7. In 1904 the fruit dropped badly before coloring. Tree strong, of open, spreading habit.

DESCRIPTION.—The tree over-bore in 1904 so that the plums ran too small for satisfactory description. Form round, regular, apex flat, cavity deep, narrow, suture a line; surface dark red with heavy blue bloom, red slightly mottled with dull yellow, surface smooth, dots whitish, minute, many; skin thick, acerb, flesh dark yellow, flavor pleasant, acid, quality medium, pit semi-free, rounded, thick, medium size.

Barnsbeck, *Americana.*

HISTORY.—Originated at Vermillion, S. D. "Good market variety." (H. C. Warner, Forestburg, S. D., Oct., 1903.)

Bassett, *Prunus maritima.*

Found wild in New Jersey about 33 years ago. This variety in the Station orchard proves to be too small and too late to be of any value.

Bender, *Americana.*

HISTORY.—This variety is also known as the Paul Wolf. Has been grown for a long time around Minneapolis, Minnesota and is noteworthy from being so firm in texture that it may be handled in marketing almost as roughly as potatoes.

Three trees planted in 1898 have proven to be heavy bearers. The tree is of heavy, low, open, strong growth with an abundance of bright green foliage. The trees do not overbear nor break down under the heavy crop. Fruit ripe 1902 September 4; 1903 September 3; 1904 September 5. Fruit large; dark red when fully ripe; very meaty and firm; quality fair; the best keeper after picking of any variety fruited in 1904.

Fruit oblong, conical, tapering to a blunt apex, irregular being compressed laterally; cavity deep, regular; suture usually a broad line; color an attractive, lively, solid dark red with light blue bloom; dots minute, gray, numerous; flesh light yellow, very firm; flavor sweet; quality fairly good; fruit freestone; pit long, pointed at both ends, regular with smooth edges; skin thick, tough, very firm, not especially acerb.

Blackhawk, *Americana.*

HISTORY.—Found wild in Blackhawk county, Iowa. Mentioned by R. P. Speer, February, 1889. (Bulletin 4, Iowa Experiment Station.)

A. Norby: "Good crop; quite large; drops before colored and has a sole leather skin." (1902.) "Tree produces well and fruit is of good size, but the 'hide' is too thick and tough for any use." (1903.)

Black Prune, *domestica.*

HISTORY.—Of Russian origin. In the old Station orchard two trees set in 1888 have in common with other Domestica varieties proven shy bearers. The tree is now in poor condition. It is worthy of inquiry whether the failure of the Domestica varieties here may not be due in part to lack of affinity with the native plum stocks on which they were worked.

Burbank, *triflora.*

Several Japanese varieties of plums have been tested at this Station, but the Burbank is the only one attaining age sufficient to bear fruit. This was in 1898 from a few branches top-worked on De Soto in the old Station orchard. These branches were killed by the succeeding hard winter. The other Japanese varieties winter-killed before fruiting.

Carpenter *seedling.*

A variety from Vermillion, South Dakota. The past two seasons a young tree has overborne and has been too late in season.

Caroline.

"The best early, so far." (H. C. Warner, Forestburg, S. D. 1903.)

"One of C. W. H. Heideman's, whether seedling or selected wild I cannot say. Fair crop; yellowish red; of good quality; medium size; ripens with Forest Garden." (A. Norby, 1902.)

Champion, *Americana.*

HISTORY.—Originated by H. A. Terry, Crescent, Iowa, from seed of Hawkeye and introduced in 1892.

This variety is recommended mainly for its late season. C. L. Watrous of Des Moines, Iowa, writes: "I think well of Champion, it comes at a time when plums are getting scarce."

At the South Dakota Experiment Station the tree is large, with round top and open habit, and bears very large dark red fruit of fair quality. The tree sunscalds badly on the main stem, and the season is too late.

A. Norby: "Sure bearer; too late for this section." (1902.) "Hardy and very productive but too late in ripening for this section." (1904.)

Cheney, *nigra.*

HISTORY.—Found wild in Mormon ravine, near La Crosse, Wisconsin, and introduced by E. Markle, La Crosse, Wisconsin, about 1887.

Seven trees planted in 1896 have been productive of large fruit. The variety appears quite subject to plum pocket. One of the largest and handsomest of our native plums. In 1902 ripe August 26; 1903 ripe August 29; 1904 ripe September 2.

The past two seasons were unusually late owing to the heavy rainfall. The trees here are quite subject to sunscald and some of them are dead from the effects. This suggests the need of growing the trees with very low stem and more in bush form.

DESCRIPTION.—Size very large, one of the largest of the native plums, form roundish flattened at ends, usually quite lopsided, extreme specimens being obscurely diamond shaped longitudinally; apex broad, cavity wide, deep, suture broad, shallow, often a line only, surface smooth, color a bright yellow thinly covered with lively mottled red, with thin light lilac bloom, dots grey, minute, numerous, flesh is light yellow, tender, juicy, a lively pleasant acid, quality good; pit very large, flat, round, oval edges often sharp; skin thin, not astringent.

"Subject to plum pocket and curculio." (H. C. Warner, Forestburg, S. D. (1903.)

"Large crop of pockets and small crop of plums as usual. Ripe August 24th; size one and one-fourth to one and one-half inch; attractive color and fine quality for canning." A. Norby (1902.) "Tree fine upright grower, not an annual bearer with me but does better in Minnehaha county. Fruit one of the largest, finest, and best for cooking purposes of all our hardy plums. The greatest drawback to this variety is the plum pocket fungus which sometimes ruins the crop. Fruit will not keep after gathered." (1903.) "Brings highest price of any Americana plum raised here. Excellent for cooking purposes but will not keep when once ripe, and the tree has the fault of producing almost nothing but pockets some years. This variety seems to do better in the neighborhood of Colton, South Dakota. Ripens August 16th to 26th." (1904.)

The Cheney Plum in Manitoba.—"I have succeeded in growing apples, crabs and plums here, but one thing surprises me, I find the Cheney plum away ahead the best of all the varieties I have grown, and yet in all your reports I scarcely ever see it mentioned; but I notice the De Soto is highly praised by many of your members, but here they taste so acid that no one will use them; the Cheney on the contrary, has no acidity, and is excellent for use.—H. L. Patmore, Brandon, Manitoba.

The Prunus nigra class of plums, to which the Cheney and Aitkin belong, has little or no value for this particular section.

We are evidently too far south for that class of plums.—Dewain Cook, Jeffries, Southwest Minnesota (1903.)

Clingstone Wolf, *Americana.*

Plum growers in recent years found that as under propagation in commercial nurseries there were two distinct varieties under the name of Wolf. Whether this is a bud variation or seedling mixture has not been determined. The true Wolf is a freestone; the spurious Wolf is give the above name provisionally. In December, 1904, the Minnesota State Horticultural Society in the recommended fruit list mentions only the "Wolf (freestone.)"

A. Norby: "Set only a few specimens; ripens with the Freestone Wolf; of darker color; a good variety." (1902.) "Not as heavy a bearer as the Stoddard, but a good tree, and fruit runs large and are more exempt from insect injuries than most other kinds and colors up well before getting soft, keeps and carries well, but of only medium quality, ripe here September 1st to 5th." (1903.) "A good market plum exceptionally free from insect injuries or fungus diseases, moderately productive, lacks quality." (1904.)

Comfort, *Americana.*

Introduced by John Wragg & Sons, Waukee, Iowa, in 1879.

"Much too late for this section, of no value here."—A. Norby, (1903-4.)

Compass, *Besseyi X Americana.*

HISTORY.—This is called the Compass cherry but would be called a small extra early plum by most people. This was originated in the spring of 1891 by H. Knudson, Springfield, Minnesota, by crossing the Sand Cherry from near Bismarck, North Dakota, with the Miner plum. The Sand Cherry was the female parent. The resulting seedling fruited in 1894. This hybrid plant has proven to be an early and abundant bearer of small plum-like fruit of pleasant, sprightly flavor, and is worthy of a place in the home garden. It is on the trial list of the Minnesota and South Dakota State Horticultural Societies.

Six Compass trees at this Station were planted in 1898, have been given special attention from the plant-breeding standpoint. After fruiting over five hundred seedlings from

the Compass the writer must conclude that some native Minnesota plum and not the Miner was the sire of this variety, because all the seedlings revert either to the sand cherry or native plum. At the time the originator applied the pollen some Morello cherry pollen was also used but no evidence shows in the Compass or its seedlings. The Compass is probably the forerunner of a race of hybrids which will be of value for general cultivation, but it is a mistake to call it a cherry.

The Compass makes a large, upright strong growing tree with a tendency to long slender branches, suggesting the need of trimming in the early years of growth.

The fruit ripe August 18 to 23; dark red; skin very glossy. Good to eat out of hand and makes a fine jelly. Keeps only a short time after picking and of value chiefly for its earliness for the home garden. The pleasant, peculiar, sprightly flavor is a mingling of sand cherry and plum. In 1903 the crop was excessive and the fruit rotted badly on the tree but the season was an extremely wet one and many other plums were affected in the same way.

DESCRIPTION.—Size one inch by seven-eighths, slightly flattened sideways, say to one and a half inch; shape roundish oval somewhat tapering; apex rounded; cavity distinct, rather deep; suture a line; surface a solid dark brownish red, with characteristic gloss, with some blue bloom, dots very minute, inconspicuous, brown; skin thin, tough; flesh light greenish yellow, very juicy and tender; quality good for eating out of hand; flavor a pleasant acid, a mingling of sand cherry and plum; pit cling, skin is fairly free from astringency; pit with considerable red and free from the fruit, pit is longish oval, tapering to both ends with blunt margin and quite thick.

"Bears young and abundantly; attractive and of fair quality, but is quite subject to spur blight and rot; as a market fruit it possesses little or no value, as we have earlier, larger and more desirable plums."—A. Norby (1904.)

Crescent City, (*hortulana, Miner group.*)

HISTORY.—Originated by H. A. Terry, Crescent, Iowa, 1885.

Two trees of this variety planted in the old Station orchard in 1888, winter-killed.

Danish Damson *Krueger, domestica.*

Imported from Denmark in the spring of 1834 by H. Knudson, Springfield, Minnesota.

A. Norby: "Set good crop; colors early; ripens medium late; blue or black; hangs well to the tree; size three-fourths inches in diameter; fine for canning; not truly hardy." (1902.) "The hardiest and most productive and best of all Domestica plums tried here." (1903.)

Diana, *Americana.*

HISTORY.—Originated by H. A. Terry, Crescent, Iowa, from seed of Hawkeye and produced its first crop in 1893. The two trees received from the originator in 1898 are of large upright spreading habit with thin foliage. Ripe 1902 September 6, 1903 September 7, 1904 September 8. A heavy crop in 1904 succeeding a light crop in 1903. Fruit very large, color yellowish red, pit large, quality very good. A good keeper. This variety merits more attention.

Downing (Charles Downing), *Wildgoose.*

HISTORY.—Originated by H. A. Terry, Crescent, Iowa, from seed of Wildgoose. The first crop in 1885.

Two trees of this variety planted in the old Station orchard in 1888 winter-killed. Downing is one of the best varieties of the Wildgoose group but must be grown further south.

Dennis, (Dr. Dennis) *Americana.*

Originated from seed of Hawkeye by H. A. Terry, Crescent, Iowa; first fruited in 1891.

A. Norby: "Fair crop; medium size; does not color well." (1902.) "Of no special value, has fruited here for several years." (1903.) "Not equal to many other kinds maturing at the same time." (1904.)

DeSoto, *Americana.*

HISTORY.—Found wild on the Mississippi river at DeSoto, southwestern Wisconsin, and introduced by Elisha Hale of Lansing, Iowa, in 1863 or 1864. This has probably been planted as extensively as any of our native plums and still retains its place on the recommended fruit list after forty years trial.

In 1897 George H. Whiting of Yankton, South Dakota, reported to this Station as follows: "In plums, If ruited the De-

Soto, Forest Garden, Wolf and wild seedlings. In value and productiveness they rank as named. The DeSoto, on its own roots, I consider the best all around plum for South Dakota on account of its extreme productiveness and its ability to endure drouth and cold. My DeSoto trees at Esmond have not missed a crop for the last nine years with no special care, and it has been so dry that some years they did not make an annual growth to exceed two inches."

Five trees of DeSoto on own roots planted in 1896 at the South Dakota Experiment Station have been exceedingly productive and made a strong growth. The chief fault of this variety is its tendency to over-bearing. The fruit should be thinned when an excessive crop of fruit is set to prevent the fruit running too small. The color is not so attractive as many other varieties and the season is rather late for the northern part of the state. Quality very good; pit small. A good all around plum for general cultivation owing to its habit of annual bearing and excellent quality.

In the old Station orchard planted in 1888, some of the trees are now in very poor condition from excessive bearing, but they still keep on bearing. Considerable plum pocket developed in 1903. Fruit ran large in 1904 and Mr. Haralson notes: "DeSoto, Wyant, Wolf in the order named are healthier than the other varieties and still bearing. They are the best varieties in the old orchard."

"Inclined to over-bear."—H. C. Warner, Forestburg, S. D. (October, 1903.)

A Norby: "Large crop; size one and one-eighth to one and one-fourth inches; does not crack after a rain; quite free from pockets but often badly hurt by curculio and gouger; needs severe thinning." (1902.) "Hardy, sets too heavily and runs small; exceptionally subject to curculio and gouger; prefer the Wolfs for market plums." (1903.) "A great annual bearer. Sets too much fruit and runs small unless severely thinned. More subject to the gouger and curculio than almost any other named variety tested here. The standard in quality when well grown. Ripe here from the 1st to the 10th of September." (1904.)

Early Minnesota, *Americana.*

Found wild by Joseph Wood of Windom, Minnesota. A low spreading tree of open habit, hardy and very productive. Ripe August 24, 1903 and 1904. Fruit rather small; yellowish red; sweet; juicy; skin rather thick but sweet; a fairly good keeper; would ship well as does not bruise easily. The small size will not make this variety desirable for the main crop but it is worthy of attention for first early.

A. Norby: "Set small crop; ripens with Odegard; size one and one-eighth inch; round; yellowish red; very sweet; subject to pockets." (1902.) "Tree good grower and fairly productive, quite subject to pockets. Fruit round, yellowish red, very sweet and good to eat out of hand, but runs too small in size." (1903.) "Tree a good grower, quite subject to pockets, fruit small to medium, round, very sweet, ripe with the Odegard, rots some." (1904.)

Esther, *hortulana Mineri.*

HISTORY.—Originated by H. A. Terry, Crescent, Iowa, 1885.

Two trees of this variety planted in the old Station orchard in 1888 winter-killed.

Forest Garden, *Americana.*

HISTORY.—Found in the woods at Cedar Rapids, Iowa, by Thomas Hare and introduced about 1862 by H. C. Raymond of the Forest Garden nurseries, Council Bluffs, Iowa. Owing to its earliness and excellent quality this variety still retains a place on the fruit list in spite of the fact that the trees are weak in the forks and are inclined to split under heavy fruiting, and the fruit is not of large size. This sprawling habit of growth should be corrected by pruning back the leading branches to induce a more compact habit of growth.

Many trees of this variety at the South Dakota Experiment Station have proven heavy bearers of rather small fruit of very good quality. Some of the trees have been badly injured by splitting down in the forks as already mentioned. In wet seasons the fruit cracks badly and is a poor keeper after picking. Fruit ripe 1902 September 1, 1903 September 7, 1904 September 7. Fifteen trees of Forest Garden on sand cherry roots planted in orchard in 1898 as one year trees have made a strong well shaped tree with a few dead limbs and plenty of fruit. S

trees of Forest Garden on own roots and on native plum roots are larger in tree and of rather open habit.

A. Norby: "Good crop; ripe August 26th; size one one-eighth to one and one-fourth inches. Sweet; cracks badly after a rain; stands drouth very well. Tree a little weak." (1902.) "Tree a rampant grower, splits easily, very productive, stands drouth well, fruit of good average size, sweet, cracks easily." (1903.) "Stands drouth remarkably well, generally productive, skin of fruit cracks easily after a rain." (1904.)

Free Silver, (see Terry.)

Golden Prune, *domestica.*

HISTORY.—Originated at Milwaukee, Oregon, from seed of Italian Prune, by Seth Lewelling.

A large yellow plum of good quality. Not tested at this Station, but has been doing well the past few years at Rapid City in the Black Hills region. First tested at Rapid City by Chris Thompson and later by Judge Levi McGee and others. This variety appears worthy of trial in localities which permit the growing of European plums.

Hammer, *hortulana.*

HISTORY.—Originated by H. A. Terry, Crescent, Iowa, from seed of Miner and introduced by him in 1892. Seven trees received in 1896 from the originator show many dead branches and many others killed back one-third to one-half. The trees have attained large size and are of spreading habit. Kill back severely while young but appear to become hardier with age; fruit is large but too late for this latitude, none have ripened the last five years before frost. Not recommended.

A. Norby: "Fair crop; little later than Forest Garden; free from pockets; bright attractive color; size one and five-sixteenths of an inch in diameter. Flesh firm; quality good; stands drouth very well; cracks badly sometimes. This variety has some of the Miner blood in its makeup and is not truly hardy in our coldest winters." (1902.) "Free from pockets, fruit of large size when not over-bearing and of high quality; cracks easily." (1903.) "Not always hardy but free from pockets and quite productive, it also stands drouth well, fruit large and fine when not overloaded. It has the fault of cracking badly after a rain." (1904.)

Harrison, (Harrison's Peach) *nigra.*

In the old Station orchard set in 1888 this variety has distinguished itself as bearing fruit of large size and excellent quality but the trees are shy bearers.

"Large but not productive."—H. C. Warner, Forestburg, S. D. (October, 1903.)

A tree of Harrison's Peach on sand cherry stocks raised at this Station and planted in the orchard as a one year tree in 1898; bore a good crop in 1902, ripe September 4; a good crop of nice clean fruit in 1903, ripe September 7; 1904 the tree overbore, fruit ripe September 10; rather small with some scab; fruit red some yellow on one side; quality fair. In the old orchard planted 1888 on the Harrison Peach on native plum root the crop was lighter but the fruit much larger; a good keeper.

Hart, (Hart's De Soto) *Americana.*

Originated with H. Hart, Sioux county, Iowa, as a sprout from stock of a tree bought for De Soto. Mr. Hart sent scions to Prof. J. L. Budd of the Iowa Agricultural College about 1890, who introduced the variety widely.

A. Norby: "Fruited for the first time last season; like the common De Soto it bears while small. Ripens eight to ten days earlier. Promises better." (1900.) "Distinct from De Soto; more spreading, very young and abundant bearer. Fruit resembles the De Soto in shape and color but ripens from ten days to two weeks earlier. Runs larger; do not think it so good in quality. Valuable." (1904.)

Hawkeye, *Americana.*

HISTORY.—Originated from seed of Quaker by H. A. Terry, Crescent, Iowa, and bore its first crop 1882. Mr. Terry introduced this variety in 1883 and states that in order to obtain good fruit of uniform size the Hawkeye should be grown on its own roots. The large size of fruit of this variety has given it a wide popularity.

Several trees of this variety on own roots and planted in 1898 have been very productive. In 1904 the trees were loaded to the ground and C. Haralson noted: "One of our very best

varieties." Fruit very attractive in color, ripens evenly; quality fair; pit large and flat; fruit a fairly good keeper. Tree of strong growth. Ripe 1902 September 6, 1903 September 8, 1904 September 9. In 1903 this variety was second only to the Terry (Free Silver) in size.

"Good market variety."—H. C. Warner, Forestburg, S. D. (1903.)

"As I have it, it appears almost identical with the Stoddard."—A. Norby (1904.)

Hunt's De Soto, *Americana.*

HISTORY.—An Iowa variety introduced by Prof. J. L. Budd from the Iowa Experiment Station a few years ago

Three trees from the Iowa Experiment Station prove to be early and heavy bearers. Fruit about like De Soto but a little larger and darker red. Quality fair as determined from trees that overbore the past season; in keeping capacity, however, in 1904 this came next to Bender. Merits attention.

Iowa, *Americana.*

An early variety from northeastern Iowa.

"Keeps well, but too small."—H. C. Warner, Forestburg, S. D. (1903.)

A. Norby: "Small crop; ripe August 20th; of good size; drops badly; bitter skin." (1902.) "Ripens with the Odegard and runs large, fair to eat from the tree but skin too acerb for cooking. Of no special value." (1903.)

Jones, *Americana.*

HISTORY.—"Originated under cultivation with Mrs. Owen Jones, Crescent, Iowa, in 1880. Introduced by H. A. Terry in 1895." (Iowa Station Bulletin 46.)

The two trees received from the introducer in 1896 do not give promise of this variety proving valuable. It lacks in perfect hardiness and is rather late. Ripe September 10, 1903 and September 12, 1904. One tree is nearly dead. The other bore a heavy crop of fair sized yellowish fruit, smooth and clear, quality fair. Tree low and spreading.

"Productive, good."—H. C. Warner, Forestburg, S. D. (October, 1903.)

Knudson's Peach, *Americana.*

From Springfield, Minnesota.

"Not worth planting."—H. C. Warner, Forestburg, S. D. (1903.)

"Poor crop; small; lacks color and produces too many pockets."—A. Norby (1902.)

Klondike, *Americana.*

HISTORY.—Originated with John Wragg & Sons of Waukee, Iowa, from Americana seed. Introduced in 1897 by W. F. Heikes, Huntsville, Alabama. A variety recommended for its earliness.

At this Station the trees proved early bearers and good growers.

DESCRIPTION.—Fruit nearly round, size medium or below, bright yellow, slightly mottled and shaded with red with thin whitish lilac bloom, dots minute, whitish, numerous; skin thin; suture a broad line, apex rounded; cavity regular, narrow, rather deep; flesh bright yellow, pulpy, tender, sweet, flavor very good; pit small, cling. The color and size against it as a market variety. Not a good keeper. Ripe September 5, 1904.

Lang, *Americana.*

HISTORY.—Under the name of Lang or Rang two trees in the orchard of this Station received in 1898 from C. W. H. Heideman of Minnesota. On sand cherry stock the habit is so sprawling and rampant that the shoots bend over to the ground. Those on native plum stock also have an open sprawling habit indicating the necessity of severe pruning to secure more compact head. The fruit is large, nearly yellow, of good quality, ripe September 5 to 8. Not especially promising.

The three trees of Lang on sand cherry stock propagated at this Station and planted in 1900 have borne the past two years. Fruit large; yellowish; skin thin; pit small; flesh sweet and juicy; quality good. A very good keeper after being picked. In 1903 many rotted on the tree. The very straggling habit is an objection to this variety.

Lillie, *Americana.*

HISTORY.—Grown from seed of Hawkeye by H. A. Terry, Crescent, Iowa; first crop of fruit 1893; introduced 1894.

Two trees from the originator planted in 1898 have borne heavy crops. Tree a moderate grower with thin foliage ; 1902 ripe September 1, 1903; 1904, September 8. On overloaded trees in 1904 the fruit was rather small. Color dark red with heavy blue bloom; quality fair; a good keeper.

Lombard, *domestica.*

HISTORY.—An old variety originated in New York. One of the most commonly grown of the European plums, but not sufficiently hardy in the prairie northwest. However, fair specimens of this variety have been grown at this station crown-grafted in a wild plum thicket. Two trees of Lombard on sand cherry stock grown at this Station and planted in 1900 have made a good growth and bore well in 1904 for the size of tree.

Manitoba No. 1, *nigra.*

HISTORY.—A wild variety from Manitoba, remarkable for bearing fruit on very young trees not over three feet in height. From this race we will probably get some extra early seedlings.

Tree very productive ; fruit ripe 15th to 20th of August ; fruit medium size ; color rich bright red ; skin rather thick and bitter; a good keeper. Valuable for its extreme earliness.

A. Norby : "Blooms a little later than Aitkin. Ripe August 10th ; the earliest variety fruited here. Crop fair ; bright red; attractive ; size one and one-eighth inch in diameter ; flesh firm, a perfect freestone ; not free from pockets." (1902.) "Ripens here from August 1st to 10th, at least a week earlier than any other variety, somewhat subject to pockets but not seriously. Tree a slow grower, bears when three feet high, and very productive. Fruit one to one and one-eighth inches in diameter; round, attractive, bright red, beautiful, meat firm, pit free. Cooks well. Worthy of planting." (1903.) "Tree a slow grower, bears when three feet high, quite productive and bears every year, fruit of bright red color, freestone, ripe August 1st to 10th, the earliest plum fruited here. So far it has developed no bad qualities and I think it valuable." (1904.)

Manitoba Seedlings, *nigra.*

HISTORY.—Under this heading may be mentioned a lot of seedlings grown by the writer at the South Dakota Experiment Station from wild pits received from Manitoba. As a class

they are remarkable for bearing fruit when very small, and as being the earliest race of plums on the grounds. In general they resemble the Manitoba No. 1 mentioned above. Several of these seedlings were selected in 1904 when bearing a heavy crop of fruit as being worthy of further trial.

Mankato, *Americana.*

HISTORY.—From Mankato, Minnesota. At first claimed to be a seedling of German prune crossed with some native plum but no evidence of this appears in the tree or fruit. Introduced by S. D. Richardson of Winnebago City, Minnesota, in 1890.

Four trees from the introducer planted in 1898 have made a very strong, vigorous growth, fairly productive and are now large trees with abundant dark green foliage. Ripe 1902 September 4; 1903 September 3; 1904 September 5. There is some tendency to fruit rotting on the trees. Rather poor keepers. Needs a longer trial.

DESCRIPTION.—Above medium, roundish, slightly oblique, somewhat irregular, apex a slight depression, cavity wide, deep, surface dark solid rather dull red, with very heavy light lilac bloom; dots whitish, large, numerous; skin medium; thick, sour but fairly free from astringency, flesh deep yellow, firm, flavor sweet, quality very good, pit semi free, roundish, rather thick.

A. Norby: "Good crop; ripe early, August 28th, size one and one-fourth inches. Dull red of medium quality; rots quite badly." (1902.) "This I think a pure Americana. Ripe last season August 25th. Not very productive but fruit runs large, one and three-eighth inches in diameter, dark red, quite subject to rot, of no special value." (1903.) "A pure Americana, tree quite hardy and fairly productive, fruit large, dark red, sweet; ripe August 15th to 25th. Much subject to rot on the tree." (1904.)

Maquoketa, *hortulana.*

HISTORY.—An old variety found on the Maquoketa river, eastern Iowa.

Eight trees of this variety planted in 1896 are large trees in poor condition with some dead branches. One tree is dead. All have been shy bearers and the fruit is too late being usually unripe when frost comes. This variety is much like the

Miner and serves to show that this race is here beyond its northern successful limit.

Marcellus, *Americana.*

HISTORY.—Originated by H. A. Terry, Crescent, Iowa, from seed of Van Buren and fruited in 1893.

Of two trees planted in 1898, one tree is dead and the other has made a strong healthy growth. Fruit ripe 1902 September 6; 1903 September 8; 1904 September 12. Of fair size; good quality; a good keeper. Tree a light bearer so far.

Marcus, *Americana.*

HISTORY.—Originated by M. E. Hinkley, at Marcus, northwestern Iowa. Mr. Hinkley is now editor of the Fruitman, Mt. Vernon, Iowa, and under date of March 27th, 1905 writes:

"Answering yours of the 22d will say Pilot and Marcus plums originated from seed which I planted in the fall of 1870. I went to a grove of wild plums on the Little Sioux river, six miles south of Cherokee, Iowa, and gathered several bushels. Picked out the largest and best to plant, and had 200 to 300 seedlings. Planted 100 of the best growers in orchard and gave away the rest. When they began to fruit there were at least 75 distinct varieties. All colors, and all seasons from August 1st to October 1st. I selected the Marcus and Pilot as the two best for commercial purposes, because of size and quality."

Fruit large, very handsome, bright red, glossy; of fairly good quality; pit small, cling, quality fair; a good keeper; generally bears heavily but is rather late for this locality. Ripe September 15, 1904. Probably would be a good variety for the southern part of the state. Fruit trees from the originator in 1896 are strong growers and bear heavy crops.

Dewain Cook, of Jeffries, southwest Minnesota, writes in Minnesota Horticultural Report for 1901: "I want to call attention to the Marcus plum from northwest Iowa. It is of large size, etc.; season a little later than De Soto. Its strongest point is its deep red color while the fruit is yet hard. It also keeps in condition for marketing a long time.

Merunka, *domestica.*

HISTORY.—Imported from Russia by Prof. J. L. Budd in 1884. As fruited in Iowa this variety is superior to Lombard in size and quality. At the South Dakota Experiment Station the

tree is not sufficiently hardy. Of trees one is dead and the other nearly so.

Milletts Early Red, *Americana.*

Found wild near Pierre, S. D. Several younger trees in the old Station orchard are of low, bushy babit. Hardy; not productive and too small and poor in quality. Its early ripening is the only good point.

In the young Station orchard several trees of this variety have proven light bearers, of value only for earliness. Ripe August 29, 1902, fruit cracked and scabby. Ripe September 1, 1904; fruit of fair size with little scab; color red with yellow cheek; skin thick; pit rather large; flesh firm, sweet; quality good. Tree rather dwarf.

Millett, (Millett's Wild Plum) *Americana.*

Several varieties of this tree in the old Station orchard, are vigorous and productive but the fruit runs too small.

Milletts T. T., *Americana.*

Three younger trees in the old Station orchard are productive, but fruit runs too small. Fruit ripe September 5 to 7. Of no special value.

Milletts Very Early Red, *Americana.*

HISTORY.—Younger trees of this variety are moderately vigorous, rather bushy habit, and very heavy bearers. Fruit ripe September 7 to 10. Too small and dry to be of any value.

Milton, *Wildgoose.*

HISTORY.—Originated by H. A. Terry of Crescent, Iowa, from seed of Wildgoose and found valuable in southern Iowa for its earliness. Not reliable in northern Iowa.

Trees set in the old orchard at this Station winter-killed at an early age, serving as another indication that this type of plum is not for this latitude.

Miner, *hortulana Mineri.*

HISTORY.—The seed which produced the Miner plum was planted in 1814, in Knox county, Tennessee, by William Dodd, an officer under General Jackson (Bailey.) Probably the first native plum to be introduced into cultivation and widely planted in Illinois, southern Iowa, Missouri and other parts of the west.

Not found on the recommended fruit list of the Minnesota State Horticultural Society. As far as South Dakota is concerned the northern limit of this variety is along the Missouri river in the southeastern part of the state. At Vermillion and Yankton this variety has been planted extensively in mixed orchards with Forest Garden. The general experience shows that Miner is not productive when planted by itself in the orchard; it should be intermingled with other varieties. At Vermillion and Yankton the proportion generally planted is two trees of Miner to one of Forest Garden; the Forest Garden for its earliness and productiveness, with the Miner considered as the more valuable variety because of its late ripening, coming in the cool weather in the fall when housewives prefer to can plums.

In the old Station orchard at Brookings are in poor to fair condition but the fruit ripens too late to be of any value in average seasons being caught by frost before acquiring sweetness. A light bearer here. In nursery row one year shoots from the graft or bud kill back severely the first winter showing inherent lack of hardiness.

Moldavka, *domestica.*

HISTORY.—Imported from Russia by Prof J. L. Budd.

This variety has not proven hardy in the old Station orchard and the trees are now dead. In the Wells orchard at Spearfish in the Black Hills region this variety was observed by the writer in the summer of 1904 to be doing well. The trees came from the introducer direct about ten years ago. The fruit is large; yellow; of excellent quality.

New American, *Americana.*

In the old Station orchard set in 1888 this variety has proven too late in season to be of any value.

New Ulm, *Americana.*

HISTORY.—A wild seedling from New Ulm, Minnesota, introduced by C. W. H. Heideman, Minnesota. This variety has been recommended for large size and productiveness, but owing to its poor growth in nursery it was removed from the recommended fruit list of the Minnesota State Horticultural Society at the annual meeting in December, 1904. At this Station the

New Ulm plum on sand cherry stock makes a dwarf tree bearing very heavy crops. A large, showy fruit of good quality. The fruit rots quickly after picking and shows tendency to rot some seasons. The last season the crop was mostly lost in this way. The tree is not strong enough to support the crop of fruit. Ripe September 8, 1904. New Ulm plums on wild plum stocks planted the same year, 1900, have behaved in a similar manner. The trees are very low, open and spreading with a strong tendency to overbearing. Ripe September 7, 1903, and September 8, 1904. Fruit large, color dull yellowish red, not especially attractive for market; skin rather tough; quality fair, a clingstone. The past two wet seasons they have cracked and rotted badly on the tree and are poor keepers after picking. The size and productiveness of this variety would give this a longer stay on the fruit list were not the poor habit of tree against it.

H. C. Warner, Forestburg, S. D., reported in 1903 that this variety was large and fine upon his grounds.

A. Norby: "Large crop; ripe August 26th; averages very large, one and one-fourth to one and one-half inch; firm, yellowish red with white bloom when first ripe, but loses its fine appearance soon after gathered and will not stand up well for shipment, but brings highest price in market and has given good satisfaction as a cooking fruit; somewhat subject to rot." (1902.) "Tree a straggling, crooked grower, the worst of the entire family. Very productive, fruit large to very large, yellow overspread with light red and white bloom. It loses its attractive color after being gathered. Quality fair and cooks well. This has been a profitable variety with me, at least while the trees are young; as the trees grow older the fruit is more attacked by the brown rot, to which it is more subject than any other kind. It also cracks quite badly after a rain." (1903.) "Tree crooked, weeping grower; a prodigious bearer; fruit large to very large; brings a good price if sold as soon as gathered; it seems to give good satisfaction for canning. Has been a profitable variety with me, although it rots quite badly. It is hard to propagate and will probably be dropped from the list. Ripens about with the Mankato, August 15-25." (1904.)

Norby No. 1, *Americana.*

HISTORY.—Originated by A. Norby, Madison, South Dakota. Our tree is too young for definite report. In 1904 the fruit was large and fine and of good quality, ripe September 12.

Norby No. 11, *Americana.*

HISTORY.—Originated by A. Norby, Madison, South Dakota.

Two young trees of this variety bore last year a heavy crop of large size and good quality. Ripe September 8. Worthy of propagation.

DESCRIPTION.—A heavy bearer, but fruit so well distributed it does not overbear; size above medium; roundish oblong, regular, apex usually a slight depression, cavity wide, rather shallow, suture broad, shallow; surface dark rich red, mottled and shaded with yellow on shaded side, surface smooth, bloom thin lilac, dots white, minute, numerous, many red dots in light colored specimens, skin thin, firm, flesh yellow, clear acid, quality good, pit free or slightly adherent, long oval. Probably a good market plum owing to firmness of fruit.

"Of seedlings originated here the No. 11 is not so bad. It is all that can be desired for bearing, as it never fails. The fruit is of fine appearance, fair size and ripens medium early." (A. Norby, 1904.)

Ocheeda, *Americana.*

Found wild in 1872 by P. L. Hardow, on the banks of Ocheeda Lake, Minnesota. Introduced in 1892 by H. J. Ludlow, Worthington, Minnesota. Now on the list recommended for trial by the Minnesota State Horticultural Society.

A. Norby: "Set only a few specimens; of fine appearance and good quality. Considerably hurt by curculio and gouger." (1902.) "Ripens with the Wolfs. Tree good, generally productive, a little undersized but of fine quality." (1903.) "Tree good, fairly productive, somewhat subject to pockets, fruit of nice appearance and high quality, but is rather small for market; a little earlier than De Soto." (1904.)

Odegard, *nigra.*

HISTORY.—Originated near Brookings, South Dakota, from a lot of pits received from Zumbro Falls; Wabasha county, Min-

nesota, and planted in the spring of 1880. Introduced by H. T. Odegard, Brookings, South Dakota, who bought some of the seedlings as one year old trees.

In the young Station orchard a number of Odegard trees on native plum roots have proven early and good bearers. 1902 ripe August 26; 1903 August 29; 1904 August 30. In favorable seasons the season is fully ten days earlier than this (August 11-15), and the variety is worthy of trial owing to its large size, early ripening and productiveness. The strong growth of the tree indicates the need of pruning back to secure more compact habit of growth. Under the heavy crop the long limbs are whipped about too much by the wind. The number of the Odegard trees on sand cherry stocks grown at this Station and planted in the spring of 1898 as one year trees from the graft or bud have borne early and abundantly but the root system does not appear strong enough to support the top which is left unpruned. Some of the trees have now sagged or lopped over to one side. In 1904 about two-thirds of the heavy crop of fruit of this variety, both on native plum and sand cherry stock, all shrivelled and dried up with scab, hardly a specimen being free from it; the foliage was also affected. Those on sand cherry were more so than those on plum stock. The past two seasons may be considered exceptional ones in plum culture.

A. Norby: "Set small crop owing mainly to overbearing in 1901. Ripe August 18th; size one and one-eighth by one and one-half, being a long plum. Quality good, very nearly equal to the Cheney for cooking and canning. Will not stand as much drought as many other kinds and generally reported a failure East. Still the best large early plum tested here, although somewhat subject to pockets and rot." (1902.) "Tree a good grower; will bear twice as much fruit as the Aitkin of same age and ripens at the same time. Fruit runs large to very large and is of good quality for any use. In a wet season like the last this variety scabs sometimes quite badly, so as to reduce the crop materially. Still the best early large plum tested here." (1903.) "Was my best early plum 'till two years ago, when it was badly attacked by the scab, also last year. Hope an effective remedy will soon be found for this disease." (1904.)

Old Gold, *Americana.*

HISTORY.—Introduced by C. W. H. Heideman, Minnesota

Two trees received from the introducer in 1898 have made a good growth, but are light bearers. Fruit medium to large, yellow; quality poor. 1903 ripe September 7; 1904 September 7. In 1903 this was the only variety in the orchard that was severely attacked by the shot-hole, or leaf spot fungus.

"Subject to shot hole fungus." (H. C. Warner, Forestburg, S. D. 1903.)

Olson.

HISTORY.—Found on the Vermillion river, near Vermillion, South Dakota, many years ago. The young tree from E. D. Cowles, Vermillion, has proven productive. The fruit is of fair size but late and the pit is too large for size of fruit.

"Quality fine, more like a prune than a plum." (H. C. Warner, Forestburg, S. D. 1903.)

Orel No. 19, *domestica.*

Of Russian origin.

Two trees of this variety planted in the old Station orchard in the spring of 1888 winter-killed.

Orel No, 20, *domestica.*

Of Russian origin.

In the old Station orchard set in 1888 two trees are still in fair condition but show many dead branches and only bear specimens; too shy a bearer for commercial purposes.

Orel No. 21, *domestica.*

Of Russian origin.

In the old Station orchard set in 1888 this variety has proven a shy bearer and the tree deficient in hardiness.

Oxford, *nigra.*

HISTORY.—An early variety from Minnesota.

Not fruited sufficiently at this Station to determine its value. J. S. Harris is quoted in Wisconsin Bulletin 63 as having found it the earliest variety fruited here and the tree closely resembling Aitkin in foliage, color of wood, habit of growth and quality of fruit.

A. Norby: "Fruit is large and ripens early; lacks pro-

ductiveness." (1903.) "Tree a better grower than Aitkin, which it closely resembles in tree, fruit and foliage, also in season of ripening; lacks productiveness." (1904.)

Owatonna, *Americana.*

HISTORY.—A wild variety from Owatonna, Minnesota. In the old Station orchard set in 1888 several trees of this variety have attained large size and are perfectly hardy and in good condition. The fruit, however, runs small and poor in quality. Not recommended.

Penning's Peach, *Americana.*

In Bulletin No. 63, Wisconsin Experiment Station, Heideman, of Minnesota, is quoted as follows: "A most excellent plum; introduced about twenty years ago as Peach Plum and was sold as such by most northwestern nurserymen. I added 'Penning's' to avoid confusion." Mr. Terry, of Iowa, is also quoted as considering it identical with Harrison's Peach.

"Only a few specimens as usual. Too shy a bearer." (A. Norby, 1902.)

Pilot, *Americana.*

HISTORY.—Originated by M. E. Hinkley, Marquis, Iowa (now of Mt. Vernon, Iowa), in 1874 from seed gathered on Little Sioux river, Cherokee county, Northwestern Iowa. (see Marcus.)

The tree is large, open, somewhat weeping habit, with heavy foliage. Ripe in 1903 September 12; 1904 September 16. Fruit quite large, one and three-eighths by seven-eighths inches, egg shaped, very dark red; quality very good and keeps well after gathering. Season rather late for this locality but a very attractive variety for market; tree productive.

"Good crop; quite large; fails to color well and has a thick, bitter skin." (A. Norby, 1902.)

Pomona.

A promising new variety originated by E. D. Cowles, Vermillion, S. D.

Of very strong growth in nursery. Apparently "a natural cross of Forest Garden and Miner."

Prunus Americana X Hortulana Crimson.

Received from C. W. Heideman, Minnesota, in the spring of 1898. A heavy bearer; fruit ripe September 4, 1902, September 5, 1903 and 1904. Fruit dark red; too small to be of any commercial value.

Prunus hortulana X Americana Yellow.

Small; too small for market, being remarkable only for its bright yellow color with no trace of red. This year (1904) it is covered with scab. Form, oblong, tapering to a point, apex pointed, cavity a raised point, suture a yellow line or invisible, dots none; skin tough, very astringent; flesh yellow, a sharp acid, quality poor; pit pointed at both ends, especially at apex, large flattened.

Prunus Maritima.

Four trees of this species, the wild Beach plum of the eastern states, bear fruit that is very small and much too late to be of any value.

Prunus nigra Crimson.

HISTORY.—Tree from C. W. Heideman, Minnesota, planted in the spring of 1900. No fruit in 1903. As fruited in 1904 the fruit is too small to be of any commercial value.

Prunus nigra Yellow.

Received from C. W. H. Heideman, Minnesota, planted in the spring of 1900. A tree of vigorous open growth. The fruit ripe August 26, 1902, and August 30, 1904. In 1904 the crop was light. Fruit yellow, of fair quality, but too small to be of any commercial value.

Prunus Simoni.

An apricot plum from China, now much raised in California.

"Not hardy." (H. C. Warner, Forestburg, S. D., 1903.)

Purple Yosemite, *Americana.*

"Quality fine, fair size." (H. C. Warner, Forestburg, S. D., 1903.)

Rareripe, *Americana.*

On several trees in the old Station orchard planted in 1888 Prof. C. A. Keffer reported in Bulletin 26, July, 1891, as fol-

lows: "Ripe September 11th; skin dark red, showing yellow below; clingstone; size a little smaller than DeSoto; shorter diameter about two-thirds of the longer; quality rather better than DeSoto, but inferior to Harrison's Peach; it is not so good a bearer as Harrison, but withstands the wind better; no better in this particular than DeSoto, and on the whole it cannot be considered an improvement on that sort. Tree hardy and a moderate grower."

These old trees have borne excessive crops and are now in poor condition. Fruit sweet and of good quality, but too small. Ripe 1903 September 1; 1904 September 8. Tree much subject to plum pocket in 1903.

Rockford, *Americana.*

HISTORY.—A wild variety introduced by Charles G. Patten, Charles City, Iowa.

In the old Station orchard planted in 1888 this variety has proven itself a very heavy, constant bearer, so much so that the fruit runs undersized. Fruit distinguished by the heavy blue bloom and excellent quality.

H. C. Warner, Forestburg, S. D., writes: "This variety is inferior."

A. Norby: "Large crop, ripe August 28th; always scab by, rather small, dark red with bluish bloom, of fine quality; free from pockets, hangs well to the tree." (1902.) "Tree hardy and excessively productive, free from pockets. Fruit generally runs too small on account of overbearing. The rust or scab confined to this variety disfigures the fruit. Pit large for size of plum. In quality it ranks high. This comes nearer being a blue plum than any other Americana. Ripens about September 1st." (1903.) "Tree inclined to overbear and fruit is too small for market; always free from pockets." (1904.)

Rollingstone, *Americana.*

HISTORY.—Found on the banks of Rollingstone Creek, Winona county, southeastern Minnesota, by O. M. Lord, Minnesota City, and introduced by him about 1882.

In the old Station orchard, planted in 1888, Rollingstone has proven very hardy and productive. The fruit runs small under heavy bearing but is of excellent quality and free from

plum pocket. Several trees of this variety set in 1896 have also been hardy and very productive. Its habit of heavy annual bearing makes the size run small some years. Of vigorous spreading growth making a large, handsome tree with abundant, dark green foliage, free from rust. Ripe 1902 September 1, 1903 September 10, 1904 September 10. Fruit roundish, medium, heavy blue bloom and small pit. One of our favorite plums owing to its high quality. The good quality of this variety will probably keep it on the recommended fruit list for a long time in spite of the recent introduction of larger varieties. The heavy blue bloom of the fruit adds to its attractiveness.

"One of the best every way." (H. C. Warner, Forestburg, S. D , 1903.)

A. Norby : "Small crop as usual; ripens with the Rockford; tree poor; fruit scarcely of medium size; very acerb skin which makes it a poor cooking plum." (1902.) "I have had it on own roots for about 15 years. Tree poor, moderately productive; fruit rather below medium, skin bitter, poor for cooking; of no special value here." (1904.)

Rollingstone X Wolf, *Americana.*

HISTORY.—Originated at the Iowa Experiment Station under the direction of Prof. J. L. Budd by crossing the Rollingstone with Wolf. Several seedlings were raised from this parentage. A tree of one of these seedlings in the Station orchard has proven hardy and productive. The tree is strong and vigorous and open in habit; needs pruning. Tree with heavy dark green foliage; fruit ripe September 4, 1902, September 5, 1903, September 5, 1904. Mr. Haralson notes: "Fruit much like Rollingstone but a little larger."

DESCRIPTION.—Medium size, roundish, truncated, apex flat, cavity deep, suture broad, very shallow, surface shaded yellow and red with the red predominating, heavy blue bloom, dots whitish, minute, many, skin rather thick, firm, fairly free from astringency, flesh firm, yellow, pleasant, sweet, quality good; pit small, free.

Rue (J. B. Rue), *Americana.*

HISTORY.—Originally received, ten or more years ago, by Prof. J. L. Budd at the Iowa Experiment Station from J. B.

Rue, Pottawattamie county, Iowa, and distributed by Prof Budd under the name of J. B. Rue.

This variety received from the Iowa Experiment Station in 1898 has been a good bearer. Fruit very large, round; deep red; skin rather tough, about like Wolf, pit rather large; flesh sweet and solid; the fruit is very attractive, of good quality, ripens evenly and is a very good keeper. Ripe September 7-10. Tree of large, strong, open habit and needs pruning to secure a more compact habit.

Russian No. 2, *Domestica.*

HISTORY.—Of Russian origin.

Two trees of this variety planted in the old Station orchard in the spring of 1888, winter-killed.

Russian No. 3, *Domestica.*

HISTORY.—Of Russian origin.

Of two trees of this variety planted in the old Station orchard in 1888 one tree is dead and the other nearly so. A shy bearer and not sufficiently hardy.

SOME SEEDLING PLUMS NOT NAMED.

Many thousands of seedling plums are coming into bearing in many neighborhoods of the Northwest. The Minnesota State Horticultural Society has had sufficient state aid so that liberal premiums could be given for seedling plums, and the Minnesota State Fair has also offered premiums the last few years sufficient to bring out a very large and interesting collection of choice new varieties. Of these only a few will come into general cultivation. As the present writer in speaking of seedling fruits in general at one time said: "We are hunting for the Shakespeare of the species and the minor authors are not wanted."

In this Bulletin a few of the thousands of seedling plums on the grounds of this Station are mentioned under the head of State Fair seedlings and Wolf seedlings. Many more could be described but it will be best to defer further mention at present. The following will call attention to some promising plum seedlings from other parts of the state:

Seedling from M. J. De Wolf.—Specimens received from M

J. DeWolf, Letcher, South Dakota, September 7, 1904, who writes that he received a lot of tame seedling plums from C. W. Gurney, Yankton, South Dakota, in 1901. These were grown from pits saved in the plum orchard of his son, H. J. Gurney, Elk Point, South Dakota, which is the largest plum orchard in the state, containing about fourteen acres, and contains mainly such varieties as Hawkeye, Quaker, DeSoto, Wyant, Wolf and Forest Garden. Mr. Gurney offered a premium of $100 to anyone raising plums from these seedlings equal to DeSoto in flavor or in size and beauty to Hawkeye and Quaker. This was one of the most promising plums of the season and the following description was made from ten samples received from Mr. DeWolf: Size very large, one and one-half by one and three-eighths inches; form regular, roundish approaching oval; apex flat; cavity wide, very shallow; suture a line; surface somewhat glossy; color an attractive dark red, slightly marbled on shady side with dark yellow and with some blue bloom; dots many, large, round, conspicuous. In some specimens the red color becomes very dark. The dots vary considerably in size. Skin rather thin, free from astringency; flesh dark yellow, tender; flavor sweet, juicy, quality very good; pit free, roundish, oval, somewhat flattened.

Norby No. 51.—A. Norby, Madison, South Dakota, is raising many seedlings (see Norby No. 11) and reported to the South Dakota Horticultural Society in 1902 as follows: "Of quite a number of seedlings fruited several are quite promising. I will just mention one, No. 51: Small tree; first fruit this year; small crop. All ripe September 2nd; size one and three-eighths by one and seven-sixteenths inches in diameter. Nearly round; red with white bloom; beautiful; hangs well to the tree for a week after colored. Quite firm and keeps well after gathered. Does not crack and was not hurt by the gouger or curculio. This is mentioned to encourage others to save and plant the best pits from best plums for fruiting."

W. H. Heald's Seedlings.—In 1895 W. H. Heald, of Letcher, South Dakota, bought 85 cents' worth of DeSoto plums and saved the pits for planting. In the spring of 1897 he planted the resulting seedlings in rows fourteen feet, eight inches apart and eleven feet apart in the row. Sweet corn was planted be-

tween for three years and cultivated with an ordinary corn plow. Of this number about 260 survived and in 1902 plums were sold to the value of $119 and in 1903 $112.25. A larger crop was set in 1902 but about fifteen bushels were destroyed by the freeze of September 12th. In 1903 circumstances prevented looking after the still larger crop of that year. Mr. Heald reports: "Some of the trees have small, inferior plums, and these we never gather. On some of the trees the fruit was attacked with a fungus resembling a brown or red rust. The fruit so affected stopped growing and was not fit for use, so we lost in that way about twenty bushels. I have many trees that bear fruit larger and better in every way than the parent De-Soto. I have some plums that O. M. Lord says are better than nine-tenths of the plums offered for sale by the nurserymen, and that they should be placed on the market. I know this: I have many plums good enough to bring two dollars a bushel. I have one large yellow plum of fine quality and an exceedingly small pit, and the tree has borne two heavy crops. It ripens about the middle of September."

Smith, *Americana.*

Originated by C. A. Smith, Caroline county, Maryland, from seed of Quaker. Said to be one of the largest plums of its class. Not in the Station orchard.

Mr. A. Norby reports: "Small trees and fair crop; ripe September 2nd; size one and seven-eighths of an inch; quite soft." (1902.) "Large, only fairly productive, much subject to curculio and gouger; of no special value." (1903.) "A good bearer, averages large, but is much injured by the gouger, curculio and rot; not equal to De Soto." (1904.)

Speer, *Americana.*

HISTORY.—A wild variety from J. A. Speer, Cedar Falls, Iowa.

In the old Station orchard the trees have proven hardy but overbear and the fruit runs too small. At its best the size is medium or below.

H. C. Warner, Forestburg, S. D., in 1903 reported this variety as being too small.

State Fair Seedlings, *Americana.*

HISTORY.—These seedlings were grown by the Horticulturist of this Station from pits obtained from prize plates of leading Americana varieties at the Iowa State Fair in September, 1895, and planted upon the grounds of the South Dakota Experiment Station in the spring of 1896. Among them are some worthy of a place on the fruit list. In September, 1904, Chas. Haralson notes that "State Fair No. 36, 24, 38 and 34 should be propagated and given a thorough trial as the fruit keeps long after being picked." The following orchard notes are by Mr. Haralson:

State Fair No. 34.—Ripe September 14, 1904. A heavy crop; fruit large, smooth, of very good quality; a little late; tree very handsome; a good commercial variety.

State Fair No. 36.—Fruit ripe September 12, 1903. A heavy crop; fruit large, about same size as Hawkeye. Ripe September 12, 1904. Mr. Haralson's first choice for heavy bearing and large fruit, but not as early as some. Fruit not as large as last year but the crop is immense. The tree bending to the ground on all sides but still no broken limbs. Worthy of general propagation. The frontispiece shows a bearing branch in 1904.

State Fair No. 37.—Ripe September 11, 1903, September 10, 1904. Tree overbearing this year, being loaded to the ground with large fruit of bright red color and good quality. Should be propagated.

State Fair No. 38.—Ripe September 11, 1903. Crop heavy, fruit large; a good crop in 1902. In 1904 fruit ripe September 10. Size large to very large; light red; of good quality; a very heavy bearer; should be propagated.

State Fair No. 24.—In 1903 fruit ripe September 8; a heavy crop; fruit large and smooth. In 1904 ripe September 10; very large, almost round fruit; color yellowish red, resembling the Terry in color and size; crop heavy; quality good; tree low, strong; fruit a good keeper. One of the best varieties and should be propagated heavily.

Stoddard, *Americana.*

HISTORY.—Origin Jesup, Buchanan county, Iowa, on the farm of B. F. Stoddard. Introduced in 1890 by John Wragg & Son, Waukee, Iowa.

Trees planted in 1896 at this Station are in excellent condition. Fruit very large, and showy, nearly round, quality good. In 1903 the fruit was ripe September 12; in 1904 it was ripe September 15. A light cropper and rather late for this latitude. Resembles Hawkeye but is a little earlier and darker red in color. Mr. Haralson notes: "Resembles the J. B. Rue both in tree and fruit; a good keeper. A very promising variety."

A. Norby: "Good crop; averages large (one and three-eighths inches); of fair quality; lacks attractive color; ripe September 4th; not as hardy as most of the Americana family." (1902.) "Tree hardy here (but will not stand as far north as DeSoto or Wyant.) Sufficiently productive, quite free from pockets. Fruit averages as large as any variety fruited in my orchard. Lacks high color and quality but brings highest price in market. Ripens here August 25th. A valuable variety." (1903.) "Tree of good habit, abundantly productive. Fruit averages as large as any variety. Fully tested here, and on that account is valuable for market, although the quality is rather below the average." (1904.)

Surprise, *hortulana.*

HISTORY.—In 1882 Martin Penning, of Sleepy Eye, Brown county, Minnesota, grew a thousand or more seedlings from pits of DeSoto, Weaver and a few Miner. The best one of these surprised Mr. Penning by its large size and hence was given its present name and introduced by him in 1899. The botanical characteristics of this variety indicate that it is of Miner parentage.

Four trees planted in the Station orchard in 1901 have proven very strong growers. A very handsome tree with upright limbs well distributed. Needs a little trimming when young to secure a more compact habit. Trees one year old from the graft in 1901 began to bear in 1903 and gave a heavy crop in 1904. The fruit large, nearly egg-shaped, color bright red, skin thin, pit small, clingstone; flesh firm, sweet good In 1903 ripe September 7; 1904 September 10. A very good

keeper. One of the best all around market varieties but its late season may make it of value mainly for the southern part of the state. However, we consider it a very good market variety as it generally ripens before frost, and at a time when housekeepers are ready to can plums.

A. Norby: "Set small crop; ripe about September 1st; size one and five-sixteenths of an inch; bright beautiful color; firm and of finest quality; free from pockets, but cracks some. Tree finest grown and truly hardy although of the Hortulana group." (1902.) "Tree extra strong, thrifty grower, with fine foliage; of Hortulana group but perfectly hardy. This variety is free from pockets but may not be as sure an annual bearer as some other kinds. Fruit large when not overbearing, of beautiful red color and excellent quality; clingstone; cracks quite badly after a rain; this I have found its greatest fault. Ripe September 1st." (1903.) "Tree a fine, rampant grower and perfectly hardy. It is also proving a good bearer, entirely free from pockets. Fruit large, when not overloaded, of fine appearance and quality, but when heavily loaded it is much smaller than Stoddard. Like the others of the Hortulana family that I have fruited, it cracks badly after a rain. A valuable plum, however." (1904.)

Terry, *Americana.*

HISTORY.—Originally called the Free Silver. Originated by H. A. Terry, Crescent, Iowa, from seed of Van Buren and first fruited in 1896. Introduced for trial in 1900 by the originator. Craig, in Bulletin 46, March, 1900, of the Iowa Experiment Station, writes: "One of the largest and handsomest native plums yet produced. Flavor strongly indicative of a strain of Miner blood. A very promising plum."

In the orchard of the South Dakota Experiment Station this variety distinguished itself in 1903 by bearing a heavy crop which was ripe September 7, and in size of fruit the largest variety of that year on the grounds. In 1904 the fruit was ripe September 9. In tree this variety is of strong, upright, open habit, but evidently needs pruning to give a more compact habit, to avoid splitting down. One of the trees was badly broken down on account of the heavy load of fruit. Fruit very large, color dark, rather dull red; pit large and flat; fruit a

fairly good keeper and ripens very evenly. Resembles Hawkeye but runs larger in fruit. A plum worthy of the originator, in whose honor it is named.

Ungarish Prune, *Domestica.*

HISTORY.—Imported from Russia.

Two trees of this variety from the Iowa Experiment Station planted in 1898 have shown too great lack of hardiness to be recommended, in common with the rest of the varieties of this species.

Van Buren, *Americana* var. *mollis.*

HISTORY.—A wild variety from Van Buren county, southeastern Iowa, introduced by J. Thatcher.

Three trees in the old Station orchard planted in 1888 have not proven of special value owing to its late season of ripening. In 1904 the fruit was not ripe by the middle of September, which is too late for this region.

Van Deman, *Americana.*

Originated by H. A. Terry, Crescent, Iowa, from seed of Hawkeye, 1891. Not in the Station orchard. Mr. Norby writes: "Full crop always; large, late, cracks so badly before ripening as to be almost worthless." (1902.) "Late; cracks before ripe; of no value." (1903.) "Tree good; very productive, but fruit cracks and scabs before maturity so as to be worthless." (1904.)

Weaver, *Americana.*

HISTORY.—Found wild near Palo, Iowa, by Mr. Weaver. Introduced in 1875 by Ennis & Patten, Charles City, Iowa. This variety has been extensively planted and is still on the recommended fruit list of the Minnesota State Horticultural Society.

In the old Station orchard set in 1888 this variety has proven hardy and productive. Its unattractive color makes it probable that this variety will be superseded by some of the newer introductions. Mr. Haralson makes the following notes of the old trees in the Station orchard: "Trees in fair condition; fruit rusty and of poor quality; discard."

In the young Station orchard two trees of this variety grafted on sand cherry root and planted in the spring of 1898

are now large, with open, spreading habit. In 1903 the fruit was ripe September 9, but very scattering. In 1904 ripe September 12; small and scabby, the trees losing most of their foliage; quality inferior.

Wildgoose, *Wildgoose.*

HISTORY.—This well known southern plum originated near Columbia, Tennessee, and introduced about 1850. The first native American plum introduced into general circulation.

In the old orchard of this Station planted about 1888, this variety winter-killed. It is not usually regarded as hardy north of central Iowa, although a few have been raised along the Missouri river in southeastern South Dakota.

Winnebago, *Americana.*

Four trees of this variety in the old orchard of this Station, planted in 1888, have been productive but the fruit is too small in size and too poor in quality. Not recommended.

Wolf, *Americana,* var. *mollis.*

HISTORY.—Originated about 1852, Wapello county, southern Iowa, on the farm of E. B. Wolf. "From pits said to have been taken from wild trees in the woods." (Bailey.) One of the most popular and widely planted of all our native plums. Sometimes an unknown Americana clingstone variety is called Wolf. (See Clingstone Wolf.)

In the old Station orchard, set in 1888, the Wolf trees are still in fair condition after many heavy crops of large, good fruit. Ripe in 1903 September 8. Free from pocket.

Wolf on Sand Cherry Stock.—Three trees of Wolf on sand cherry stock planted in the spring of 1898 are now large, round topped, vigorous trees. Fruit ripe September 8, 1903; September 10, 1904. Light crop 1903; fair crop 1904. A good commercial variety and generally a fair crop every year. A fairly good keeper.

"All things considered, the best plum here." (H. C. Warner, Forestburg, S. D., 1903.)

A. Norby: Freestone Wolf.—"Set good crop; ripens with Stoddard; size one and one-fourth to one and three-eighths inches; light red; firm; freestone; does not crack, and is quite

free from insect injuries. Good market variety." (1902.) "Distinct in tree, foliage and fruit from the Clingstone Wolf. A better bearer. A perfect freestone, ripening about the same time; like the clingstone it is very free from insect injuries and is a good market plum, although not of high quality. Valuable." (1903.) "Distinct in tree and leaves, more productive than the cling, and equally as free from insects and diseases; not high in quality. Valuable." (1904.)

Wolf Seedlings.

The fact that the Wolf is one of the most desirable varieties has led the writer to raise many seedlings from selected specimens on the grounds of this Station. As a result of the experiments so far the conclusion is reached that the Wolf is prolific of good seedlings. A considerable number bear fruit of good size and quality. Some of these varieties are under propagation for further trial, and a full report is deferred for the next report on plums. The seedlings fruit freely, even when planted closely in nursery rows, the fourth year from the pit, and transplanted the second spring.

Wood, *Americana.*

HISTORY. Found wild by Joseph Wood, Windom, Minn.

Not fruited sufficiently at this Station to determine its value. The tree is somewhat affected with plum pocket and the past two seasons quite subject to ripe rot of the fruit.

DESCRIPTION.—An attractive red and yellow plum of large size and good degree of firmness, size large, form roundish, flattened at both ends, somewhat oblique, apex a slight depression, cavity unusually wide and deep, suture a wide line, sometimes shallow, surface a rich, clear yellow mostly covered with lively red with bloom thin, the red is mottled with numerous dark red dots, skin thin, acid, free from astringency, flesh firm, flavor pleasant sub-acid, quality good, pit small, free. Fruit a good keeper.

A. Norby: "Good crop, sure bearer, ripens with Cheney; size, one and one-fourth inches; soft, bitter skin, drops from the tree too easy and rots badly always." (1902.) "Hardy, productive large and early, but of poor quality and too much subject to rot to be of any value." (1903.) "Very productive, early, and large, but rots too badly for any use." (1904.)

Wyant, *Americana.*

HISTORY —Widely and favorably known as one of our very best native plums. Originated about thirty-five years ago at Janesville, in northeastern Iowa, and widely introduced by Prof. J. L. Budd, from the Iowa Agricultural College.

In the old Station orchard planted 1888 the Wyant has been a heavy, early and constant bearer and the trees have proven perfectly hardy. The fruit retains fair size even with a heavy crop. The excellent quality, large size and heavy bearing of this variety have given it wide popularity.

In the young orchard of this Station several trees of Wyant on sand cherry stock planted in 1901 bore a good crop of large fruit in 1903, ripe September 7. In 1904 Mr. Haralson notes: "The tree dwarfed very much, low, bushy and strong. A heavy crop but fruit rather small. Ripe September 12. One tree over-bore."

A. NORBY: "Large crop of only medium size when bearing heavily, but large to very large on young trees when bearing moderately. Quality fair for eating out of hand but the acerb skin detracts from its value for cooking and canning. More hurt by the plum gouger than almost any other variety." (1902.) "Ripens about the same time as the Wolfs. Generally bears a good crop and comes in bearing earlier than the Wolfs. It has a very acerb skin which detracts materially from its value as a canning plum." (1903.) "Tree good, excessively productive, fruit averages large on young trees but runs rather small with age. Skin bitter and of poor quality for cooking or canning. The gouger likes to work on this kind.." (1904.)

Yellow Yosemite, *Americana.*

"The Yellow Yosemite is very good" (H. C. Warner, Forestburg, S. D., October, 1903.)

Culinary Uses.

Good plums are sometimes spoiled by poor cooking. For this "there's a reason." The experience of those who know the most about the culinary possibilities of our native plums should be more generally known. For the convenience of South Dakota readers the valuable collection of recipes made

by Prof. E. S. Goff in Bulletin 87 of the Wisconsin Experiment Station is herewith quoted in full :

"During the summer of 1898 a number of ladies residing in different states, who were known to have had large experience in using the native plums, were invited to contribute recipes for the preparations they had found most satisfactory. Their response was generous, and from the contributions sent in we compiled a list of approved recipes which was published in a number of newspapers of our own and adjoining states. The interest manifested in these recipes then and since, warrants the reprinting of them here.

"The native plums, especially those with firm pulp, after being treated by any of the methods mentioned below, are well adapted to all purposes for which the foreign plums are used. As a rule, more sugar is required for the native plums, but the preparations are richer in proportion. The harshness in the skin and stone of some native plums is readily removed by steaming them in an ordinary cooking steamer until the skin cracks; or pour over them boiling water to which has been added common baking soda in the proportion of half a teaspoonful to a quart. The thicker-skinned varieties may be readily peeled by placing them in boiling water two or three minutes. The recipes follow :

"*Canning.*—Pick the fruit when well colored but a little hard, steam or cook in a porcelain-lined kettle until tender, put in cans that have first been treated to boiling water and cover with boiling syrup made of equal parts of granulated sugar and water, filling the can to the top; then run a silver knife around the can inside and let out the air, and seal at once. Plums cooked in the syrup are likely to be tough. Canned plums may be used for pies and for mixing with or flavoring other fruits. Plums are often canned without sugar to be used in winter for making fresh plum butter. The juice of canned plums makes excellent jelly." One lady recommends splitting native plums to the stone on one side before cooking to avoid crumbling.

"*Drying.*—DeSoto, Wyant and doubtless other varieties may be pared, pitted, and spread on plates, lightly sprinkled with sugar and dried, first in the oven and later in the sun Cook like dried peaches."

"*Plum Jelly.*—The fruit should be gathered when only part ripe—about half colored. This point is very essential. Put plums in a large granite or porcelain kettle—the latter is best—with barely enough water to cover them. Cook until tender but not until they are in a pulpy mass. Having previously covered a large jar with a cloth, strain the fruit in and let the juice drop through, but do not squeeze. When all has drained through, strain once or twice more through another cloth, until the juice is perfectly clear. To one measure of juice provide one measure of granulated sugar, but do not put together at once. A very important point in the making of all jelly is that only a small quantity should be cooked at one time. Into a medium-sized kettle put, say, four tumblers of juice; let it boil briskly fifteen or twenty minutes, then add the four tumblers of sugar, and in a very short time—usually from three to ten minutes—the jelly will be finished, light, clear and delicious. To test the jelly, dip a spoon into the boiling juice and sugar and hold it up; when the jelly clings to the spoon in thick drops, take it off quickly and put into jelly glasses. The plum pulp which is left can be put through a colander and used for plum butter."

The following is regarded as important by one contributor: "The earlier in the morning and the clearer the day the better will be your jelly. A cloudy day makes dark jelly, and if not made early in the day the juice requires boiling so much longer that the jelly is dark, and sometimes it is almost impossible to get it to jelly."

"Another correspondent writes: 'It is well to begin to test it after boiling fifteen minntes, putting a teaspoonful at a time in a saucer and setting in a cool place for a moment; scrape it to one side with a spoon and if it is done, the surface will be partly solid; then roll the tumblers in boiling water quickly and fill them with the jelly. On the top of each, while it is still hot, drop a lump of clean paraffin, which will melt and cover the top quickly, preventing moulding. If prepared in this way it will not need to be tied with brandied paper or other special care taken.'"

'*Plum butter, jam or marmalade.*—Boil the fruit in clear water until nearly done. Remove from the stove and put

through a colander to remove the pits. Then rub through a sieve to make the pulp fine. Place pulp in a kettle with about half as much sugar as pulp, or if you wish to have it very rich, nearly as much sugar as pulp, and boil down to the desired thickness. Stir almost constantly to prevent sticking to the kettle.

"*Another recipe.*—To make very nice plum butter out of DeSoto, Wyant or any other freestone plum, pare and take out the pits, put in granite kettle or pan and sprinkle heavily with sugar, and let stand over night. In the morning there will be juice enough to cook them. Stir constantly while cooking and add more sugar if not sweet enough. This way preserves the grain of the fruit and with the DeSoto plum makes a butter equal or superior to peach butter. If put in glass and canned, less cooking is required than if kept in open jars. A third correspondent would add: Do not attempt to make a fine quality of either plum butter, jam or marmalade without first steaming the fruit."

"*Plum preserves.*—Use plums that will peel, like Wild Goose or Pottawattamie. No water is required if the sugar is allowed to remain on them long enough to draw out the juice. Boil until the syrup is clear and as thick as honey.

"*Another recipe.*—Take equal weights of fruit and sugar; place in stone jar a layer of fruit, then a layer of sugar—alternating thus until the quantity desired is reached. Let stand over night; in the morning drain off the syrup that will have formed into a porcelain-lined kettle, place same over the fire and let syrup come to a boil; then pour it over fruit in jar again; repeat this every day until the fourth heating, when fruit and syrup are both put in kettle and boiled for a few minutes. Place same in glass jars while hot, seal and put away in some cool and preferably dark place.

"*Still another recipe.*—To each pound of plums add a pound of sugar; put the fruit into boiling water until the skins will slip; peel and sprinkle sugar upon each layer of fruit in a bowl, allowing them to stand over night; then pour off the juice, bring quickly to a boil, skim and add the plums; cook very slowly till tender and clear, which will take about one-half hour; take them out carefully and put into a pan; boil the

syrup a few minutes longer till it thickens, pour it over the fruit, seal or tie them up.

"*Spiced plums.*—Make a syrup, allowing four pounds of sugar and one pint of vinegar to each seven pounds of plums; to this add a teaspoonful of allspice, one of cloves, two of cinnamon, and one-half ounce of ginger root, tying these spices into muslin, and cooking them in the syrup. When it boils, add the plums, bringing all to the boiling point, then simmer slowly for fifteen minutes and stand in a cool place over night. Next drain the syrup from the plums, put the plums into stone or glass jars, and boil the syrup till quite thick, pour it over the fruit and set away.

"Another correspondent recommends pouring the boiling spiced syrup over the plums in a stone jar, drawing it off and bringing it to a boil every other day and pouring over the plums again until it has been heated five times, after which the fruit and syrup are placed in a kettle and boiled slowly for five minutes, and sealed hot in glass jars. This is said to preserve the plums whole.

" *Other ways of using native plums.*—The choicest varieties, peeled and served fresh, are equal to the finest peaches. By simply covering the fresh plums with cold water, they may be kept for three weeks or longer, and the water removes all harshness from the skin and pit. They may be kept in good condition for use until winter or the following spring by placing in a barrel or jar and pouring boiling water over them."

Hardy vs. Tender Stocks.

By stock is meant the root or stem upon which a tree is budded or grafted. The word "grafting" has acquired a sinister meaning of late years, being often used to designate various forms of financial corruption; hence it appears desirable that the word "ennobling," translated from the German word "veredlung," should take its place. To cause a wild plum tree, for example, bearing small and inferior fruit, to bear large, choice fruit by the simple operation of budding or grafting is really to "ennoble" that tree. The word is also recommended as a good generic term, meaning either budding or grafting, or

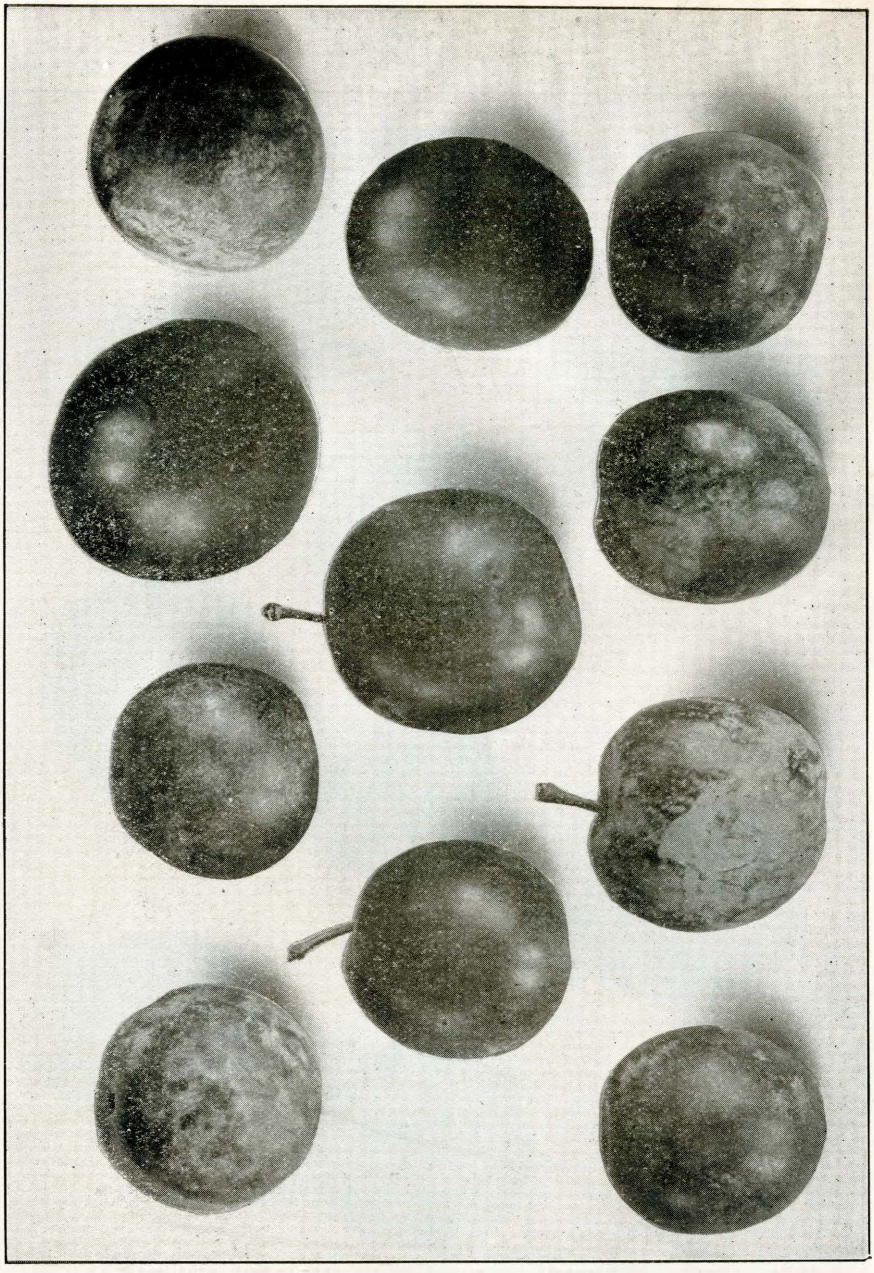

PLATE No. 2.

Some Native Plums, Crop of 1902

(Read Downward)

Left Row	Middle Row	Right Row
Forest Garden	Odegard	Mankato
Cheney	Diana	Jones
Rollingstone	Lillie	Wyant
Rollingstone X Wolf		Bender

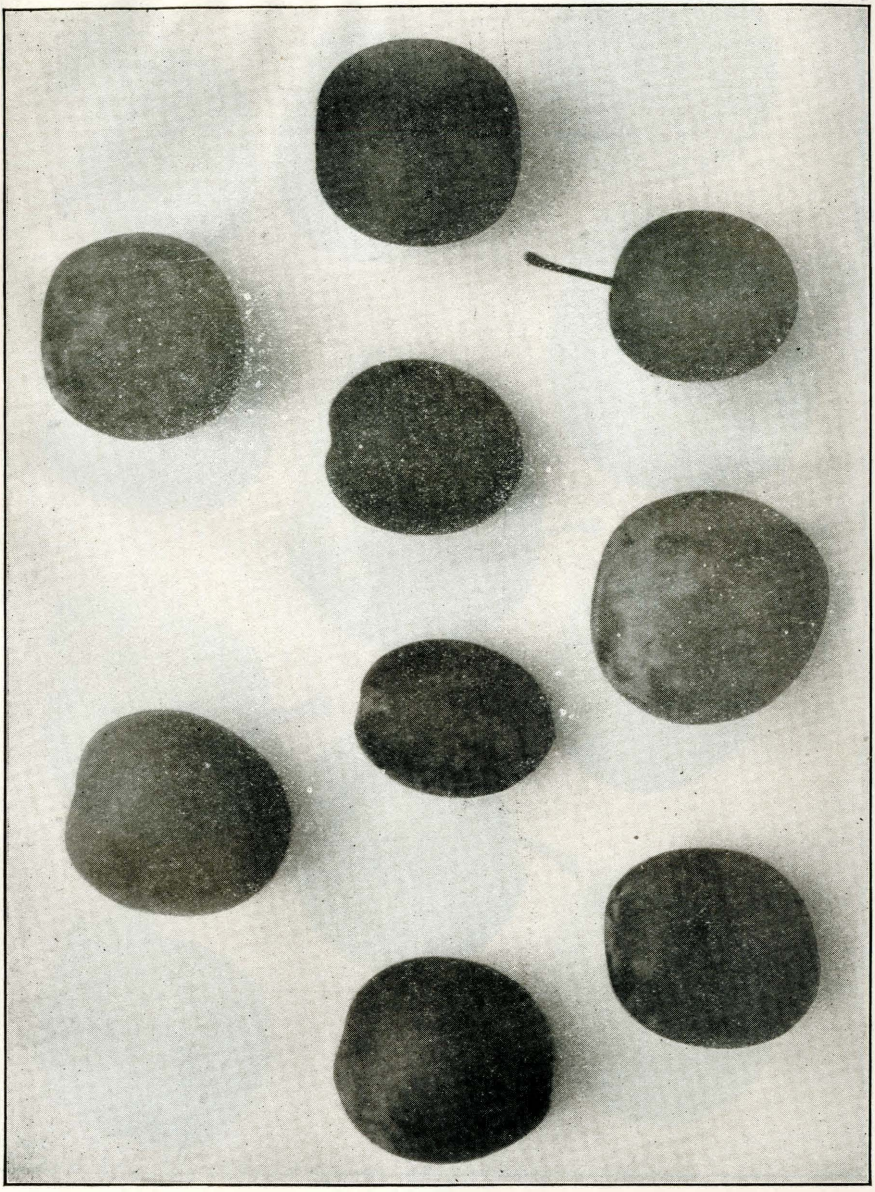

PLATE No 3

Some Native Plums, Crop of 1904

(Read Downward)

Left Row	Middle Row	Right Row
Ames	Rollingstone	DeSoto
Marcus	Weaver	Stoddard
	Jones	Wyant
	Marcellus	

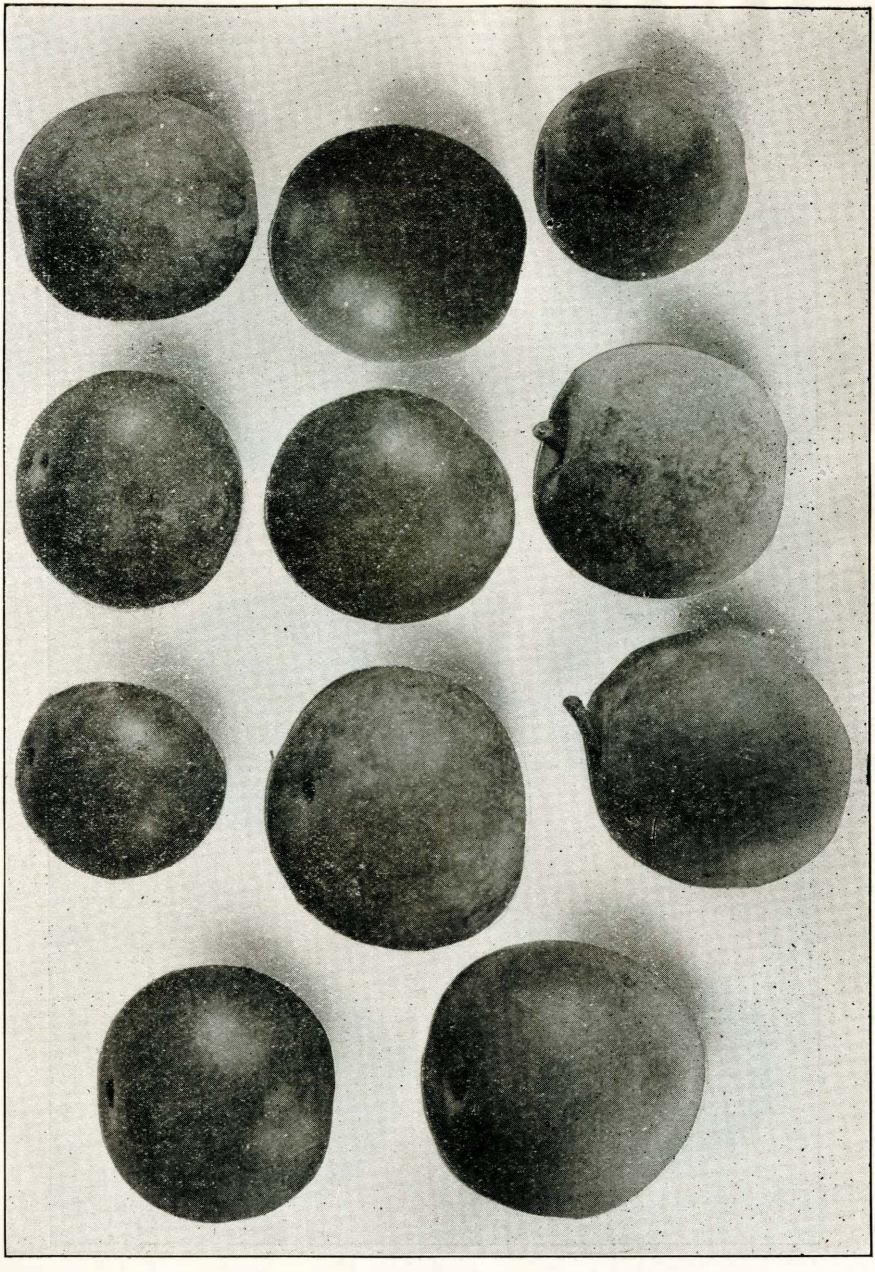

PLATE No. 4

Plums in 1902—Ten Native and One European

(Read Downward)

Left Row	Middle Row	Right Row
Marcellus	Wolf	Hunt's DeSoto
Baldwin	DeSoto	Stoddard
Harrison's Peach	Hawkeye	New Ulm
Terry		Lombard

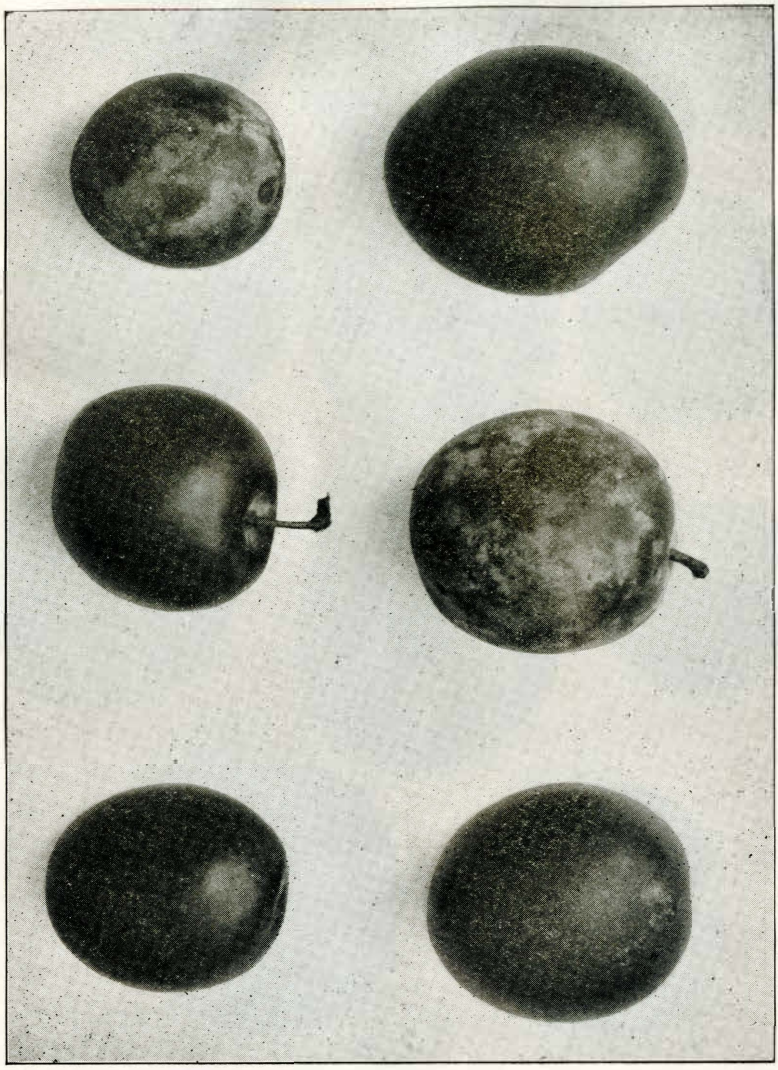

PLATE No. 5

Plums September 7, 1904—Five Native and One European

(Read Downward)

Left Row	Right Row
Mankato	Cheney
Wood	Lombard
Bender	M, J. DeWolf

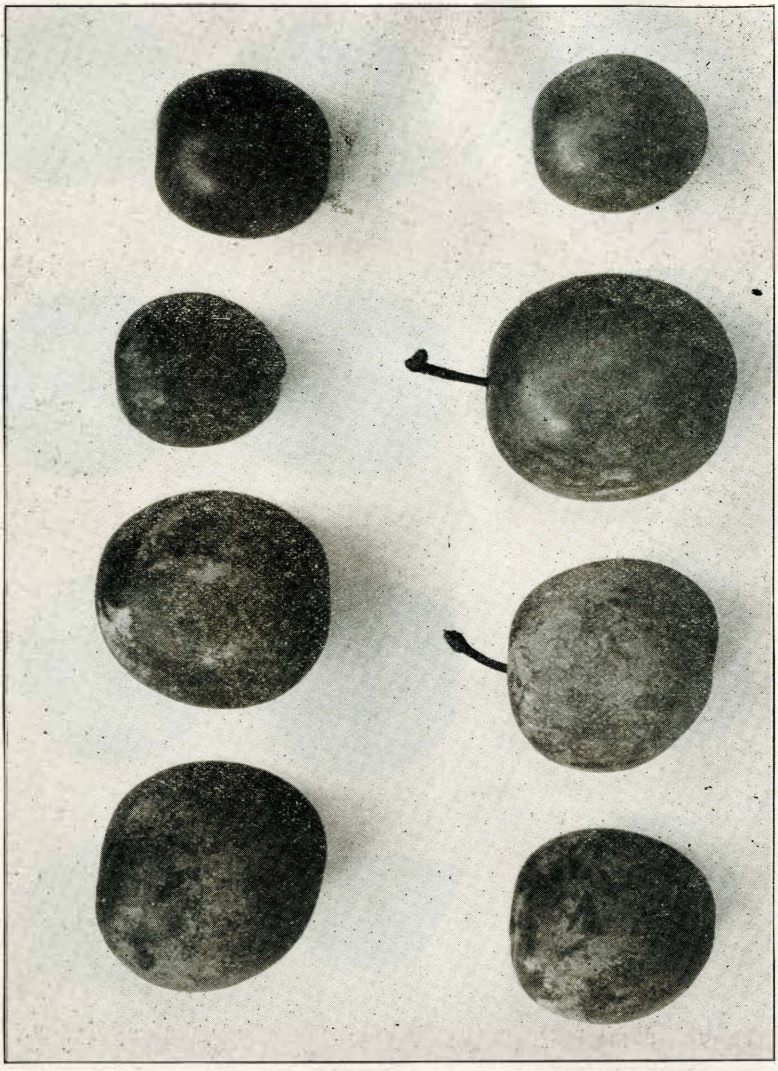

PLATE No. 6

Native Plums September 7, 1903—Several Ran Small From Overbearing

(Read Downward)

DEFT ROW
Lillie
Hunt's DeSoto
Diana
J. B. Rue

RIGHT ROW
Harrison's Peach
Terry
Hawkeye
Lang

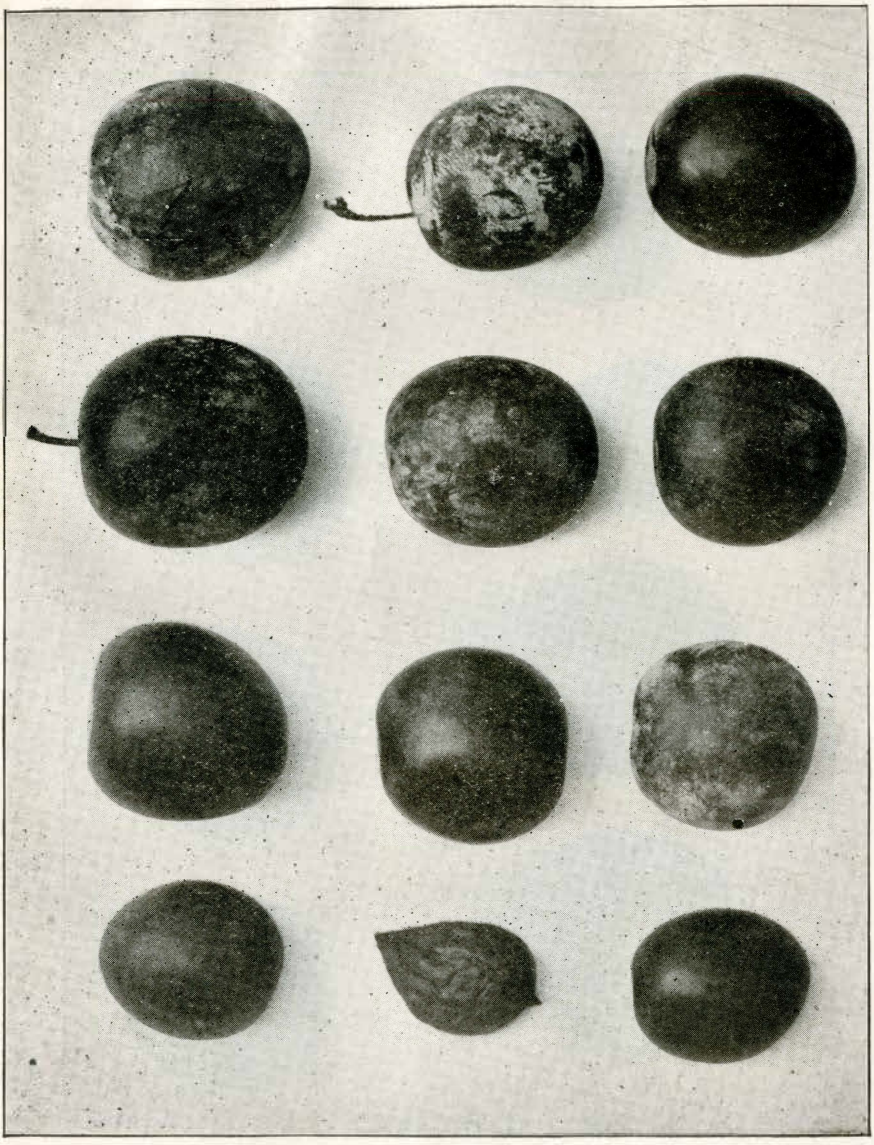

PLATE No. 7

Native Plums September 7, 1904

(Read Downward)

LEFT ROW	MIDDLE ROW	RIGHT ROW
New Ulm	Wolf	Surprise
Champion	Wolf Seedling No. 14	Rollingstone X Wolf
State Fair No. 16	Forest Garden	Rollingstone X Wolf
Wolf Seedling No. 11	Prunus Americana X hortulana, yellow	Prunus Americana X hortulana, crimson

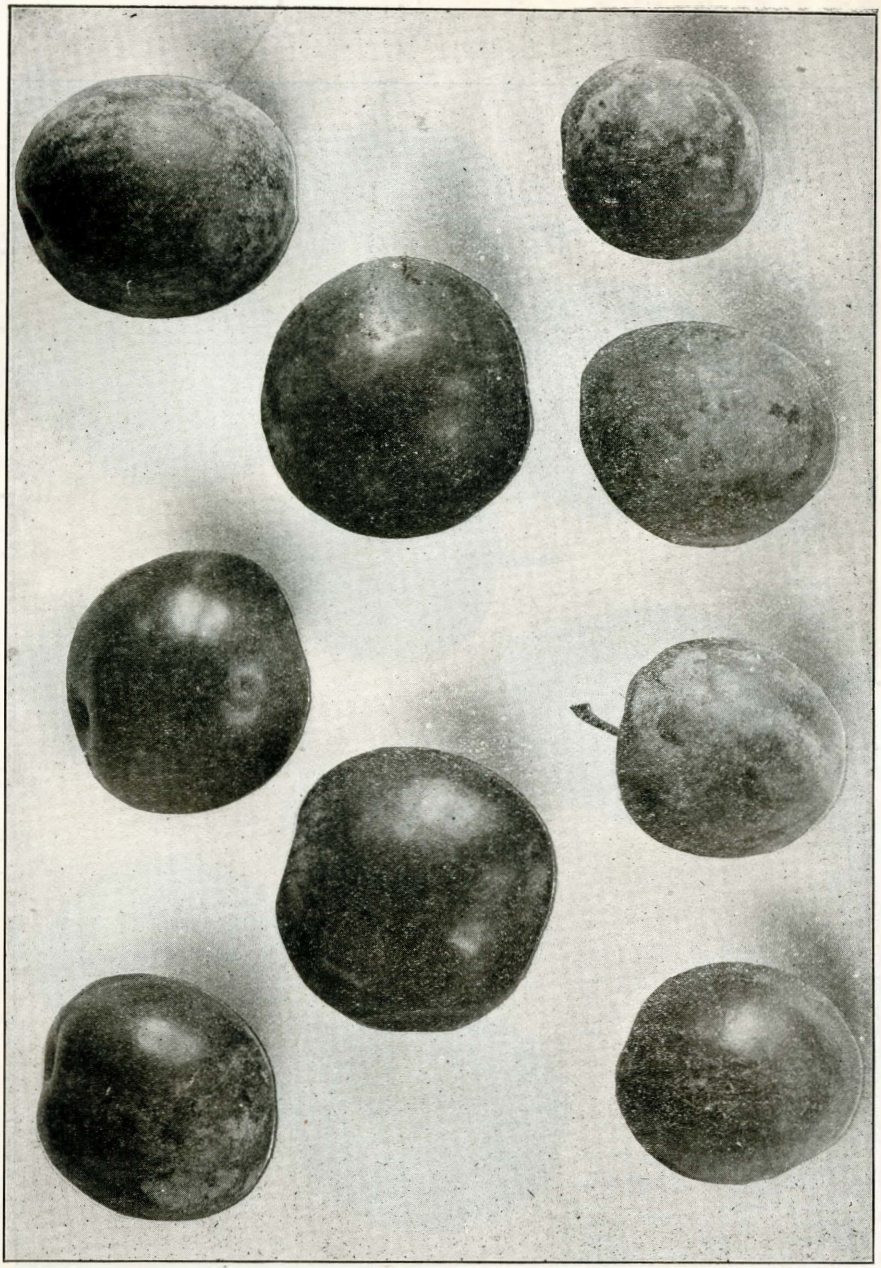

PLATE No. 8

State Fair Seedlings September 9, 1902—Raised From Prize State Fair Plates

(Read Downward)

Left Row	Middle Row	Right Row
36	16	6
4	24	38
19		12
		34

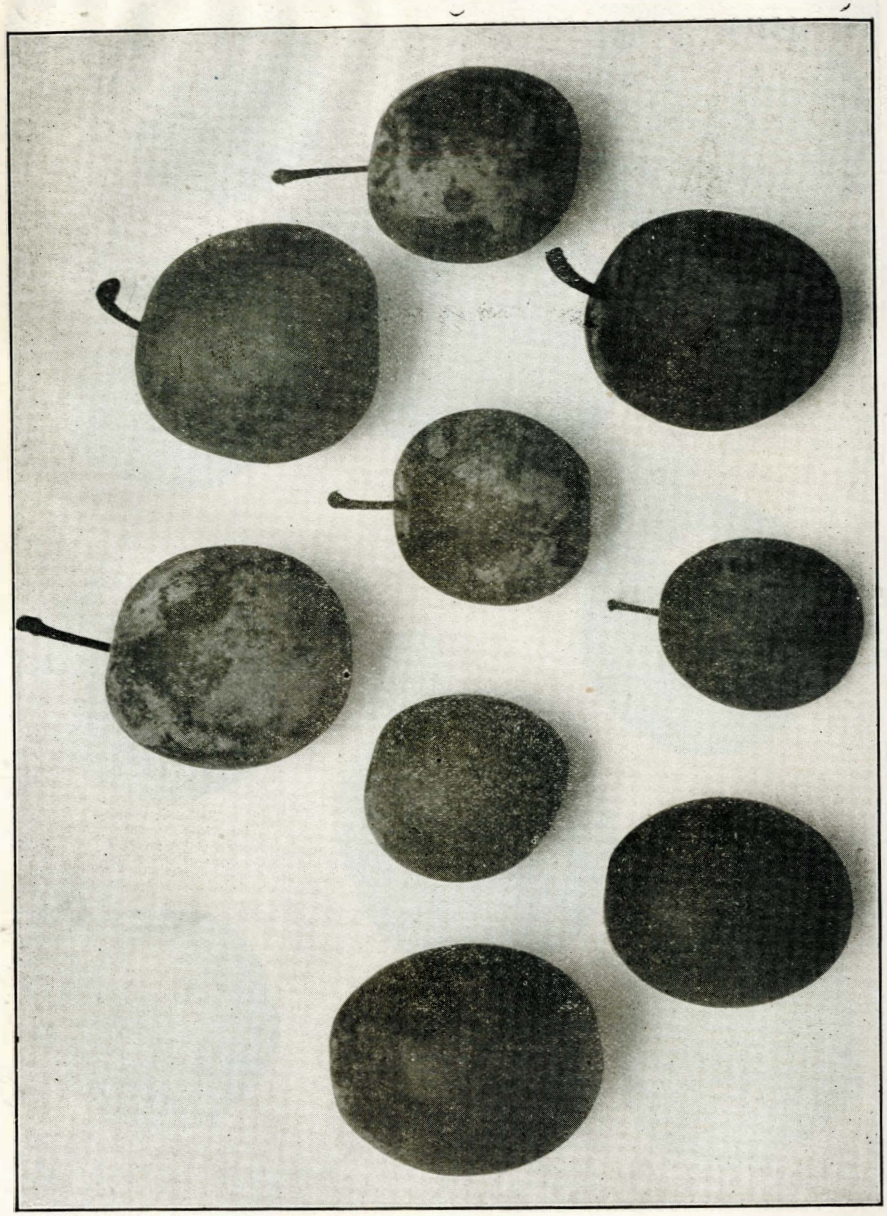

PLATE No. 9

State Fair Seedlings September 8, 1904

(Read Downward)

Left Row	Middle Row	Right Row
S. F. No. 4	S. F. No. 11	S. F. No. 1
S. F. No. 36	S. F. No. 6	S. F. No. 38
	S. F. No. 21	No. 34
	S. F. No 24	

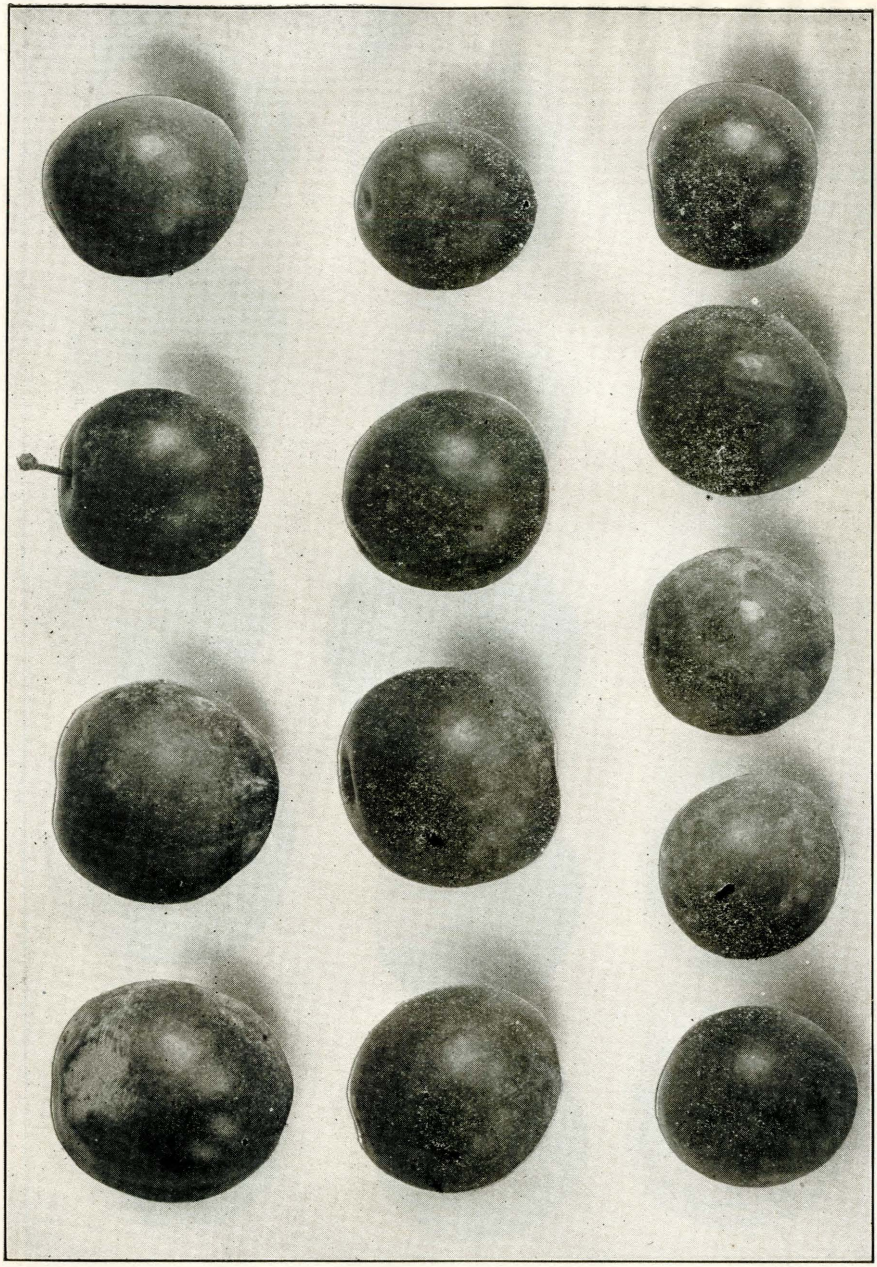

PLATE No. 10

Wolf Seedling and Other Plums in 1902

(Read Downward)

LEFT ROW
Miner
Rockford
Lang
X

MIDDLE ROW
Rareripe
Wolf Seedling No. 12
Wood
P. Am. X Hortulana

RIGHT ROW
Mellette's Early Red
Owatonna
Wolf Seedling G
Wolf Seedling Q
Wolf Seedling V

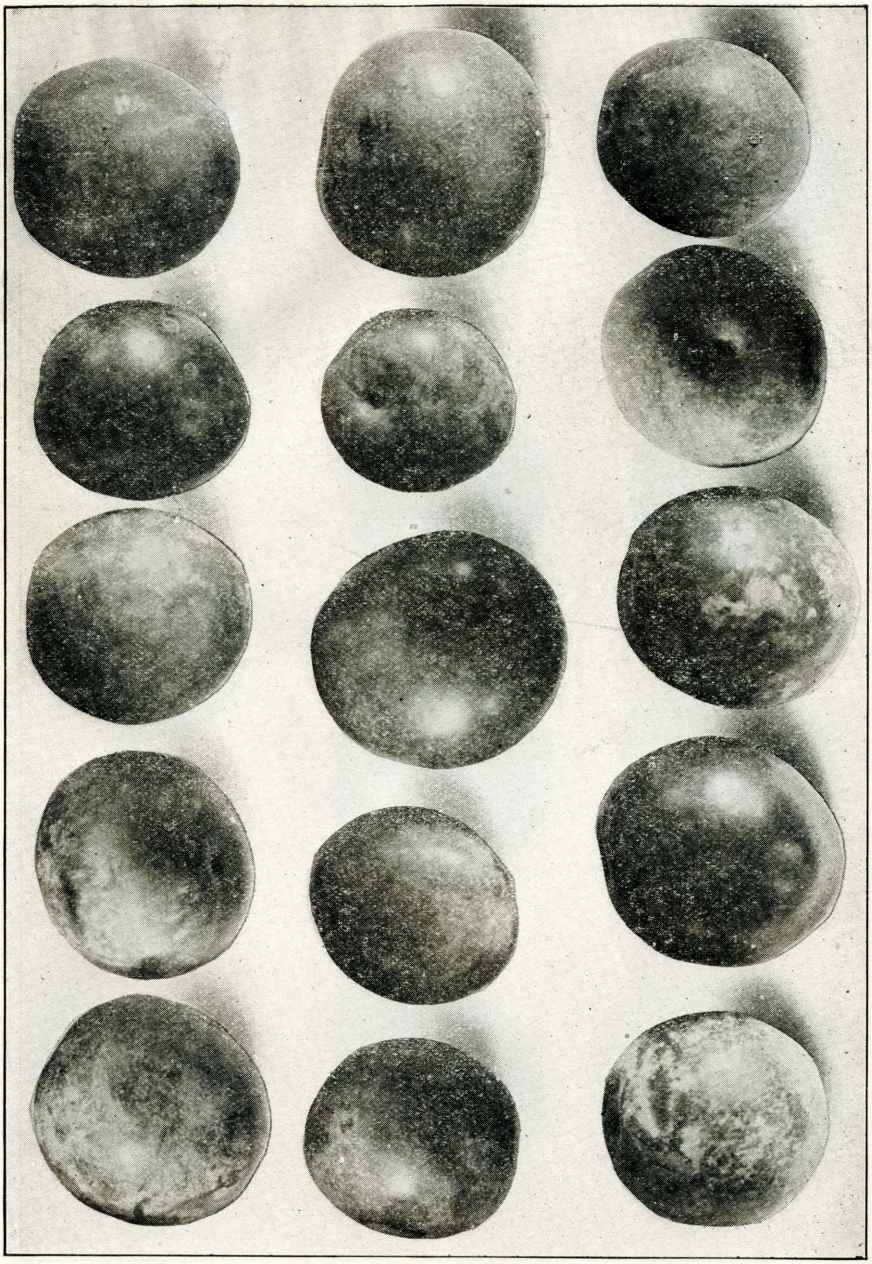

PLATE No. 11

The Wolf Plum and Fourteen of its Seedlings in 1902

(Read Downward)

Left Row	Middle Row	Right Row
F	A	N
No. 10	P	C
E	Wolf	O
H	I	No. 6
D	M	K

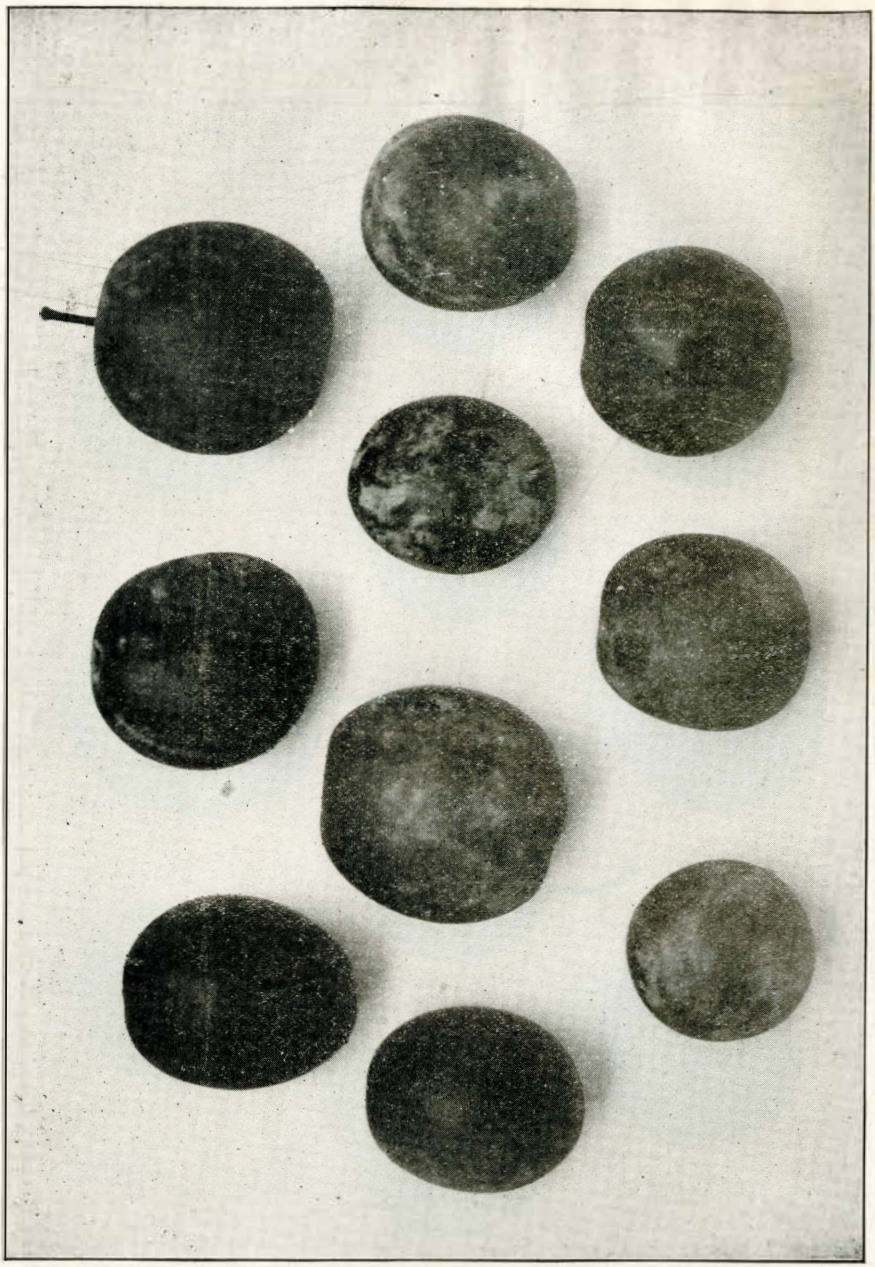

PLATE No. 12

Some Promising Plums Selected From Over 6,000 Seedlings September 8, 1904

(Read Downward)

Left Row	Middle Row	Right Row
56	55	59
43	63	24
7	62	37
	41	

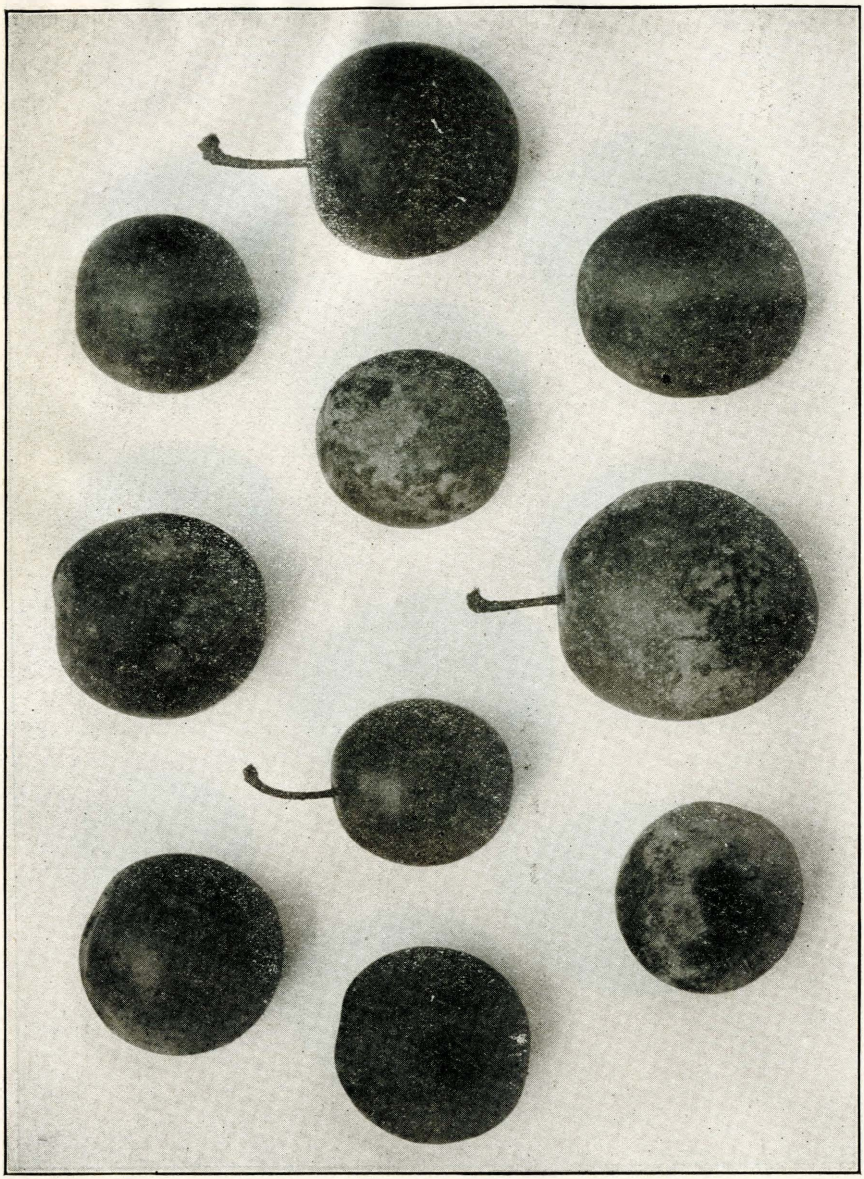

PLATE No. 13

Some Promising Plums Selected From Over 6,000 Seedlings September 8, 1904

(Read Downward)

Left Row	Middle Row	Right Row
14	27	32
47	18	44
50	28	64

PLATE No. 14

State Fair No. 36 Plum—The Original Tree in Bearing, Crop of 1904

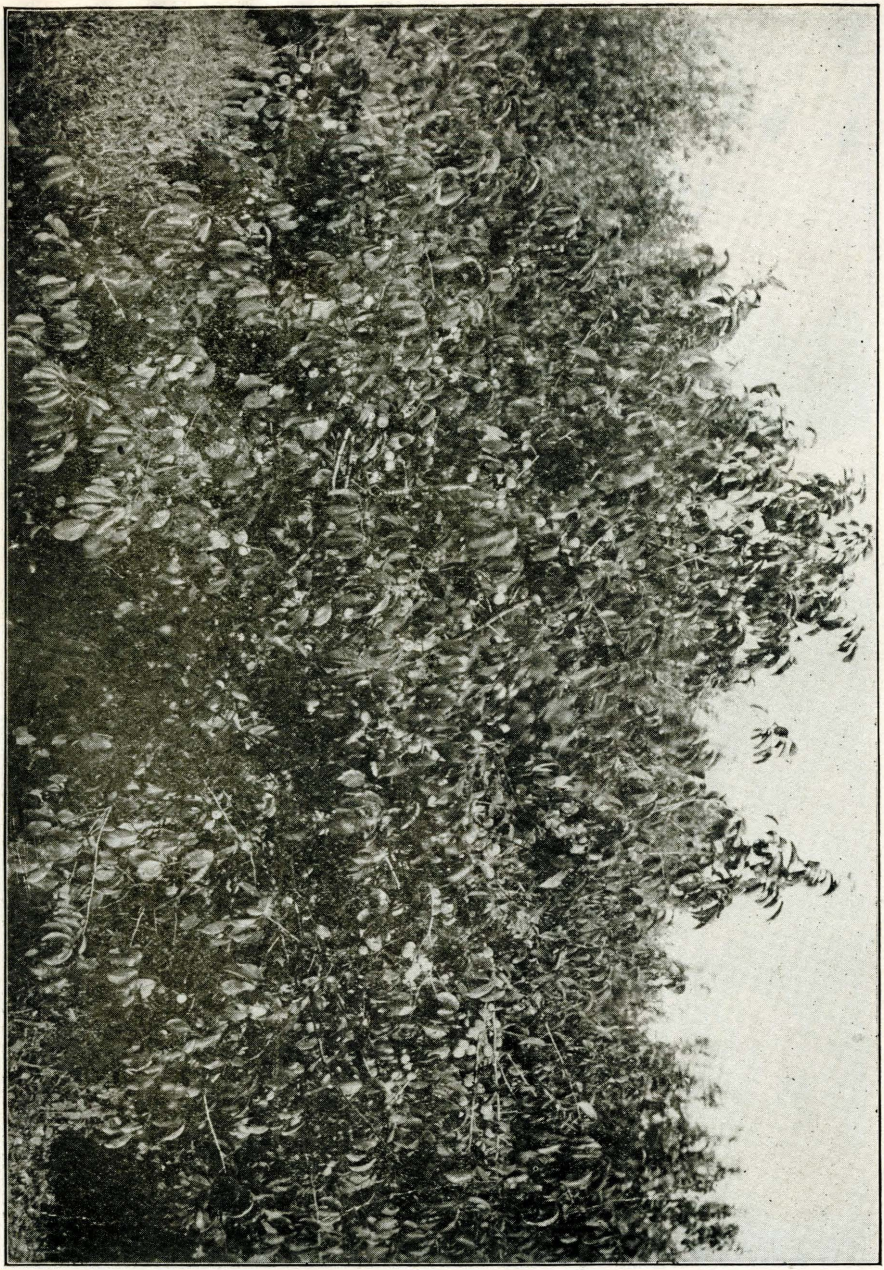

PLATE No 15

Illustrating the Low-Stemmed Bushy Habit Best Adapted to Plum Trees

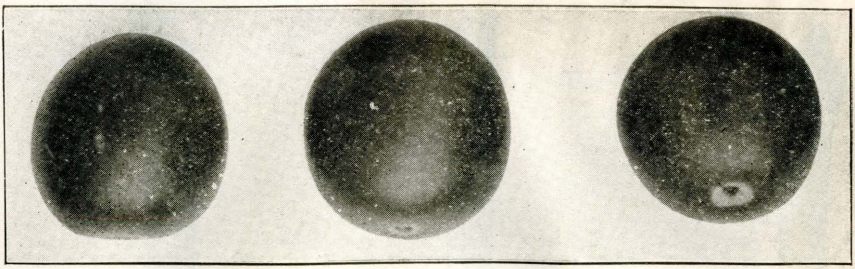

PLATE No. 16

A Promising Plum Found Wild Near the Missouri River, Campbell County, South Dakota, Collected in Exploration Tour, 1904

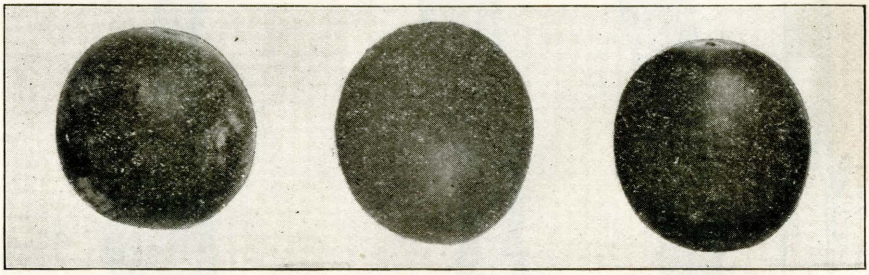

PLATE No. 17

One of our Manitoba Seedlings

Klondike

A Wild Plum from near Pedro, 120 miles west of Pierre, collected in exploration tour, 1904

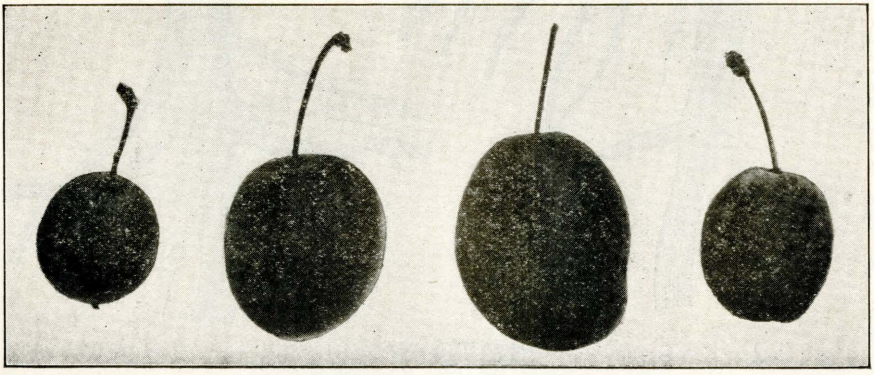

PLATE No. 18

Four of Our Seedlings of Compass

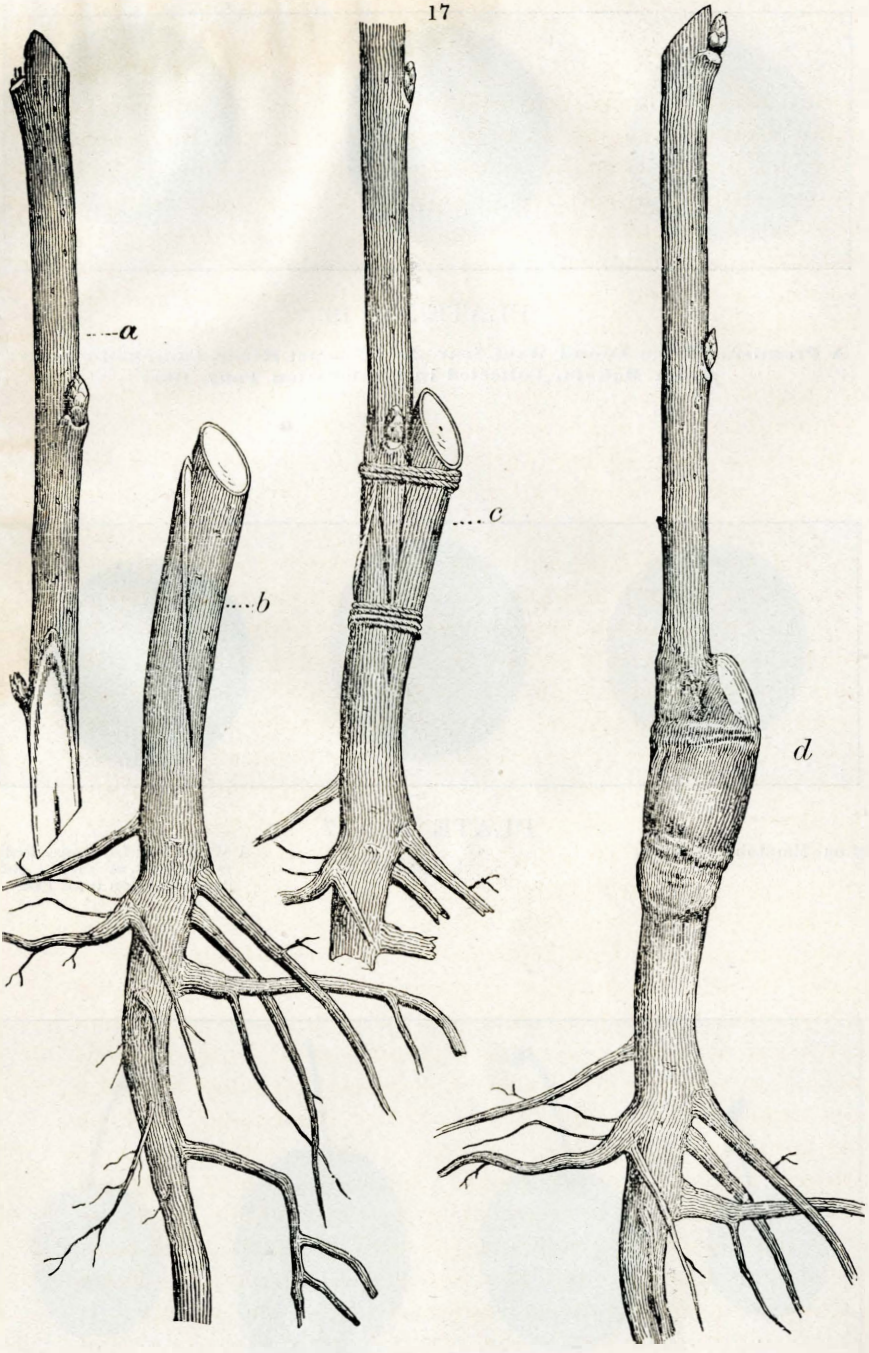

PLATE No. 19

Crown-Grafting of the Plum

(From Bul. 37, John Craig: Canada Exp. Station)

a, Scion cut ready for insertion into side-cut *b*; *c*, graft tied with waxed thread; *d*, graft tied and covered with grafting wax. In out-door work no waxed thread is used

both. Raising plums from seed is something of a lottery and many disappointments must be expected. In this way, however, have originated the numerous varieties of choice plums now in cultivation, with the exception of a few originating as bud sports or variations. Some plums, such as those of the Damson type, come nearly true to seed. Raising plums from sprouts or suckers from the roots is also practiced but the method is too slow for profit. If we had to wait for root sprouts before a new variety could be generally disseminated, progress in the plum industry would be too slow. By the gentle art of "ennobling," which is a word which the writer trusts will come into general use, any new variety can be quickly disseminated, as every bud will make a good tree under suitable management.

A few years ago a prominent horticulturist in Great Britain startled the horticultural world by stating that it would be better if the art of budding and grafting had never been invented. As a result of the extended discussion which ensued these conclusions were evident: (1) that the art of grafting and budding, which dates back into the mists of antiquity, is a good and useful art; (2) that the art has often been abused from the use of unsuitable stocks, the consequent lack of affinity between the stock and scion causing much loss and disappointment; (3) that the abuse instead of the use of the art does not condemn it.

By ennobling fruit trees it is possible to greatly hasten the fruiting, owing to the slight retardation of the downward flow of elaborated sap at the point of union between the stock and scion, causing the fruit buds to be transformed into blossom buds. In other words, that varieties which are tardy bearers on own roots, owing to the tendency to make more wood than fruit buds, bear better when this strong vegetative tendency is checked by ennobling. Hence it appears that ennobling is a mild form of girdling, tending to restore the balance between vegetation and reproduction in trees of varieties which tend too strongly to vegetative processes. In general, it may be stated that ennobling tends to cause earlier bearing in fruit trees provided that the proper selection of stock be made. But own-rooted fruit trees are not necessarily less productive. Early bearing is simply one of the characteristics of the variety. It is certainly true that own-rooted trees of certain varieties should

be planted whenever obtainable, as experience has proven them to bear early and heavily; a good example is the DeSoto plum, which is productive on own roots.

The necessity for rapid methods of propagation of plum trees owing to the great demand for them from newly settled regions of the Northwest has been an indirect cause of the widespread disaster to our plum orchard. The demand was greater than the supply; all sorts of plum trees were shipped in. Many nurserymen have done their best to kill the whole business by using tender stocks which prove tender and are killed the first winter, leaving a hardy top to die. Even to this day, when every well informed nurseryman knows that tender roots are a fraud upon the planter, some are using them because they are cheaper than our native hardy plum stocks. In commercial nurseries the stocks generally used for the plum are Myrobalan, Mariana, peach; St. Julien, apricot; native northwestern plum (*Americana*), Chicasaw and other southern plums, the Western sand cherry and the Japanese plums. Every plum tree on tender roots sent to the planters of the prairie Northwest is a delusion and a snare to the planter and is only a source of discouragement. It is passing strange that their use is not wholly abandoned even at this late date. Too many of our Dakota plum orchards are upon a worthless foundation, and like the house founded upon the sand, soon pass away, leaving only the blackened stumps in memory of misplaced confidence in the too enterprising agent and nurserymen.

The following is a brief review of the principal plum stocks:

MYROBALAN.—The Cherry plum (*Prunus cerasifera*, Ehrh or *Prunus domestica myrobalan*, Linn.) is a form of the European plum. Myrobalan stocks are imported annually in immense quantities from France. They are usually cheaper than our native plum stocks even with the tariff and long freight haul added. It is of course a good stock for the European plums and as most plums work readily upon them and make fine trees in nursery and are quite free from sprouting, the Myrobalan is a favorite stock with nurserymen. For Dakota trees this stock is worthless owing to the fact that the Myrobalan root winterkills. This general experience with these plum trees has been

confirmed by experiments at this Station, a very small per cent. of Myrobalan stocks survived the first winter and these died the ensuing summer. If you have any reason to suspect that the plum trees you have are on this stock the best thing you can do is to mulch heavily with well rotted manure every fall to prevent root-killing, and to remove this mulch during the summer to prevent the roots coming too close to the surface.

Other European Stocks.—The St. Julien and other forms of the European plums are also imported from France and Germany and their value for stocks in the Northwest is the same as that of Myrobalan which has largely superseded other Domestica stocks for various reasons. At this Station the St. Julien and European Sloe (*Prunus spinosa*) both winter-killed.

MARIANNA.—This appears to be a hybrid of Myrobalan with some southern Chicasaw plum. It originated in Marianna county, Texas, and was introduced in 1884 as a good early market plum. It has not been found hardy at the North and is now superseded by better and hardier varieties. However, it was found of value in the South as a plum stock, owing to the ease with which it may be grown from cuttings. Hence, in the South it is found even cheaper than Myrobalan. Plums on this stock make fine trees in the nursery. A commercial plum orchard on Marianna stock in the southeastern part of this state suffered severely in the winter of 1898-99, although the trees had been set deep to encourage the formation of roots from the scion above the point of union.

PEACH.—The advantage of the peach as a plum stock is its freedom from suckers or sprouts from the roots. Peach roots are especially suited to light, sandy soils. It is the writer's observation that Lombard and other European plums on peach must be handled carefully in nursery when digging to prevent breaking off at the point of union. Further south some varieties of the Wildgoose type which are unproductive on own roots bear heavily on peach stocks. Previous to the winter of 1898-9 some men in South Dakota proclaimed that peaches could be raised to a considerable extent at least in the southern edge of South Dakota, but these men have kept very quiet about peach culture since that time. As the peach will fruit the third year

from the seed two mild winters in succession may cause a revival of the notion that we can raise peaches. Others claim that the peach root is hardy enough for the southern part of the state but such trees should not be shipped north. Even in the southern part of the state such trees should be heavily mulched to protect the tender peach roots. The writer agrees heartily in the statement that trees on peach roots should not be shipped north.

APRICOT.—About ten years ago the Russian apricot, which bears well in parts of Kansas and Nebraska, was recommended as a stock for the plum. It was sent out extensively for two or three years, but the nurserymen generally dropped the whole business like a hot potato because they found that the apricot root system was insufficient to support the plum top and the trees lopped over to the ground the second year in nursery.

SOUTHERN PLUMS —Various varieties of the southern race of plums such as Angustifolia, Wayland, Wildgoose and Miner have been used for stocks at the south but their tendency to sprout is an objection to them where non-sprouting roots are hardy, and at the north they root-kill. Miner seedlings would be a possible exception as their hardiness would be about that of the Miner. For this latitude the Miner lacks in hardiness.

JAPANESE PLUMS. Seedlings of the Japanese plum have been tested to a limited extent in regions where they are grown successfully, but at the North they should certainly not be used, owing to the lack of hardiness of the Japanese race of plums.

WESTERN SAND CHERRY.—The value of the western Sand Cherry (*Prunus Besseyi*), a native of our prairies from Manitoba and Minnesota to Kansas and Utah, both for stocks and fruit, was discussed in Bulletin 87 of this Station. Experiments with various varieties of the native plum worked on sand cherry stock in the orchard of this Station show that the trees become dwarfed and bear early and abundantly and the fruit is fully up to standard size and quality. Some of the trees, however, have made too rampant a growth for the root so that now they have too tall a stem which sags or lops over under the heavy crops of fruit. My present impression is that such trees are for the

small amateur garden rather than for commercial orchards and should be raised in bush form with very low stems with some attention paid to heading back the top the first few years to compel a compact habit of growth. For dry soils it will probably be a better stock than the native plum.

AMERICANA SEEDLINGS—The native wild plums of the prairie Northwest, as has been shown earlier in this bulletin, is the only race adapted to the Dakotas, northern Iowa, Nebraska, Wisconsin, Minnesota, Manitoba and Assiniboia. In a like manner it may be said that the only safe stock to use for this race of wild plums are seedlings of this race. Costly experience with tender stocks in the region mentioned induced nurserymen to turn with more favor than was at first the case to this race of hardy plums. The fact remains that even now it is often cheaper to import tender stocks from France than it is to buy seedlings of our hardy native plums. This fact is a constant temptation to propagators more zealous for present gains than for the future welfare of the trees sold. Reliable nurserymen have had to meet unfair competition from men catering to the demands of unscrupulous agents who wish only the cheapest trees; and to a large proportion of planters a plum tree is a plum tree and the cheapest tree is the only one wanted regardless of their qualifications. As a matter of fact, it is more expensive to raise plum trees at the North on hardy seedlings than it is to ship trees from regions with milder climate. Hence it has been extremely difficult to be strictly honest in the propagation of plum trees and planters are especially urged to make proper discrimination. Buy of your nearest reliable nurseryman who has the varieties you want propagated on hardy native roots. Remember the cheapest are not always the best.

Some people object to the native Americana plum stocks owing to their sprouting tendencies. These suckers or root sprouts should be treated as weeds and removed with a sharp hoe before they become woody. Treat them the same as other weeds and there will be no trouble. In the early years of the orchard the sprouts are more troublesome than later when the strength of the tree goes into bearing heavy crops of fruit. It is better to wage warfare on sprouts than to have an orchard of dead trees.

Propagation.

It must be admitted the question of cheap propagation of our native plums on hardy stocks has not been fully solved. Plum trees are propagated in three ways: (1) budding; (2) grafting; (3) root sprouts. The discussion of budding and grafting will be confined to our native plums. The northern commercial nurseryman has not found budding a wholly satisfactory method owing to the short and often dry season in August and in grafting by the rush of work the following spring just before the buds swell, which is the only time for outdoor grafting.

BUDDING.—In this section buds take best usually the first three weeks in August and upon stocks raised the same season from seed. Budding should be done as near the surface of the ground as possible, in dry seasons especially. It is better if the bud is covered wholly or partly with earth and when inserted on the north side of the stem to afford shade. The seedlings should be kept thoroughly cultivated to keep them in growing condition. If the growth has been checked owing to drouth or to lack of cultivation, or if the buds are rather dry owing to formation of the terminal bud and the consequent hardening of the layer of new wood in the cambium layer, it will be of no use to insert the buds. Both scion and stock must be in a condition of rapid growth. In budding, a very new layer of wood which is just hardening is transferred from one plant to a similar position in another plant.

It is very difficult to teach budding from a book. Half a day in a nursery is better than volumes of reading. In brief, a T-shaped slit is cut in the bark of the stock and the edges lifted with a sharp, thin-bladed knife. Into this opening is inserted the bud, cut with the adhering bark called the shield, which extends about one-half inch above and below the bud. The shield is cut with a very thin layer of the newly forming wood the full length of the shield. After insertion, the tying is done with raffia, a palm fibre from Madagascar. Woolen yarn will do in an emergency. The bud-sticks are prepared by having the leaf stalks cut off, except one-third inch left as a handle, and kept in a wet cloth. We find raffia the best material for tying but care must be taken to use it nearly dry. If used

when wet the raffia loosens when dry. We also find it best to tie the whole length of the shield, exposing no part of it to the air. Only the bud itself is exposed. In the fall loose earth should be thrown up to the bud with a cultivator to prevent injury from the winter. In the spring the stock is not cut off too early as the starting of the stock helps to draw up the sap. When the young shoots start from the bud, great care should be taken to support the tender growth with stakes, to which the shoot is tied with raffia. Heavy wire stakes or double strength lath or fence pickets are used for this purpose. When the buds attain a height of three or four feet it is best to pinch the terminal bud to encourage the formation of the head. Some propagators prefer to let them grow and head the trees back early the following spring.

Some of our nurserymen are inclined to abandon budding entirely but this should not be done as where the buds have failed the grafts can be inserted the following spring. The stocks must not be too large for successful budding. Where budding cannot be done the same season the pits are planted, the seedlings should be taken up and transplanted and the budding done the following season. Older bark than this should not be lifted for the insertion of buds.

It would be best if our prairie planters would be satisfied with trees one year old from the bud or graft. Such straight whips are far better for the planter than large, heavy trees and would simplify the problem for the nurserymen as well. Buds inserted on stocks raised from the seed the same year take readily and make a strong growth, but if left longer than one year the root system is not satisfactory, being too much of a tap root with few lateral branches.

GRAFTING.—Crown-grafting or stump-grafting, by which is meant inserting a graft at or just below the surface of the ground on seedlings established one year in the nursery, early in spring before the buds swell, has been found to be the most satisfactory method in the Dakotas and Minnesota. The trouble with this method is that there is too much else to do at that season in the nursery. The planting, digging, shipping and transplanting all come too near together for the comfort of the nurseryman and it would be unprofitable to hire an extra

force for the one purpose of grafting. Men who can do such work are scarce. The fact that it is very unpleasant work in the early spring in inclement weather is an additional objection. Nurserymen would gladly welcome any satisfactory solution of this problem. The commercial nurserymen well know that the native plum has not been an easy stock to handle in indoor grafting in the winter. Piece-root grafting as practiced with the apple usually fails with the plum. In plum grafting the buds of both stock and scion must be kept dormant up to the time of planting in the spring. Crown-grafting on whole roots indoors in winter is done by inserting a wedge-shape scion in a side slit at the collar as shown in Plate No. 19. This is commonly known as side-grafting and will give a fair stand if the work is carefully done and a suitable cellar is provided for storage before planting. The per cent of stand is better than with whip-grafting. But with ordinary nursery help it is an easy matter to make a mistake in the nursery by trimming up one of the numerous sprouts from the wild root instead of the shoot from the scion, owing to the great similarity in foliage between the two. It is also found that the root-system on these plum-grafts on plum roots is rather meager at one or two years of age when dug, and with others a strong tendency to the formation of a tap root with no side branches is evident, thus making a tree that is not well received by the average customer upon delivery. At this Station the Western Sand Cherry is being tried as a substitute for the plum as a stock for indoor grafting of the native plums, owing to the fact that a better stand is usually secured, and if a long scion is used and the graft set deep the tree will soon be on its own roots, thus obviating the dwarfing tendency of the sand cherry stock. The trees are not dwarfed in nursery.

To secure a well branched root-system from seedling plums the first year the writer several years ago tried starting the seed in shallow boxes the same as cabbage plants. The pits were sown thickly broadcast in boxes and when the young plants were four or five inches high they were removed from the box, the tap-root cut back, and the young plants set at the proper distance in nursery row. This transplanting operation was not a new idea but is largely practiced in European nurseries with the apple and other fruit seedlings, and insures the

branched root-system so desirable for trees which must be budded or grafted in nursery row. The natural tendency of fruit seedlings, it must be remembered, is to make a deep tap-root. In dry seasons this transplanting method would probably fail and the expense of the operation is an item, so the experiment has not been repeated. However, in a small way it would no doubt be desirable as a method for filling out vacancies in the nursery row, and where cheap labor is available it would save one digging and one transplanting. I am not sure but that the method is worthy of trial, at least in a small way.

The method has been tried of sowing the seed rather thickly in nursery row, taking up the seedlings as soon as the leaves drop in the autumn and resetting at proper distance in nursery row for budding or grafting, the tap-root being cut back to compel the formation of side-roots, and the top cut back about one-half to make up for the loss of roots. Such trees, when partially protected by a light furrow thrown up on each side late in the fall, have come out in the spring with but little killing-back of the top during the winter and the grafting was done as usual about an inch below the surface of the ground, using the side-graft method as illustrated in Plate No. 19. But the growth has not been as rapid the first season as from trees already established one season, but usually good enough.

The practice of commercial nurserymen at the North is to sow the seed rather thickly in wide nursery row, cultivate well the first season, take them up with the aid of a tree-digger in the fall, keep in cellar over winter or bury in the earth outdoors. At the proper season for transplanting in spring, the seedlings are taken up and cut back, as already described, at the top and bottom, and set in nursery row three to four feet apart and five or six inches apart in the row. Good cultivation is given this second season and the budding is done in August of that year or the collar-grafting early the following spring. Collar or stump-grafting is steadily gaining favor as a larger stand is secured, one year with another, than with budding. Where the grafting is done under ground simply the alcoholic plastic is applied, no muslin being used. Even the alcoholic plastic we have found unnecessary when the graft fitted well. In all grafting great care must be exercised to make the cam-

bium layer, the growing layer between bark and wood, of the scion, fit the cambium layer of the stock.

GRAFTING WAX.—For all outdoor grafting and for covering cut surfaces in pruning the following is a good wax; it is called alcoholic plastic: One pound of white resin, one ounce of beef tallow, one tablespoonful of turpentine, five or six ounces of alcohol. Melt resin and tallow slowly, take from fire and when a little cooled by stirring, add the turpentine, stirring constantly. When still cooler add alcohol. If the plastic becomes too thick to work well, add more alcohol. For outdoor grafting the plastic is kept slightly warm in a small tin pan set in the top of a cone-shaped tin box with a lamp inside, thus forming a portable heater. The wax should not be warmer than can be applied with the finger. The tip of the scion should be waxed, as well as the point of union.

TOP-GRAFTING.—When a plum seedling begins to bear it is unsafe to judge the value of the fruit by the first crop. The second or third crop will be a safer standard for judgment. If the fruit proves too small in size or inferior in quality the top can be changed by budding or grafting with better varieties. Top-grafting is done in the same manner as side-grafting, as illustrated in Plate No. 19. Each limb if desired can be worked over to a different variety so that a tree can bear several kinds of fruit. In practice, however, but one or two varieties are used in each tree. However, some enthusiastic experimenters with plums, sometimes known as "plum cranks" by their best friends, top-graft several kinds in each tree, thus enabling them to obtain fruit from a great many varieties in an orchard of limited size. As a commercial practice, top-grafting can scarcely be recommended owing to the labor involved. In cases of varieties failing to fruit satisfactorily from lack of proper pollination, such infertile trees can be made to bear by top-grafting other varieties blossoming at the same time into some of the branches. Occasionally, when some strong-growing variety of the plum is top-grafted on a variety of more slender habit of growth, trouble is experienced from the dried-up bark at the point of union, and from the overgrowing scion. As is well known, the bark of the stone fruits comes off in non-elastic rings when torn. The danger of strangulation comes

along the latter part of June, when it is time for the deposit of new wood to begin. Practical nurserymen remedy the difficulty by slitting through the outer bark in several places with a sharp knife. This is sometimes termed "cutting the corset strings."

In top-grafting it is best to use a wedge-shaped scion in a side slit as illustrated in Plate No. 19. The scion is made three buds long and the stock is cut off one-third of an inch above the slit, thus leaving a ring of bark which facilitates the healing of the stump. Alcoholic plastic is applied and the point of union wrapped with a narrow strip of old white muslin. It is not best to attempt top-grafting on limbs over half an inch in diameter if it can be avoided. Only the largest branches are top-grafted. Saw off square, split the stump and put two grafts in, one on each side, as is commonly practiced in top-grafting other orchard fruits in the East.

The question is sometimes asked, "Will it pay to bud or graft on young sprouts dug up in a thicket and set in nursery row?" The writer has tried work of this kind but thought it did not pay as the root system was unsatisfactory. It is much cheaper and easier to raise seedlings. While working in a nursery in central Iowa a few years ago the writer saw the experiment tested of top-working in nursery row Miner plums grown from root cuttings. The experiment was not considered a success as various plums grew so rapidly on the stock that they were much inclined to blow off, even when pruned severely.

TREES ON OWN ROOTS.—It is safe to say that plum trees on their own roots, if obtainable, would be popular with prairie planters who have had costly experience with trees worked on tender roots. The only trouble with these own-rooted trees is their poor root system when first dug. They should be dug carefully with a short piece of the main root on each side. The plant when dug will resemble an inverted capital letter T (⊥). If simply pulled up or dug carelessly the wood structure will be strained at the point of union with the root and the trees will be badly stunted from the start. If it is desirable to have seedling plum trees sprout, the smaller surface roots near the tree may be cut off with a sharp knife in early fall or spring. A general law in propagating plants is that any tree or bush which suckers or sprouts freely from the roots will grow readily

from root-cuttings. Good examples of this are the red raspberries, blackberries and plums. In practice, we find that some varieties of plums grow more readily from root-cuttings than others. Nurserymen do not generally like to handle trees grown from sprouts as they are usually somewhat crooked and lack the smooth, clean, thrifty appearance of trees grown from buds or grafts inserted on thrifty seedlings already established in nursery row—and appearances upon delivery go a long ways with the average planter.

The surface roots of plums may be cut up into pieces about six inches long in the fall, buried over winter in the soil in a well drained spot in the garden, mulched with manure over winter and planted in nursery row in spring. A sharp knife should be used in cutting.

The question is often asked, "Are the suckers from my plum orchard of choice varieties of any value for planting?" If the trees are on their own roots the sprouts will of course bear the same fruit as the tree from which they grow. If the trees are budded or grafted, the value of the suckers depends upon whether they originate above or below the graft or bud. If from above, the sprouts will of course be of the same variety as the top; if from below, their value is uncertain as they will then be the seedling of unknown value. This explains why plum trees of choice but tender varieties which have been killed to the ground in a severe winter will often sprout up and bear different fruit.

Raising Plum Seedlings.—Any method of raising plum seedlings in which the flesh is left on the pits generally does not give as good a stand as when the pits are cleaned owing to the liability of mold. Nor is fall planting advisable as the ground becomes packed too solid over winter for the best results in the spring. Pits should be cleaned free from all flesh or anything that will cause mold, and they should be frozen over winter and kept neither too wet nor too dry. "The best method is just as good as any," and our experience through a number of years indicates the following method as one quite sure of giving a good stand. All plums, apples and stone fruits generally may be handled the same way. As soon as picked the fruit is spread out in thin layers and permitted to get soft. If good care is

taken the flesh can be utilized at the proper time for plum butter or similar culinary uses. If there is danger from unbidden pickers the plums can be picked just before they become tempting as the pits have by that time as good germinating capacity as when the plums are picked fully ripe. If put in a barrel or pail the plums will heat. The cleaning of the seed is facilitated by putting into a pail with a little water and pounding carefully with a tamper or short piece of scantling. Larger lots are cleaned more readily by running through a home made shredding-machine. This is a wooden cylinder made from a section of fence post, studded with wire nails and hung at the bottom of a short hopper made from four boards a foot wide and two feet long. The cylinder nearly fills the chimney or shaft and is turned by a crank, the plums by being forced against the revolving nail-studded cylinder have the flesh shredded and the work of cleaning is greatly facilitated. As soon as the pits are washed clean, spread out in the sun to dry for a day or two and then mix with sand in a small box not over a foot deep. The seeds are in alternate layers, the aim being to keep the seeds separated, in a measure, to avoid heating or moulding. Free drainage should be provided by having holes bored in the bottom of the box. It is easy to keep the seeds too wet before cool weather comes in the fall, under which conditions they are inclined to mold. The aim is to keep them only moderately moist until cool weather comes. This is usually done by putting the box in a cool, airy cellar. If the sand is kept too wet or too dry good results will not follow. If the box is buried outside as soon as the seeds are cleaned the seeds are apt to dry out in the dry weather sometimes experienced before winter sets in. It is essential that the seeds do not dry out before planting and still they must not be in water all the time as that would water-soak them. This may be prevented by a mulch of old stable litter during the dry spell and is the best plan if the box in the cellar is apt to be neglected and the sand become too dry. Before the ground freezes the box should be buried two inches below the surface of the ground out of doors in a well drained spot in the garden and allowed to freeze all winter. If snow comes too early in the fall it should be removed so that the seeds will be sure to freeze very hard. Be sure also to have the sand quite wet just previous to the

time the ground freezes in the fall. As early in the spring as possible the seeds should be planted. If possible use fall plowed land. Get the land in good condition by thorough harrowing. In case the spring is so wet that it is impossible to get the seed planted early, the frost may be kept in the box by deep mulching, or the sand may be stirred every day to prevent the seeds in the bottom of the box germinating sooner than those in the top of the box. If possible the seeds should be planted before there is any sign of germination, or at least just as they start. It will be found that if they are in good condition the freezing and thawing will have cracked the shells in many cases. Plant in rows three or four feet apart and two or three inches apart in the row. A shallow furrow may be opened with a hoe and the seeds stepped in and the furrow filled with a hoe or by dragging the feet in walking. With large lots of seed a horse marker with rather sharp runners is the most convenient. In case the seedlings are to be taken at the end of the first year sow the pits a little closer and make the drill wider as this economizes land. A little experience will soon indicate how close the seed should be planted for the purpose desired. If the ground becomes too hard after planting, it may be necessary to loosen the soil across the line of the row with a nursery hook. Nursery hooks are also used in weeding. These are made something on the style of a pitch fork with the tines bent in the middle at right angles with the handle. A sharp, long-toothed rake may also be used. The rest of the cultivation can be done by wheel hoes, common hoes and by the ordinary field cultivator. In the latter case the shields should be set so as not to smother the young seedlings with earth, and attachments are now made consisting of harrow teeth to replace the cultivator shovels when needed. With good cultivation the young plants will make a strong, vigorous growth and can be planted into nursery row early the following spring. It is best to heel them in over winter, root and branch, to prevent injury from field mice and rabbits and not from lack of hardiness. By "heeling in" is meant to bury completely in the soil with a mulch of stable manure over the surface to prevent drying out of the earth.

Cultivation.

Plums of large size and good quality are as easily raised as varieties with small and inferior fruit. In some sections of the state where native plum thickets abound the market is at times glutted with wild plums gathered indiscriminately. But year by year the market is becoming more critical and those who wish to secure the best prices for their product should select the varieties carefully, as those of large size, bright color and fair quality will sell for double the price paid for small wild plums.

The plum delights in rich soil. Any land good enough for corn will raise choice plums. A north slope tends to keep back the blossoms and hence lessens the damage from late frosts. If on too low land the blossoms are caught by late frost oftener than on somewhat high land. Plums prefer a heavy soil rather than one too light. Some planters favor protection from the east wind, as being the one most injurious at the blossoming period. However, the Station orchard in open exposure bears abundantly. In this locality and the Northwest generally, fall planting is very unsafe as the winter winds usually make the trees dry enough to burn by spring. If the trees are received in the fall they should be buried root and branch over winter and the soil covered two feet deep with stable litter. Trees received in the spring should be set out as early as possible. The best size of a tree is a straight whip, one year old from the bud or graft on native plum root. This whip can be cut back to three or four feet so as to favor the formation of a well branched top. Most planters, however, prefer a larger tree and the size usually sent out by nurserymen is two years old from the bud or graft on a root one year older. The distance apart for the trees depends somewhat on the locality, soil and variety. At the North, a good plan is to plant in rows running north and south and not nearer than 18 to 24 feet with the trees 10 feet apart in the row. Large growing varieties on rich soil demand more room and there should be space enough for a free circulation of air.

Thorough cultivation should be given the first four or five years after which they could be mulched sufficiently to keep

down the weeds. Head very low in bush form, the trunks should not be higher than two feet as high exposed trunks are liable to sun scald. As to how long cultivation should be kept up is a point not fully settled. Clean cultivation without a mulch if continued through a series of years is bad for the trees as the humus will be burned out of the soil by the hot sun. On the other hand, cover crops tend to rob the soil of moisture needed by the trees. In most seasons trees need all the moisture for the best development of the fruit. The worst treatment is leaving the ground in dense sod. On the other hand, too long continued mulching tends to bring the roots to the surface. A golden mean between continued cultivation and too heavy mulching will be cultivating through the growing season and mulching when cultivation stops. This mulch of barnyard manure should be cultivated into the soil the next spring. The new orchard disc cultivators and similar implements introduced in recent years are excellent because they permit cultivating close to the trees without injury from the horse and singletrees, owing to the discs which can be extended on either side. When the trees get too close for cultivation, or if thorough cultivation cannot be given earlier, the trees should be mulched enough to keep down weeds and if on hardy roots there will be no trouble from root-killing.

Very little pruning is done with the plum and the best season for this is the latter part of June. Many varieties are apt to make too long naked branches in the early years with a tendency to set the fruit too near the ends of the branches. This causes too much strain on the forks, which readily split down. When the tree is bearing a heavy crop some attention should be given to propping and tying up the branches, and to suitable thinning of the fruit. The tendency to split in the crotch is sometimes remedied by driving a long wire nail through and clinching it. Heading back in the early years so as to induce a compact habit is a wise precaution against splitting down later on. Even then as the trees become older the fruit branches often become too long, so that the fruit is all near the ends. In such cases more heroic treatment must be pursued and the heading back done with a saw.

If there is one thing that plum trees need more than any other it is manure. So many varieties are strongly inclined to

exhaust themselves in excessive crops of fruit. This tends to shorten life and even if the trees live the fruit runs too small and poor in quality. Unleached wood ashes and barnyard manure are needed to keep up the fertility of the soil. Many a gallon of soap suds from the family washing is wasted which would do good service among fruit trees or currant and gooseberry bushes.

The fact is now well established that many varieties of our native plums do not bear well alone; that is, they bear much more abundantly planted intermingled with other varieties, thus providing for cross-pollination of the blossoms. Some varieties which are entirely sterile planted alone bear abundantly when planted in a mixed plantation. Elaborate series of observations have been made by various authorities as to the best varieties to plant together for the best results. In this locality the Americana varieties do not vary very materially in their period of blossoming, except with the nigra varieties, which are several days earlier in their main period of blossoming than those of the true Americana type. Some years the spring is so late and backward that when the weather does change the blossoms come on with a rush and very nearly together. In regions where a larger range of choice is possible as to races of plums, more care is needed in the choice of varieties.

DISEASES OF PLUMS.—Plum trees are attacked by several species of fungi or parasitic plants. The four principal ones are plum-pocket, black knot, ripe rot and scab.

PLUM-POCKET.—In plum-pocket, bladder or leaf curl, the leaves and young shoots become curled and distorted. Instead of the plums developing, a plentiful crop of hollow bladder-like deformities is produced. The fungus is difficult to control as it lives over from year to year in the woody tissues of the plant. The pockets when noticed on the young shoots should be removed and burned as soon as possible. Spraying with Bordeaux mixture when the buds swell and just before the blossoms open is recommended, but more experiments and further study are needed. To a certain extent it is somewhat a question of variety, some varieties being much more subject to the trouble than others. Sometimes a single tree in an orchard will be found to bear many pockets year after year. Such trees

should be destroyed as they tend to spread the disease to other trees.

BLACK KNOT.—This is characterized by black wart-like or knotty spongy swellings on the branches or even on the trunks. It is quite common in neglected dense plum thickets where the trees have no room for proper development. In cultivated orchards there is usually no trouble from this disease. Branches containing knots should be cut as soon as noticed. Where the knots form on large branches or on the main trunk the knots should be painted with kerosene during the growing season. This should be followed by spraying with strong Bordeaux mixture. All the wild choke cherries in the neighborhood should be examined for black knots and removed if practicable.

RIPE ROT.—By this is meant the rotting of plums on the tree. This is especially noticeable in wet seasons on trees bearing an excessive crop. The remedy usually recommended is to spray with strong Bordeaux mixture just before the buds start in early spring. The rotted plums and blackened dead twigs should be removed after the fruit is gathered and burned.

SCAB.—This disease is characterized by round grayish spots with a tendency to dry up before ripening. The past two wet seasons have been especially favorable to scab. Early spring spraying with Bordeaux mixture is recommended. But the experiments in this line have not been numerous.

INSECTS.—The three principal insect pests are curculio, gouger and aphis. The curculio is a beetle about one-fifth of an inch long with a short snout. The eggs are deposited in the young green plums after which a semi-circle is cut to prevent too rapid growth of the plum in that portion and consequent drowning of the larva. When very troublesome the trees are jarred and the beetles shaken down on sheets under the trees. Sometimes an inverted umbrella-like arrangement of this kind is attached to a wheelbarrow with a slit in front to admit the tree and a padded bumper on the wheelbarrow. This is begun while the tree is blossoming and continued morning and evening as long as the insects are abundant. A method demanding less labor is to spray the trees with a solution of one pound of Paris green to two hundred gallons of water every week or ten days during the egg-laying period. The larva of the plum gouger

lives within the pit instead of working around it in the flesh as does the curculio. The same remedies are applicable.

Aphis or leaf lice are abundant some years. They are especially numerous on the tips of young shoots. Spraying with a strong decoction of tobacco stems or kerosene emulsion is the usual remedy. Webworms and their webs should be removed by winding up on a stick and burned as soon as possible.

As a matter of fact there has not been enough trouble with fungi or insect pests in the Station orchard to make any extended spraying work necessary. One serious trouble in some orchards is what Professor Waugh has called the single-tree disease, from careless driving in cultivating. Leather or burlap tied over the ends of the tugs and the use of short single-trees help, and great care should be exercised in driving the team. A plum tree should be recognized as being a valuable machine for turning out a product of considerable money value and there is no excuse for skinning or peeling the trees by careless driving. Wounds should be smoothed with a sharp knife and protected with a good coating of alcoholic plastic or grafting wax.

Rabbits and mice must be kept from gnawing the bark of young trees. The stems of young trees are best protected by a strip of wire mosquito screen netting.

Marketing.

As has been noted many native plums are apt to overbear so that the fruit runs too small for the best market price. Some plums habitually set five to ten times as much fruit as they should ripen. Even when such trees are heavily manured the trees are short lived. The market is becoming more discriminating every year as to size and quality of fruit so that the man who has a few trees well cared for will realize a better price than one who raises more than he can take care of properly. Thinning is done as soon as possible after the June drop. This question of overbearing may be one for the plant-breeder who recognizes the need of originating varieties that bear enough but not too much. Overbearing is a serious fault as the question of labor in thinning becomes an important item.

For market plums should be picked before they are fully ripe as when fully ripe they must be used immediately and can-

not be shipped any distance. An overripe plum means that the process of decay has already begun. In the local market some Chickasaw plums have been observed sent in berry boxes. This might do for the first early but the main crop can be sold in ten pound grape baskets. Extra fancy fruits could be sold in the tin-edged splint baskets in which California plums are so generally shipped. Only for fancy fruit will such small baskets be profitable. The man who handles his plums as roughly as he would potatoes cannot expect to get a good price. The fruit should be picked by hand and not shaken off the trees. If the latter method is resorted to for plums to be used immediately for plum butter or preserves in general, a sheet should be spread under the tree before shaking. The half-bushel and bushel basket covered with red mosquito bar are used on plums sold by the bushel for preserving. In general, the lower the grade the larger and cheaper is the package used.

Breeding.

In determining the value of varieties of our native plums, earliness must be considered as a leading factor.

The following list of plums was adopted by the Minnesota State Horticultural Society December 8th, 1904, as a guide for planters in Minnesota:

Recommended for general cultivation: De Soto, Forest Garden, Cheney, Wolf (freestone), Rollingstone, Wyant, Surprise.

Most promising for trial: Ocheeda, New Ulm, Stoddard, Mankato, Aitkin, Brittlewood, Compass Cherry.

The above list is intended to be a brief one for the guidance of the beginner. The list is varied from year to year as additional experience makes it appear advisable. In the foregoing pages the history of each variety has been given as far as practicable as the origin is considered of importance in predicting the profitable range of the variety. At the South too many early plums are not desired as the main demand for canning or preserving is for the later varieties. It is more profitable when the work must be done in a hot kitchen to wait until the cool weather in the fall. But as we go north some of the best plums now in cultivation are too late in the season and hence are deficient either in sweetness or flavor or the fruit is frosted on the

tree. At the far north it now appears probable that the varieties of the Prunus nigra type will be found of special value for this reason. The following extracts from correspondence will make this point clear.

Alex Alin, Fullerton, Dickey county, North Dakota (south central), writes under date of January 16th, 1904:

"In regard to fruit experience, I have not been at it long enough to say much that would be conclusive. About plums, I will mention that De Soto, Wyant and Hawkeye did not ripen here the last two seasons, and Quaker only partly.

"The last two summers were unusually cool here, and possibly these varieties would ripen here in ordinary years, but it is probably safest not to recommend these as far north as this. I have the last years planted Forest Garden, Odegard, Aitkin and Surprise, but they have not fruited yet; but Odegard ripened last summer at Mr. N. S. French's place, 15 miles north of me."

D. W. Buchanan, St. Charles, Manitoba, writes in March, 1905:

"The only plums I have fruited to ripeness are Cheney and Aitkin. These are also perhaps the two hardiest of any of the northern named plums we have tried. Some trees of De Soto have proved fairly hardy, but the fruit is usually frozen back before it is ripe. Forest Garden and Wyant have frozen back nearly all the new growth every year. A number of other varieties have been planted more recently and I would like to experiment with them a while longer before reporting on them. The ones reported on have been under test for a sufficient number of years to make it possible to speak with authority so far as my experience goes. I have the Aitkin, Cheney, Forest Garden, Wyant, Wolf, Odegard, Surprise, De Soto, Weaver, Mankato, Ocheeda, Rollingstone, Bixby, Cottrell, etc. Cheney and Aitkin have ripened fruit. A number of these varieties freeze back badly, but a few appear quite hardy.

"These trees have come from Minnesota nurseries and have probably been worked on miscellaneous stocks."

A. Norby, of Madison, S. D., reported in 1904 to the South Dakota State Horticultural Society as follows:

"Among the hardiest natives are New Ulm, Wyant, De

Soto, Manitoba. Among those occasionally killed back from the top when one or two years old are Forest Garden, Wolf, Rockford, Stoddard, Hammer (sometimes quite badly)."

Further extracts from the correspondence of this Department could be given all showing that Prunus Americana, our wild plum, has a wide distribution and that selected varieties from the southern part of its range will not be adapted to the northern portions owing to the lack of hardiness and too late period of ripening. Conversely, plums of far northern birth will not usually be desirable at the southern borders as the season will probably be too early for the highest market value and the tree will not be fully adapted to the climate. In other words, hardiness means adaptation to heat as well as to cold and each region must in a large measure deve op its own plums. Earlier and hardier plums are evidently needed at the north. Increase in size and improvement in quality must come either by selection from large numbers of pure native seedlings of northern birth or by crossing. We must have good keepers with firm flesh, so that they may be shipped long distances and arrive in good condition. By crossing with cultivated varieties from other states and other continents a tribe of hybrid plums are being bred that in a large mea ure will combine the good characters of both parents.

A chief factor of a score card for plums should be the ratio of weight of pits to that of flesh. This has been largely overlooked. If the pit is too large in proportion to the amount of flesh, the customer does not get as much for his money as when the plum is smaller but with a pit still smaller in proportion. Our investigations in this line are not yet completed. It is to be hoped also that this method of determining the ratio of pit to flesh will be taken up elsewhere.

The methods of breeding hardy fruits in general were illustrated and discussed in Bulletin No. 88 of this Station. Most of the work is done under glass and a full discussion of the methods is not the object of the present bulletin. The raising of plum and other fruit seedlings is not recommended to amateurs or commercial growers who must make every foot of land count in a financial way. The disappointments are too many, and the hope of financial return too remote. The work,

if done at all, must be largely a labor of love, as a personal contribution for the general good. Incidentally the fascination of watching and waiting for a lot of new seedlings to develop and bear fruit will in itself be something of a recompense. A brief account of the methods employed at this Station in fruiting thousands of plum and other fruit seedlings may be of interest. After thorough preparation of the soil by plowing and harrowing the ground is marked out with a horse-marker set at four feet. With careful driving and the use of tall sticks to sight by it is easy to mark out the land in rows four feet apart. The plan is to set at regular intervals in the rows and the same marker may be used across the rows at right angles. In practice it is not always possible to do this and the spacing is then roughly done by stepping. Plums, choke cherries, apples and other fruit trees are set in rows twelve feet apart and about two and one-half feet apart in the row. Bush fruits are set out four to eight feet apart and two and one-half feet apart in the row. Dead furrows are opened where wanted by plowing a furrow and then plowing back as deeply as possible in the same furrow with an active man to press down the plow beam. This does away with spading. The main essential is to tramp the earth firmly about each plant and to rake in loose earth on top to prevent surface-baking of the soil. Where the dead furrows are to be only four feet apart it is better to make them eight feet at first. Plant them full and then plow the furrows for the intervening rows. The last two years we have found it best with the bush fruits to set the marker at three feet and run the furrows six feet apart. With over a quarter of a million fruit seedlings raised here in our plant-breeding experiments quick nursery methods are essential. After about two crops the trees bearing the best fruit are given more room by chopping out the inferior trees on either side. When the final selection has been made of the best plants from which to start the new generation under cultivation, the others are readily removed with a tree-digger and a bonfire made. This is truly a survival of the fittest as determined by man and not by nature.

EXPLORATION WORK.—Somewhere in the plum thickets of South Dakota is a plum tree growing with fruit superior in size and quality to all other wild plums in the state. That is a

tree which we should all try to find. Last summer and autumn an overland trip from Pierre to the Black Hills along the Cheyenne river, and two trips along the Missouri river in Campbell and Walworth counties to the North Dakota line, were made by the writer in the hope of discovering this plum tree. The Pierre-Black Hills trip necessitated driving two hundred and fifty miles with team, and camping out fifteen nights in a tent. It is too much to hope that this ideal tree was found in this search, but far west of Pierre on dry upland, in alkali breaks of the Cheyenne river, and along the Missouri river, plums were secured deemed very worthy of further trial. Especially one in a thicket bearing fruit one and three-eighths inches in diameter and of good quality. Much other valuable material was obtained and it is planned to continue this work of exploration as opportunity affords. The general experience with plums taken from the wilds and put under nursery propagation is that the fruit improves in size and quality.

The Pierre-Black Hills trip was in co-operation with the Division of Botany of this Station, Prof. Wheeler collecting the native grasses and forage plants

Acknowledgment.

The photographs for all the plates in this Bulletin were taken by A. B. Holm, photographer of this Station.

Summary.

1. An abundance of plums of good size and excellent quality can easily be raised in South Dakota.

2. For profit, plant only the selected varieties of our native wild northwestern plums. The foreign and southern plums are a matter of hazardous experiment only. Some of the newest and best of the native plums are not yet common in the nurseries. Some promising hybrids of the native and foreign plums deserve more attention, and many more are on the way.

3. Hardy stocks are essential. A plum orchard may consist of hardy varieties, but if worked on tender roots, the trees will root-kill. Be sure you have a good *foundation* for your orchard.