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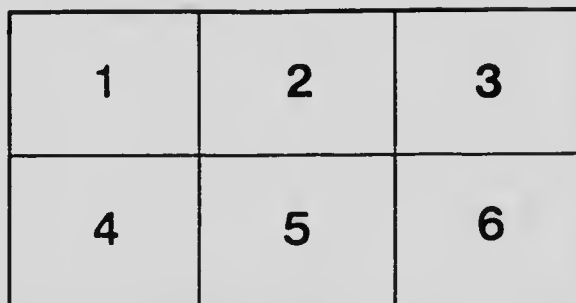
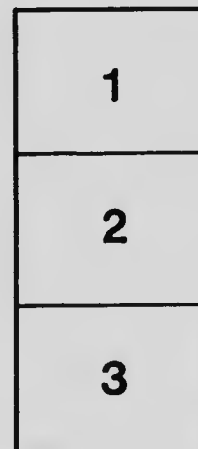
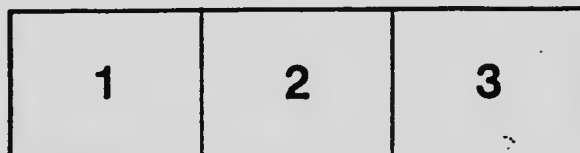
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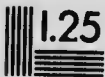
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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
EXPERIMENTAL FARMS

PLUM CULTURE

AND

DISTRICT LISTS OF PLUMS SUITABLE FOR CANADA

WITH

DESCRIPTIONS OF VARIETIES

BY

W. T. MACOUN,

Dominion Horticulturist, Central Experimental Farm.

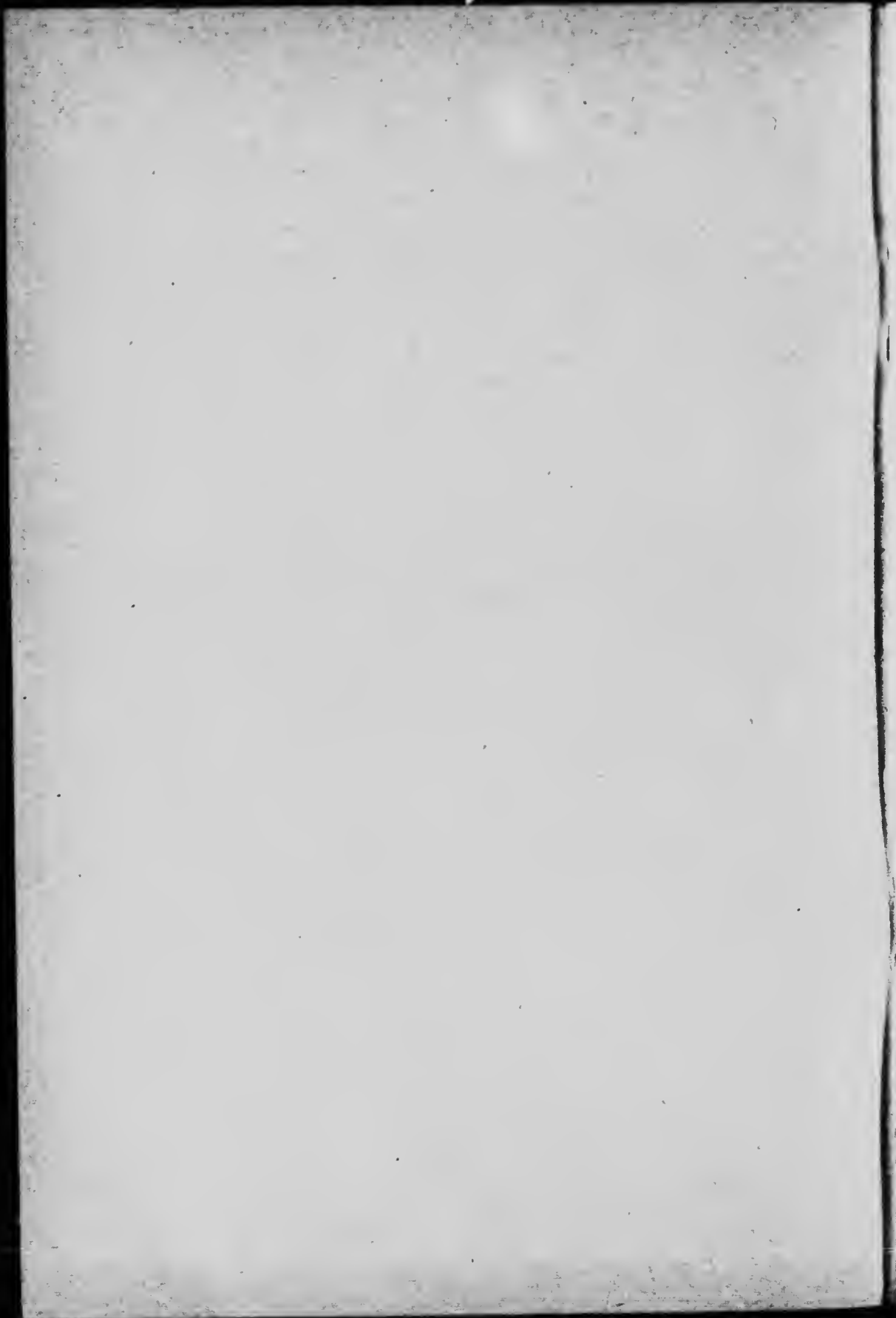
BULLETIN No. 43

(REVISED EDITION)

1918

Published by direction of the Hon. MARTIN BURPELL, Minister of Agriculture, Ottawa, O.

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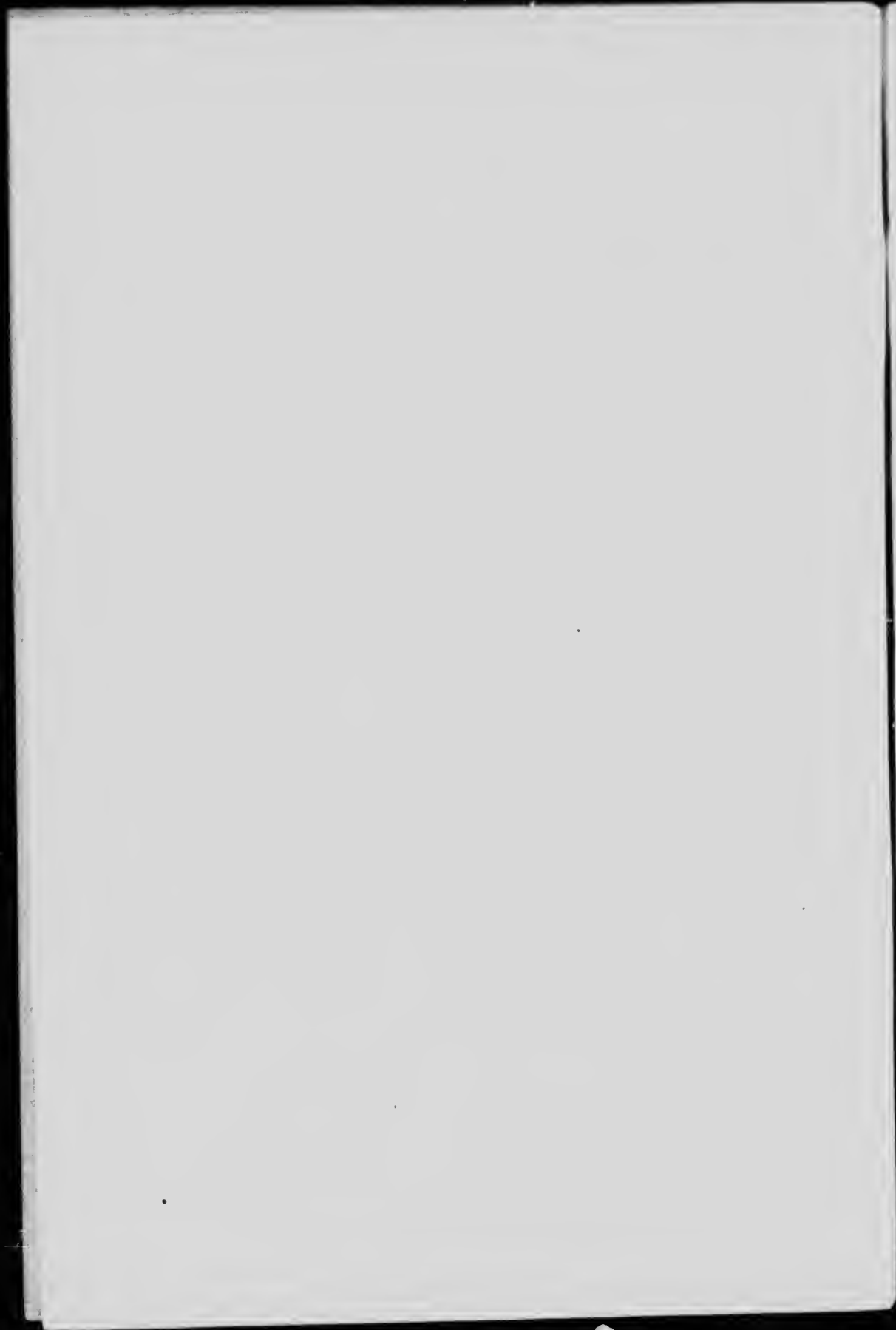
BULLETIN No. 43

(REVISED EDITION)

1913

Published by direction of the Hon. MARTIN BURRELL, Minister of Agriculture, Ottawa, O.

48069—1



To the Honourable

The Minister of Agriculture.

SIR.—I beg to submit for your approval Bulletin No. 13 of the Experimental Farm series which has been revised under my direction by Mr. W. T. Macoun, Dominion Horticulturist.

The subject treated of is Plum Culture and the information presented has been largely derived from the experience gained in connection with plum growing at the Central Experimental Farm during the past twenty-five years. In this bulletin information is given as to the best methods of preparing the soil for a plum orchard, with particulars also as to the planting and subsequent care of the trees. Instructions are also given as to methods of pruning, grafting and on many other topics relating to this branch of fruit industry. Lists of varieties of plums suitable for planting in different parts of Canada are given with descriptions as to the character, quality and time of ripening of each sort. Some of the insects and diseases to which the plum is subject are also referred to and methods of treatment suggested. A chapter has been prepared by Mr. F. T. Shutt, Dominion Chemist, on fertilizers for the plum orchard.

It is hoped that the information submitted will be useful to those interested in the cultivation of this fruit in Canada, that it will prove a stimulus to the further planting of plums and that it may aid in making the growing of this useful fruit more successful and more profitable in this country.

I have the honour to be, sir,

Your obedient servant,

J. H. GRISDALE,

Director Dominion Experimental Farms.

Ottawa, August 29, 1913.

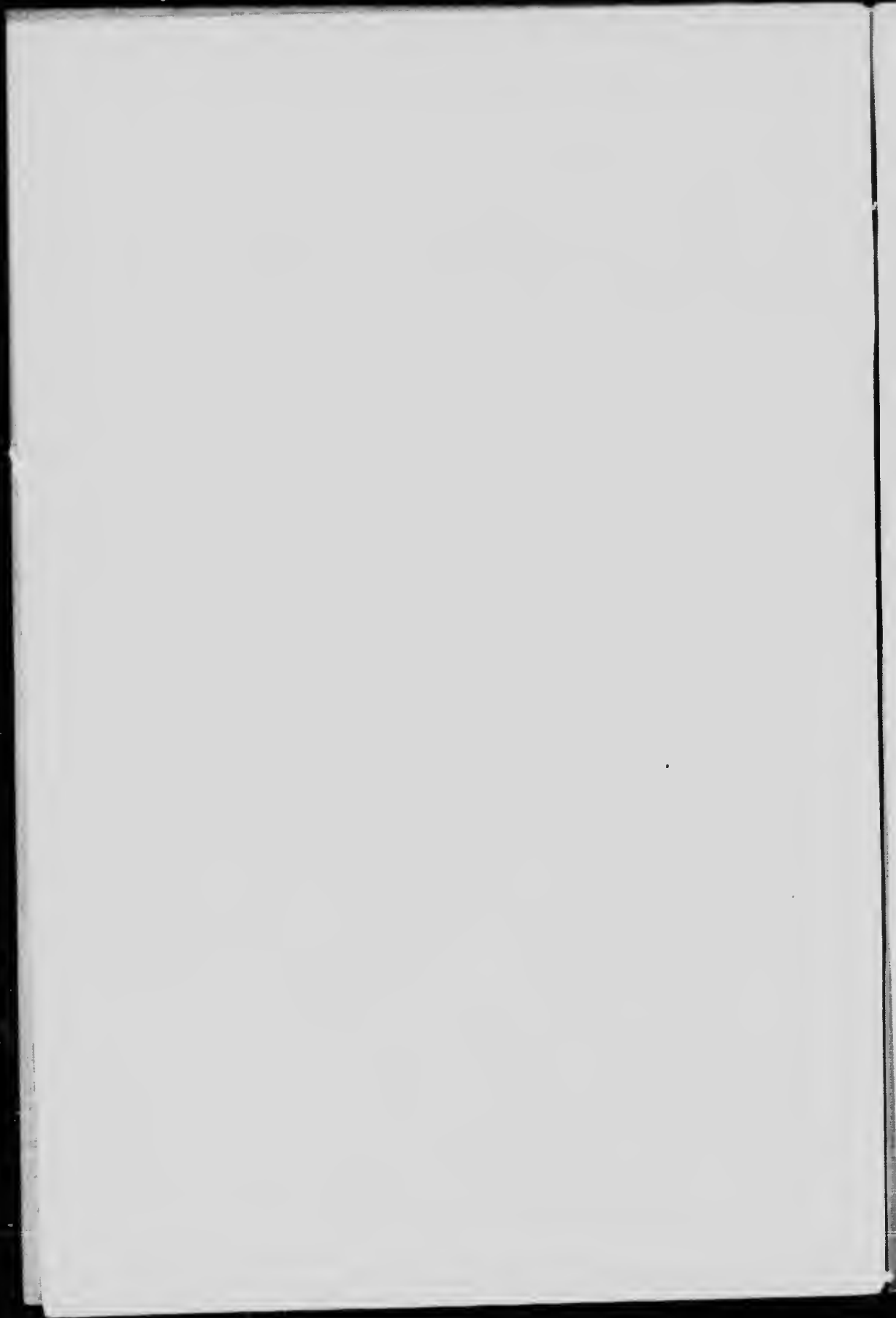


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PLUM CULTURE

BY

W. T. MACOUN,

Dominion Horticulturist.

If every member of every family in Canada had a plentiful supply of plums of the best quality for home use, and if enough of the fruit were exported profitably from Canada to supply the demands of the people of other lands there would be less necessity for publishing a bulletin on Plum Culture; but unfortunately this is far from being the case. Comparatively few people get good plums to eat, especially in the fresh condition, and the export trade in plums, whatever it may be in the future, is practically nothing at the present time.

Past experience has been that the consumption of fruit increases almost, or quite, as rapidly as the supply, providing the latter is properly distributed, and it is not too much to expect that it will do so in the future, at least for some time. The desire for fruit grows on the consumer, and the better the quality of the fruit supplied the greater will be the desire for it.

The plum has not been as profitable to grow in Canada as some other fruits, but with a careful selection of varieties and good care it will be found to give fairly good returns. In those parts of Canada where the European plums do not succeed, the improved native and American varieties have been found very profitable. Some of these ripen before the European plums come on the market and they sell at high prices.

In preparing this bulletin, it has been necessary to correspond with many fruit growers in Canada to obtain accurate information in regard to plum culture in different parts of the Dominion. This, with the knowledge gained from experience at the Central Experimental Farm, has enabled the writer to make this bulletin much more useful than it otherwise would be.

CLASSIFICATION OF PLUMS.

There are five species of plums from which are derived most of the cultivated varieties of to-day, namely, the European, derived from *Prunus domestica*, *Prunus insititia*, and *Prunus carasifera*; the Japanese, from *Prunus triflora*; and the American, from *Prunus americana*, *Prunus nigra*, and *Prunus hortulana*. A Chinese species, *Prunus Simonii*, has given at least one variety and has been used extensively in cross-breeding, and the so-called Western Sand Cherry, *Prunus pumila Besseyi*, a native of North America, has also been used as a parent in plum breeding.

EUROPEAN PLUMS.

This class of plum has reached a higher stage of development than either the Japanese or American, which is due to the fact that they have been under cultivation from very early times and that more systematic and intelligent labour has been spent on their improvement. It is thought by some authorities that the European plums have gradually developed from the Damson, and that the latter originated

from the European sloe, *Prunus spinosa*. The Damsons, however, are so distinct in tree and fruit from other European plums that other authorities have a separate group of them. There is such a wide difference between the Damson and the Reine Claude or Green Gage groups that it seems reasonable to suppose that the origin of the two was different, and indeed they have been regarded as different types, at least since the Middle Ages. Both the Damsons and the Green Gages come fairly true from seed. The following classification is the same as that given in the 'Plums of New York' (Hedrick) and 'Plums and Plum Culture' (Waugh):

Yellow Egg type.—This includes some of the largest European plums and is represented by Yellow Egg, Golden Drop, and Grand Duke.

Perdrigon type.—The only variety of this type which is grown in Canada, to the writer's knowledge, is the French Red Perdrigon, introduced by the Trappist Fathers, Oka, Que.

Diamond type.—(Waugh), Imperatrice type (Hedrick).—This includes some of the most productive, firmest and best shipping varieties but usually those of only medium quality. Varieties of this type are Diamond, Kingston, Quackenboss, Glass, Shipper, Mount Royal, and Arctic. Archduke and Grand Duke, while differing considerably from the type, might be put here.

Bradshaw type.—Under this type, Professor Waugh includes Bradshaw, Victoria, Pond, Field, Duane Purple, Oswego and Giant Prune. These varieties, however, have not as many characteristics in common as those of the previous types. In the 'Plums of New York' they are included in the next.

Lombard type.—Represented by Lombard, Communia, Vorenesh 20 of Budd, Leipzig of Budd, Prince of Wales and Mermika. The early Red Russian and White Nicholas of Budd would also be included in this type.

Prune Group.—Represented by Italian Prune (Fellenberg), German Prune, Raynes, Agen, and Ungarish.

Damson Group.—In this are the Damson type and Mirabelle type.

Damson type.—The best known varieties of this type are Shropshire, French, Frogmore and Cluster.

Mirabelle type.—The varieties grown in Canada are Mirabelle précoce and Mirabelle tardive.

Reine Claude or Green Gage Group.—There is a large number of fine dessert varieties in this group, the principal being Reine Claude, Green Gage, Lawrence, Imperial Gage, McLaughlin, Jefferson, Washington, General Hand, Bleeker Peter's Gage and Queen May.

Plums of the European class succeed best in Ontario in the counties bordering on the great waterway southward and eastward from the Georgian Bay to the Thousand Islands. They may be grown very successfully all through south-western Ontario and the Niagara peninsula, and through the central counties to those bordering on Lake Huron. East of Toronto the best varieties are grown within twenty-five or thirty miles of Lake Ontario. North and east of these areas, only the hardiest kinds succeed well, and but very few are hardy north of latitude 45°.

In the province of Quebec, a few varieties give fair satisfaction in the Eastern Townships and a few on the Island of Montreal, and along the Ottawa river above Montreal, past the Lake of the Two Mountains. Along the south shore of the St. Law-

rence river, below the city of Quebec, in the counties of Levis, Bellechasse, Montmagny, L'Islet, Beauce, Kamouraska and Temiscouata, most of the finest varieties of European plums can be grown with good success, and along the north shore in the counties of Portneuf, Quebec (Island of Orleans, especially), and Charlevoix, some of the hardiest sorts succeed. It is, however, near the river, and where its influence is felt, that these plums succeed best.

On Prince Edward Island, the European plums do well; also in many parts of Nova Scotia, and they do particularly well in the southern part of that province. In New Brunswick, some of the varieties succeed in the warmer parts of the province, particularly along the Lower St. John river and near the south coast.

The European plums do exceptionally well on Vancouver Island and the Lower Mainland of British Columbia, and also in the Okanagan, Kootenay and other valleys, and no doubt in many of the northern valleys of that province with temperate climates, where they have not been fully tested yet, they will be found to succeed.

In the Prairie provinces, the European plums have not been found sufficiently hardy, the trees being winter-killed.

The hardiness of the European plum appears to be governed partly by the moisture of the atmosphere, and partly by the temperature. At Ottawa, very few varieties will fruit at all, and most of these bear a good crop only once in three or four years. It is not the wood which is killed by winter, although winter-killing of the tips does occur when the temperatures are very low, but the flower buds are destroyed. This killing of the buds appears to be due partly to the dry, cold weather of winter, and partly to spring frosts. Good crops of European plums have been produced at Ottawa after the temperature had been lower than 20° Fahr. below zero the previous winter, showing that temperature alone is not the cause of failure. Along the south shore of the St. Lawrence, below the city of Quebec, where the temperature falls 30 degrees Fahr. below zero, good crops of the best varieties of European plums are regularly produced. The moisture of the air in this case appears favourable to the preservation of the flower buds, even though the temperature is low. There is a great difference, however, in the hardiness of the different varieties, and in time seedlings may be produced which will have flower buds capable of surviving the coldest temperatures which occur in cold districts in any winter. Sudden changes of temperature are hard on flower buds, but near large bodies of water the temperature does not change suddenly.

JAPANESE PLUMS.

Owing partly to their introduction being comparatively recent, partly to their vigour, productiveness and good shipping qualities, and partly to the way they have been boomed, the Japanese plums have been widely planted on this continent in recent years. Although introduced into America as recently as 1870, this class of plum is now almost as well known as the European. The origin of the Japanese plum is unknown, but it is thought to be a native of China. The Japanese were not very systematic in their nomenclature, and when the plums were introduced into America there was great confusion of names. They have, however, been fairly well worked out, and the best known and most profitable kinds can now be obtained true to name. Many seedlings have been grown in the United States and a large number of hybrids originated, some of which have great merit.

The fruit of most of the varieties is only medium in quality: a few, however, are good, and a still smaller number very good. The productiveness, firmness, appearance and good keeping qualities are what make these plums valuable. The majority of the Japanese plums are not as hardy in the flower bud as the European and some are much tenderer. They bloom very early, and on this account are more likely to be injured by spring frosts. The Burbank and Red June are, perhaps, the hardiest.

The Simon or Apricot plum *Prunus Simonii*, Carr., though not a Japanese plum has some of its characteristics and may be classed with the Japanese here. This

plum is thought to be a native of China and was introduced into America from France about twenty years ago. It has not been planted to any extent in Canada, nor is it widely grown in the United States. The tree is productive and the fruit is large and handsome, though inferior in quality. The fruit keeps and ships well. It does not appear to be any hardier than the Japanese plums. It has been grown with success in south-western Ontario, but is not a desirable plum to plant. It has been used as a parent in cross-breeding.

AMERICAN PLUMS.

These plums have a wide range on the American continent, being found wild from Mexico north to the province of Manitoba, and from the Atlantic to the Pacific oceans. They are represented over this great area by seven distinct species and six recognized groups or types. Of these, the cultivated varieties originating from the American wild plum *Prunus americana*, Marsh. and the Canadian plum, *P. nigra*, Ait., include nearly all the American plums that are profitably grown in Canada. The more southern groups, of which a few varieties are partially successful, are: the Miner group, *Prunus hortulana mineri*, Bailey, which is closely related to *Prunus americana*, but has some resemblance to the Wildgoose group; and the Wildgoose group, *Prunus hortulana*, Bailey. It is, however, only in the mildest parts of Canada that they are even fairly satisfactory. At Ottawa, the flower buds are injured and the crop light. The varieties of the Wayland and Chicasaw groups of plums,—two other important groups—are too tender for most districts in eastern Canada.

Americana Group.—This group has, up to the present time, furnished the best varieties of American plums. The range of *Prunus americana* as given by Hedrick in the 'Plums of New York' is as follows:—'The boundary line of its northern range passes through Central New York to Central Michigan, southern Wisconsin, Minnesota, and South Dakota, extending north westward to Manitoba and reaching its western limits in Utah. It occurs locally southward through Colorado to northern New Mexico. It is rare in Oklahoma and does not occur in Texas, but is represented in Missouri by a pubescent form. East of the Mississippi the typical species occurs in all of the States from Central New York southward to northern Florida.'

The tree is a spreading grower, sometimes reaching a height of twenty feet. On account of its spreading habit the trunk and large branches are often split or broken by winds when laden with fruit or by heavy snow storms in winter, and this is a serious drawback to some varieties especially. The varieties of this species bloom later than the Canada plum, *P. nigra*, and sometimes escapes frost from which the native species suffer, an example of which occurred in Ottawa in 1902 and 1913. The trees are very productive and the fruit is much improved in size by thinning. The fruit varies greatly in size and the colour ranges from yellow to red. The skin is generally tough, and often thick and astringent, but the flesh is moderately firm or firm, very juicy, sweet, and sometimes rich and high flavoured. The stone usually clings, but occasionally is almost or quite free. When growing wild, this tree is found thriving best in rich and rather moist soil, but under cultivation it succeeds very well even where the soil is comparatively poor and not very moist. It is only about sixty years since the Americana plums were thought worthy of cultivation, but during the past few years the cultivated and named varieties have increased so fast that there are now over two hundred of them. The size, appearance and quality are also very much improved. Indeed, the improvement is remarkable considering the short time in which it has been made, and we may hope for still greater improvement yet. The appearance of the plums is all that could be desired, and the best varieties are almost large enough,

but there is great room for improvement in the character of the skin and flavour of the fruit, although the latter is good. Earlier varieties are also wanted. The present fruiting season of the Americana plums at Ottawa is from the fourth week of August until about the last of September. Some varieties of this group are Bixby, Wolf, Hawkeye, Stoddard, Brackett and DeSoto.

Nigra Group.—From this group of plums, of which *Prunus nigra* is the species, will probably be originated the varieties which will be of greatest value in the northern parts of Ontario, and the coldest parts of the province of Quebec. This is the wild plum of Eastern Canada, having a range from the Maritime Provinces westward to Lake Huron. It is found in Michigan, in northern New York and in the New England States. It is also found in Newfoundland. Although in some places this species can scarcely be distinguished from *P. americana*, into which it seems to merge in some districts, in the colder parts of the provinces of Ontario and Quebec the tree is very distinct, and for this reason we prefer considering it a separate species although some good authorities make it merely a variety of *P. americana*. It is a more upright grower than *P. americana* and the wood is darker and tougher. The tree seldom breaks down like *P. americana*, which is a great advantage. It blooms earlier and has larger flowers than the Americana. The flowers also have a pinker tinge, especially when opening. The serrations of the leaves are rounded, not acute as with Americana and the leaves are broader than the latter. The fruit ripens early, and on this account is sometimes more profitable, as it can be marketed when there is little competition with other plums. Although the named varieties which are now upon the market are not as high in quality as the best of the Americana group, some of the wild seedlings are fully as good in quality, though not as large. The skin of the Canada plum is thinner than the other species and breaks up easier when cooked. The colour of the fruit varies almost as much as *P. americana*, but is more often entirely red with little or no bloom. The shape varies, but the fruit is more regularly oblong and oval than *P. americana* and is not flattened like that species. The Canada plums begin to ripen about August 1 at Ottawa, and the season extends to September. Very little has yet been done either in the United States or Canada to improve *P. nigra*, but as good results are as likely to be obtained as with *P. americana*. Some of the varieties of this group are Carstesen, Aitkin, Odegard, Cheney.

HYBRID PLUMS.

During the past ten years a number of hybrid plums have been placed upon the market. Most of the more prominent of these were originated by Luther Burbank, of California, who has devoted much time to this work. Few of his hybrids, however, which are now on the market have proved valuable in Canada. The parents of most of them are varieties which do not prove successful where the climate is severe. The warmer parts of Ontario, Nova Scotia and British Columbia, where the Japanese plums do well, are where they are most likely to succeed. Maynard is one of the most useful. The Omaha, a hybrid originated by Williams of Nebraska, is proving very valuable at Ottawa on account of its earliness. Hansen has originated some hybrid plums which are proving hardy in the colder districts.

There is a wide field for work in plum hybridization. If blood of the European and Japanese varieties can be introduced into the Americas and Nigras and the hardiness of the latter maintained, plum culture in the north will receive a great impetus. It is not too much to hope that this will soon be accomplished, and, in the case of the Japanese and Americana, the Omaha is an example of a combination of these two.

PLUM CULTURE IN THE DIFFERENT PROVINCES OF CANADA.

A circular was sent out to leading fruit growers in the different provinces of Canada, in which certain questions were asked relating to plum culture in each province. From the replies, the following summaries have been made, which it is thought may prove useful.

Prince Edward Island.—The European plums succeed well in this province. The Japanese varieties are too tender, and natives are not desired. The quantity of plums grown on the Island is limited as the home market is not large. Plums have been shipped with good success to the mining towns in Cape Breton and Nova Scotia. Late spring frosts sometimes affect the crop. The trees, as a rule, bear heavily every other year, but are not long-lived. Black Knot is the most troublesome disease, and Shot-hole fungus also causes injury. Plum culture is considered profitable.

Nova Scotia.—The climate of the Annapolis and adjacent valleys and parts of the south coast is admirably suited for the culture of the European plum, and some of the Japanese varieties do well also. Large quantities of plums could be grown, but, owing to the small size of most of the towns, the market is limited at present. Cold, wet weather in spring, especially during blossoming time, and severe winters, affect the crop occasionally. Very early and very late varieties are profitable as they do not come so much into competition with Ontario fruit. Black Knot and Brown Rot are troublesome, but the latter is not so prevalent as in some other parts of Canada.

New Brunswick.—Except near the Lower St. John river and near the coast in Charlotte and some of the other counties, where a few of the hardier European plums do fairly well, the chief dependence must be in the Native and Americana varieties. Severe winters and late spring frosts are, occasionally, hard on the European plums. Black Knot is the most prevalent disease; and of insects, the Curculio. Local markets are good but they are mainly supplied with plums from other provinces.

Quebec.—With the exception of the south shore of the Lower St. Lawrence river where there is open water in winter as a result of which the European plums succeed admirably, it being possible to grow many more plums than is being done at present, the growing of plums is confined mainly to the Native and Americana varieties. Along the Ottawa Valley, in the vicinity of Montreal, and in the Eastern Townships, European plums give crops occasionally, but the winters are too severe to make them a commercial success except in the most protected places. In L'Islet and Kamouraska counties where most of the European and Domestica plums are grown, the growers are now canning their plums with good success. The season is very late, some varieties keeping into November. Good prices are obtained for native plums in local markets, but the larger cities and towns are supplied with European plums from western Ontario.

Black Knot is the commonest and most injurious disease. There is also some Brown Rot. Scab and Plum Pocket affect the native plums very badly and in some places they rarely mature because of these diseases, unless sprayed. Curculio is often injurious unless the trees are well sprayed.

Ontario.—The climate of a large part of western Ontario is suited to the culture of both European and Japanese plums and great quantities are grown in the Niagara district especially. Along Lake Huron further north, the European plums do well. Sometimes low temperatures in winter or spring frosts lessen the crop. In Eastern Ontario, only the hardiest European plums need be tried and it is only in an occasional year that there is a full crop of these, even in protected places, the

winters being too severe. The Native and Americana varieties do well in eastern and north central Ontario and early varieties bring good prices. In northern Ontario, the earliest native varieties should be tried.

In the plum districts, the Brown Rot is the most serious disease, but some varieties are not much affected. *Cureulio* is controlled by spraying.

Where the Native plums are relied upon, the Seab and Plum Pocket make the crop very uncertain unless the trees are thoroughly sprayed. Taking one year with another, there is a fair profit in plums in Ontario.

Prairie Provinces.—In the Prairie Provinces the winters are too severe for any but the Nigra and Americana varieties, the Native varieties and the hybrids between the plum and the Sand Cherry. Early varieties are the most desirable as the later Americana do not ripen. Spring frosts often prevent the setting of fruit of even the Native sorts. Good prices are given for Native plums when they can be obtained.

British Columbia.—Large quantities of plums can be grown in British Columbia, as the climate is admirably suited to their culture in many parts. The varieties that ship well are the most profitable. The Italian Plum (Fellenberg) is the variety most largely grown. The Japanese varieties succeed in the warmer parts. In the dry districts, there is little injury from disease, but on the lower mainland Brown Rot often causes great loss. Spring frosts sometimes lessen the crop. In the moist districts, moss on trees is sometimes troublesome unless the trees are well sprayed when dormant.

EXPERIMENTS WITH PLUMS AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA.

Experiments with plums were begun at the Central Experimental Farm in 1888 and have been continued ever since. The testing of varieties to determine their hardiness, productiveness, and other qualities has been one of the most important experiments, and a large number of varieties have been tested. Experiments have also been carried on with various stocks, to learn which was the most satisfactory for the various classes of plums, and different methods of grafting have also been tried. The spraying of the trees with various mixtures and solutions to control fungous diseases and insect pests has also been an important part of the work. Careful records have been kept of the dates of blooming of the different varieties, and the information thus obtained is very useful, as it has been proven by Waugh and others that few varieties of American plums are self-fertile, and it is thus necessary to have, in most cases, some other kind blooming at the same time in order that fruit may set well. A table showing the blossoming period of the different varieties will be found in this bulletin. The yields from each individual plum tree are kept separate, and it is thus possible to tell whether one tree is bearing better than another. Much work has been done in testing and originating seedling plums, especially of the American varieties, and a few very promising sorts have been produced and introduced. More attention is now being paid to the Native species *Prunus nigra*. Some experimental work in cross-breeding has also been carried on.

The soil in the plum orchard is not as suitable as it might be, being a light, sandy loam but good plums are raised. The trees were originally 20 by 20 feet apart, but interplanting has been carried on and the trees are now 20 by 10 feet apart and some 20 by 15 feet. There are now 323 trees in the orchard. In addition there is a large number of seedlings planted 10 by 10 feet apart.

Following are the number of varieties of each group or class in the orchard and nursery:—

Group or Class.	Number of Varieties.
European.....	24
Americana.....	65
Nigra.....	8
Minor.....	2
Wayland-like.....	1
Hybrid.....	19
Total varieties.....	119

SEEDLING VARIETIES.

While there are many fine named varieties of plums which succeed in the more favourable parts of the provinces of the Dominion, there is always the possibility of getting something better. In the colder parts of the provinces where few of the better plums succeed, there is a fine opportunity for developing hardier and better kinds. One of the easiest and best methods of obtaining new varieties is by growing seedlings from the stones of the best plums which have ripened in the district where new kinds are desired, and if no plums have yet been grown these stones should be procured from the nearest place where they can be obtained. The European plums have been improved for so many centuries that it will be difficult to obtain a seedling plum of this class which will be better in quality than the best now in cultivation, but the prospects for obtaining trees with hardier fruit buds are very bright. The native and Americana plums have been, relatively speaking, little improved as yet, and there is a wide field for development here. Stones should be saved from the largest plums from the most productive tree of the variety of which seedlings are desired. These stones should, when possible, be planted immediately after the fruit is ripe, as if the stones become dry they will not germinate as well, and sometimes will not grow at all. If they are planted at the time the fruit is ripe it is not necessary to remove the pulp. If the stones cannot be conveniently planted at this time they should not be allowed to become dry. They may be kept over winter in boxes mixed with sand, which should be moist but not wet. A layer of sand about one inch in thickness is put in the bottom of the box and is merely covered with a layer of stones, the latter are then lightly covered with sand and another layer of stones on top, and so on until the box is filled. This is called stratification. The box should be buried outside where there is good drainage and no danger from small animals, or kept in a cellar. If the stones freeze when they are thus moist in sand they will crack and seedlings grow quicker in the spring, but there is a danger of their drying out when exposed to the frost unless the box is buried. Stones spread outside in the autumn in a well drained place and lightly covered with soil will often come through the winter in fine condition.

The stones should be planted not more than one inch deep (often they are planted too deep) in good loamy soil, in rows three feet apart and dropped from one to two inches apart in the rows. These usually germinate in the spring, but if the stones have become dry before planting few, if any, will germinate the first year but the next year, if they have not been too dry before planting they will germinate well, if not disturbed. The soil should be kept thoroughly cultivated during the summer to induce a thrifty growth. The next spring or the one following, the young trees should be planted out about ten feet apart and left to fruit, which they will do in from three to six years. Scions may then be taken from the promising varieties and grafted. Stones planted from the best of these will be likely to produce something still better. As many of the seedling plums, especially of the Americana and native varieties are as good as their parents, the ground on which they are growing is not lost as the fruit can be sold to advantage.

CROSS-BREEDING.

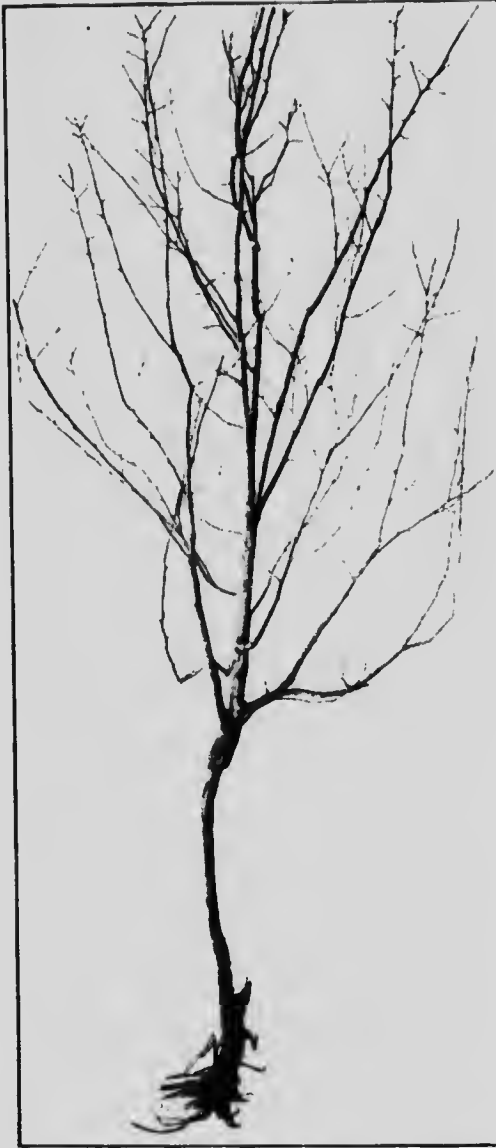
New varieties of plums may be obtained by cross-breeding, and by this method one is even more likely to obtain the kind of plum desired, but the time for this work is so limited, being only a few days when the flowers are opening, that only specialists can very well undertake it. The method of crossing is explained in Bulletin No. 37 on Apple Culture.

PROPAGATION.

The plum is propagated principally by budding and grafting, although a few varieties will strike more or less readily from cuttings, and some kinds when on their own roots are increased from suckers.

STOCKS.

While it has not yet been clearly proven that the stock on which a scion is grafted will materially change the flavour or season of the fruit, it does affect the vigour and fruitfulness of the tree in a greater or less degree. If a scion is grafted on a dwarf stock the tree will be dwarfed and will come into bearing sooner than if grafted on a thrifty stock, as anything which checks the growth of the tree promotes early fruitfulness. It is possible, however, especially in top grafting, to have such a slow growing stock that the graft outgrows it too much and the



European plum top-grafted on Nigra plum three feet from ground.

tree becomes top heavy and if it does not die owing to a poor circulation of sap, the graft is liable to be broken off by wind. The tree in the accompanying cut (a European plum top-grafted on *Prunus nigra*) was killed because there was not a free circulation of sap. The stock also, if it is tender, may be winter killed, and a tree which may be perfectly hardy above ground is ruined by being grafted on such a stock. Nurserymen find that the scion influences the root system of the stock, but it is not so clear that the scion or graft makes the scion any hardier.

If a tree is planted deep enough, roots may be thrown from the scion and the tree will eventually be on its own roots, but this should not be depended on as a rule, and

a stock should be used that will be hardy, give a good union, and make a thrifty tree. The two main stocks used in grafting and budding the plum are the Myrobolan and Marianna.

Myrobolan.—This is a European plum, *Prunus cerasifera*, and is imported principally from France. It unites readily with the scion and throws few suckers, which makes it a very desirable stock, where the winters are not very severe. It is used very generally in America, but more in the north than in the south where the Marianna is chiefly used. The Myrobolan plum is not a satisfactory stock for the colder parts of Ontario and Quebec, as it is liable to winter kill.

Marianna.—The Marianna plum is used largely in the southern States as stock, where it propagates freely from cuttings. It is thought to be a hybrid between the Myrobolan and the Chickasaw plums. This, also, is not a desirable stock for the colder parts of Ontario and Quebec.

Peach.—The peach unites readily with the plum and is used very largely in the United States as a stock for it. It can be grown cheaply, and strong young stocks are readily obtained for grafting and budding. It has, however, the disadvantage of not being hardy enough in many parts of Canada.

St. Julien.—The St. Julien is a European stock that is used to a limited extent in America for propagating the European plums, but the Myrobolan and Marianna stocks can be obtained so cheaply that it is not used much now. The St. Julien is, however, the safest stock for European plums in the north.

Americana and Native.—Americana and Native plum seedlings furnish the best stocks for the colder parts of Canada. The young trees make strong growth and are very suitable as stocks for grafting and budding. This stock is not usually satisfactory when the European plums are top grafted on it, as the top outgrows the stock and either breaks off from being top heavy or dies from lack of nourishment, as the native varieties, especially, grow much more slowly. No bad results, however, have followed from root grafting the European plums on American stock, and good thrifty trees have been obtained.

Sand Cherry (Prunus pumila).—The Americana plums have been successfully root grafted on the Sand Cherry at the Experimental Farm, and trees which had been grafted nineteen years were still in good condition with a perfect union and bearing well when they had to be removed. The trees are considerably dwarfed by this stock. The Sand Cherry may prove very useful where close planting is adopted, as many more trees could be planted on an acre when dwarfed by this stock. Trees grafted on this stock, however, are not as firm in the ground as we should like, and strong winds have a tendency to loosen them.

B U D D I N G .

The favourite method of propagating plums is by Shield budding, and the best season for doing the work is in late summer, some time during August being the best time in Ontario and Quebec. At Ottawa the trees have been found in good condition during the second week of August. In some parts of Canada the time will be earlier and in other parts later. Young stocks one or two years old are the most satisfactory.

Budding is best performed when there is still sufficient sap beneath the bark to permit of the latter being easily raised with a knife. On the other hand, if the work is done when the tree is still growing vigorously the bud is liable to be 'drowned out,' or, in other words, forced out by reason of too much sap and growth of the stock.

The stock which is to receive the bud should be at least three-eighths of an inch in diameter near the ground. The lower leaves are rubbed off to a height of five or six inches to enable the budder to work more freely. A perpendicular cut is now made in the stock as near the ground as possible from an inch to an inch and a half long and preferably on the north side of the tree, as the bud will not be so readily dried out by the sun on that side. The cut should only extend through the bark. Another cut should now be made across the top of the perpendicular one. The two cuts when made will appear thus: T

The buds are cut from well developed and ripened shoots of the current season's growth of the variety it is desired to propagate. Before the buds are removed the leaves should be cut off the shoots; a piece of the petiole or leaf stem is left, however, by which the bud may be handled after it has been removed. A very sharp, thin-bladed knife is necessary in removing the bud. Knives are specially made for this purpose. The bud is cut off the shoot downwards or upwards, whichever is more convenient, the general practice, however, is to cut upwards. The length of the piece removed with the bud should be about one inch long, and the cut surface smooth. It should be quite thin, as but little of the wood is taken with the bud. The buds or twigs should be kept where they

will not dry out while the work of budding is going on. The bud is inserted under the bark by raising the latter with the blade of the knife or the part of the budding knife made for that purpose. The bud is then pushed down and under the bark with the fingers, and finally the piece of leaf stock which was left when it was removed from the twig is pressed with the blade of the knife to bring the bud into the proper position. The bark on each side of the bud, which should now be under the bark of the stock, will hold it in position. In order to bring the bud and stock into close contact and prevent the former



Sample of Shield_budding.

from drying up before the union takes place, they should be tied tightly together with raffia or some soft string, taking care not to cover the bud with it. The bud should unite with the stock in two or three weeks, and after that time the string should be cut, as otherwise the bud may be injured. If the proper season has been chosen for the work the bud should remain dormant until the spring. If it starts in the autumn it may be killed during the winter. In the following spring the stock should be cut off just above the bud which will cause all the strength of the stock to be directed into the bud and produce rapid growth, three to five feet not being an exceptional growth for the first season.

Budding is now a very popular method of propagating plums. The first season's growth is greater than from root-grafted trees and there is a larger proportion of straight trunked trees by this method. If it is desired also to prevent trees from growing on their own roots, budding is preferable, as trees propagated in this way may be planted so that the stock is just at the surface of the soil and all roots are thrown from it. We have not found root-grafting as successful with plums as with apples and budding is recommended.

Buds may also be inserted in the branches of trees with good results. When the buds have united and grown the top may be shaped up as if top grafted, but this is seldom done with plums.

GRAFTING.

Scions.—As much of the success in grafting depends on the condition and quality of the scions, too much stress cannot be laid on the importance of having them of the best quality and in the best condition at the time of grafting.

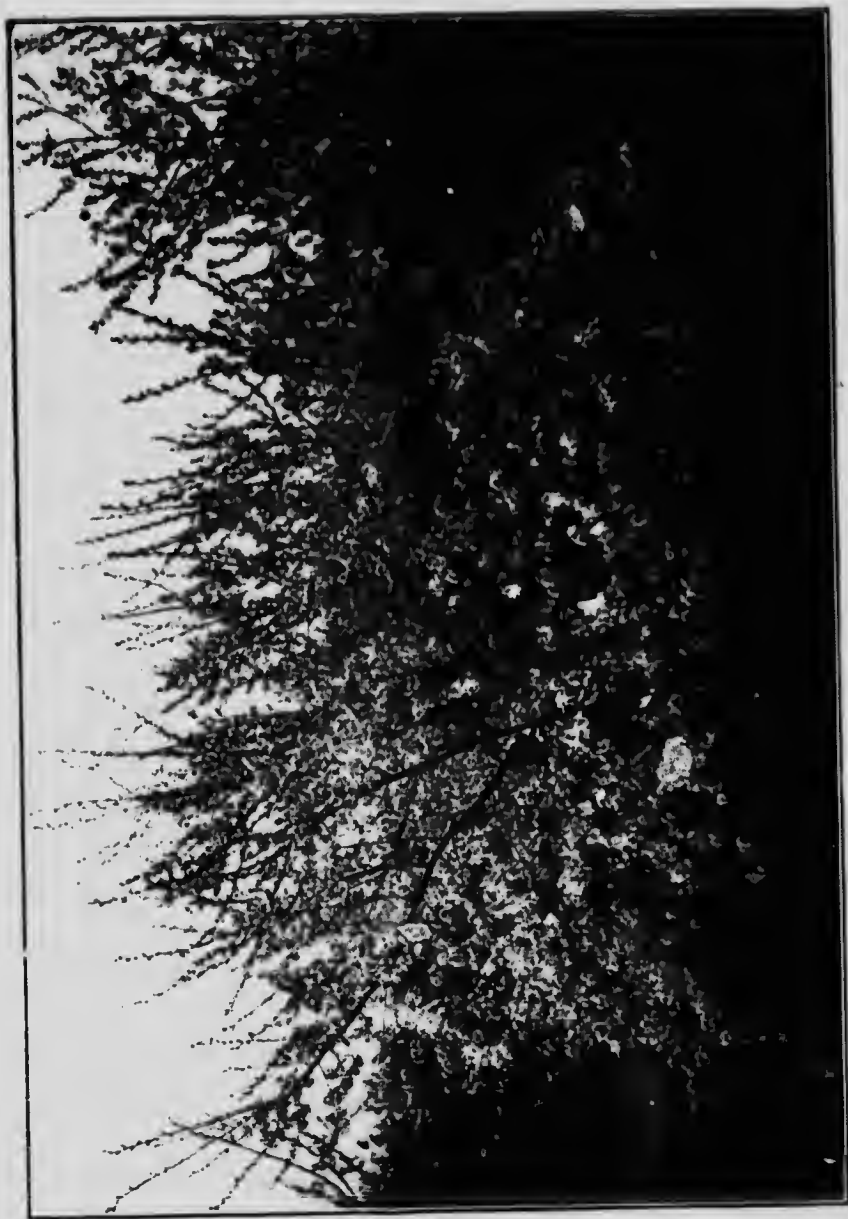
Scions may be cut any time after the wood is well ripened in the autumn and before the buds begin to swell in the spring. The best time, however, is in the autumn, as they may then be kept in the condition desired. If they are cut in cold weather, in winter, there is less sap in the scions at that time and thus the chance of their drying up is greater than if they were cut in the autumn. One cannot tell very well, either, in winter whether the young wood has been injured or not. Scions should be cut from healthy, bearing trees. The wood of old trees is liable to be diseased, and if diseased wood is used it is likely to produce a diseased tree when grafted. Scions should also be cut from the most productive trees. Occasionally, one or more trees of a variety will produce more and heavier crops than the others. If scions are taken from these trees, there may be a larger proportion of the grafted trees produce crops like the trees from which the scions were taken than they otherwise would, though this is not yet conclusively proven. The scions should be cut from the wood of the current season's growth, as older wood is not satisfactory. The buds should be well developed and the wood thoroughly ripened. It is not wise to use the water sprouts or young shoots which spring from the main branches or trunk for this purpose. They may not be thoroughly ripened, and it is also possible that sprouting propensities may be thus more developed in the grafted trees. The entire season's growth may be cut off and packed away until required for grafting, when it should be cut into pieces from four to six inches in length having three well developed buds.

Scions may be kept in good condition in moss, saw-dust, sand, or forest leaves. The last named are found very satisfactory at Ottawa. These materials should be slightly moist, but not wet; the object being to keep the scions fresh and plump without their being any danger of their rotting. They should be kept in a cool cellar which is not too dry, and should remain dormant until ready for use.

Root Grafting.—Plums are propagated successfully by root grafting, although budding is more general and gives, as a rule, much better results. Strong one year old or two year old stocks are heeled in during the autumn in a cool cellar in moist sand. Grafting may be done any time during the winter, but it is usually not stated until January or February. Whip or tongue grafting is the method usually employed. As only the root is required, the trunk and branches are cut off and thrown away. As there is



Example of Root Grafting.



Cotoneaster in Bloom. - Typical Tree of *Cotoneaster*.

but little advantage in using the whole root, it may be divided into several pieces much depending on its size. Each piece should be at least four inches long. A smooth, sloping cut upwards, about two inches long, is made across the main part of the root most suitable to receive the scion. The scion is prepared by cutting off a piece of the wood procured for this purpose in the autumn from four to six inches long and with about three well developed buds on it; a smooth, sloping cut downwards and across it is now made of about the same length as that already made on the stock. Clefs are now made in the sloping surface of both scion and stock, in the former upwards; and in the latter downwards. They are then joined together by forcing the tongue of the scion into the cleft of the stock. The inner bark, or cambium, of both scion and stock, should be in contact with one another on at least one side of the graft, as it is at this point of contact where the union begins to take place. In order to ensure a speedy and successful union, waxed cotton thread is wound tightly around to hold the parts together. Amateurs are also advised to rub grafting wax all over where the two parts are joined, as with this treatment, success is likely to be more certain.

The operation having been completed, the grafts are packed away in moss or sawdust until spring. They are then planted out in nursery rows about three feet apart and one foot apart in the rows, the point of union being about three inches below the surface of the soil. The ground should then be kept thoroughly cultivated throughout the season.

Crown Grafting.—Crown grafting is usually done on young stocks in the nursery row in the spring. The trees are cut off at or just beneath the surface of the soil at the crown or collar. A sloping cleft is then made in the side of the crown and a scion, cut wedge-shape at the lower end, is inserted in the cleft. The same precautions should be observed as in root grafting, of having the inner bark of both stock and scion touching on at least one side. The grafted part should then be well covered with grafting wax, in order to exclude the air. The trees usually make a strong growth when grafted in this way, but as the work has to be done in April before growth begins it is often inconvenient to do it at that busy season of the year.

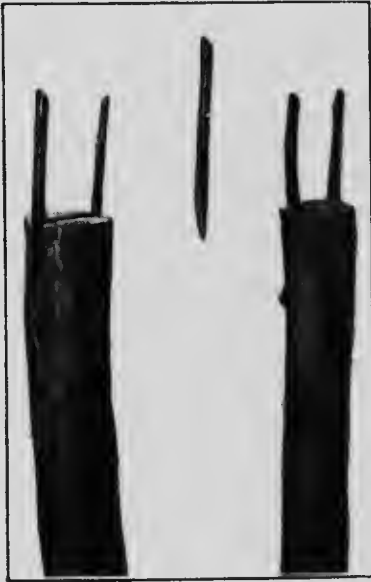
Top Grafting.—Plum trees are not top grafted as frequently as apple trees, but they can be very successfully grafted in this way. When there are trees which produce poor or unprofitable fruit they may be made to bear good fruit by top grafting other varieties upon them. An unsymmetrical top may also be improved by top grafting. European or Japanese varieties should not be top grafted on Americana or Nigra stock. In our experience at the Central Experimental Farm it has been found that although a good union is made, the European will outgrow the Americana so much that the top will die a few years after grafting, the trunk of the stock expanding too slowly. In top grafting plums it is best to have both stock and scion as nearly related botanically as possible. Top grafting is done in the spring before growth begins, and early grafting is more important with the plum than the apple. As the shock to a large tree would be very great if all the branches, on which leaves develop, were cut off the first season, about three years should be devoted to changing the top of the tree. Cleft grafting is the method usually adopted in top working plum trees, it being simple and satisfactory.

The branches to be grafted should not exceed one inch and a half or two inches in diameter. If they are larger, it is so long before the stub heals over, that disease may set in. It is possible, however, to graft larger branches by putting in more scions. The top grafting of a large tree should be done with a view to having the new top as symmetrical as possible, and great care should be taken in selecting the branches to be grafted upon. After the branch is sawn off it is cleft by means of a mallet and strong knife to the depth of an inch and a half to two inches. It is held open to receive the scion by driving a wedge in it. Scions for use in top grafting

are cut from dormant wood which has been kept in good condition in the manner already described. They should have about three strong buds, and be cut wedge shape at the base, one side, however, being a little thicker than the other. Two scions are now inserted in the cleft of the stub, with the wide side of the wedge on the outside, and thrust down until the lowest bud is almost on a line with the edge of the stub. The inner bark of both scion and stub should meet at some point, so that the union will take place readily, and this is more easily effected if the scion is given a slightly outward slope when inserted. When the wedge has been withdrawn from the cleft the advantage of having the wedge-shaped end of the scion thicker on one side will be apparent, as it will be held much more tightly than if both sides were the same. If the scion is not a tight fit all along, there is something wrong in the way it has been cut or the stub has been cleft. The cut parts should now be covered with grafting wax to exclude the air and hold the scion in place. Cotton is also sometimes wrapped around the wax in order to more effectively hold the scion in place. If both of the scions grafted on a stub should grow, the weaker one should be removed after the other is well united and the surface of the stub at least partially healed over.

It is often desirable to top graft young trees, and this may be done very readily. The main branches are cut back to within a short distance of the trunk, and the scions grafted on, either by cleft or whip grafting. The closer the grafted part is to the trunk, the better, as the tree will be stronger than if the union occurred further out on the limb, since the growth of graft and scion may not be equal. It is possible to cut off the whole top of the tree and graft successfully on the main trunk, when the tree is young, but unless one is sure that the union will be perfect and the top not outgrow the stock, it is better not to run the risk of losing the tree. Furthermore, if the whole top is cut off there will be such a growth the first season that the scions are liable to get broken off. In top grafting a young tree that has been planted from three to five years, it is better to take two seasons to do the work, as the results will be, as a rule, more satisfactory.

It is necessary to examine the grafted trees during the summer and remove any young shoots from the stocks which are interfering with the scions. It is not wise, however, especially when the tree has been cut back severely for grafting, to remove all the shoots until the grafts have grown considerably and furnish a good leaf surface.



MATERIALS NEEDED IN GRAFTING AND BUDDING.

While grafting implements and appliances are numerous, the work can be done with a few, and as it is not often convenient for the farmer or fruit grower to get a large outfit, only the really necessary things are mentioned. These are:—A sharp, fine-toothed hand saw, to be used for sawing off large limbs, or for making the stubs on trees to be top-grafted where the limbs are too large to be cut with the pruning knife.

A strong pruning knife for cutting the smaller limbs; for smoothing the wounds made by the saw or pruning shears; for trimming off torn edges of branches, and for pruning roots of young trees when planting.

A budding knife, with a thin steel blade, for removing buds, having an ivory handle which is made thin at the end and is used for raising the bark.

A grafting knife, which is used in top-grafting trees. Home-made grafting knives can be easily made. A strong, sharp blade is the chief requisite.

Pruning shears, which are intermediate in their uses between the saw and the pruning knife. They are used for cutting off branches which are too large for the latter and too small to need the saw; for rough pruning and for cutting scions.

A wedge and mallet are also necessary in top-grafting large trees.

Raffia, which is one of the best tying materials. It is very strong and very pliable, and is particularly useful for bandaging when budding.

Cotton yarn, which is used for tying root grafts, and is one of the most satisfactory materials for the purpose. The size known as No. 18 knitting cotton is the best. It is bought in balls, which should be soaked for a few minutes in melted grafting wax before using. The yarn may also be drawn through melted wax, which ensures its all being thoroughly soaked, and is, perhaps, on this account preferable to soaking the ball.

GRAFTING WAX.

There are many kinds of grafting wax recommended, but it is unnecessary to enumerate them all. One of the cheapest and best is made as follows:—

Formula I.—Resin, 4 lbs.; beeswax, 2 lbs.; tallow, 1 lb. Melt together and pour into a pail of cold water. Then grease the hands and pull the wax until it is nearly white. A good wax for either indoor or outdoor use. This should be heated before using if too hard.

Formula II.—Resin, 2½ lbs.; beeswax, ½ lb.; boiled paint oil, 10 ounces. Make up as in Formula I. This wax is more suitable for outside in cool weather than Formula I, as it remains more pliable.

The principal value of grafting wax is to exclude air from the wound, and thus prevent the wood from drying before a union takes place. A good grafting wax should not crack when on the tree, else the air will reach the wound and the wax prove of little value. Many materials may be used instead of grafting wax for this purpose, one of the simplest being a mixture of clay and cow dung, but grafting wax is much to be preferred. Strips of cotton are often used, especially in top-grafting and crown-grafting, for wrapping around the wound after the wax has been applied for the purpose of helping to exclude the air, and also to assist in holding the scion in position until the union takes place. This cotton is unnecessary if good grafting wax is used; but if a very valuable variety is grafted it is safer to use the cotton, as when the growth of the scion is rapid there is a chance of its getting broken off during the first season before it is thoroughly united with the stock. Large wounds on trees should be covered with some material that will protect the cut surface from the weather, prevent disease from setting in, and which will not peel off easily. A good dressing of white lead paint is probably the best material to use for this purpose. Grafting wax may be used on smaller branches.

THE NURSERY.

Although, as a rule, it will be the most convenient plan to buy trees from the professional nurserymen, yet he who propagates plum trees by root grafting, crown grafting, or budding, for his own use, should have a nursery in which to grow them until they are ready for the orchard. A good sandy loam soil, which does not bake

and is well drained, is best suited for this purpose, and will grow the strong, healthy trees which are desired. The ground should be thoroughly prepared and the young trees planted about 12 inches apart, in rows about 3 feet apart. Cultivation should be thorough up to about the middle of July, when it should cease, as in colder climates, especially, it is very desirable that the wood ripen well, and late cultivation would encourage late growth. It will be necessary the first year the grafted or budded trees are growing in the nursery to go over them carefully and cut out any shoots which may be coming from the stocks, and also to reduce the graft to one stem should more develop. If any side branches grow, however, they should be left intact. In small nurseries it is sometimes advisable to tie the young trees to stakes the first season. This will make them straighter and will help to keep them from being broken. These trees may be planted in the orchard the following spring if one-year old trees are to be used. By the end of the second year or the beginning of the third, after the branches have been pruned to the proper height and the tops shaped, the trees will be in the best condition for planting in the orchard.

THE ORCHARD.

Soil and exposure.—Plums will succeed well on a great many kinds of soils, but some appear to succeed better on certain soil than others, the best soil depending somewhat on the climate in which the plums are grown. In those sections of Ontario where the European plums succeed best, well drained clay loam has given the most satisfactory results. Along the south shore of the St. Lawrence, below the city of Quebec, where the European plums succeed well, these plums do better on sandy loam soils. The Japanese plums on the whole give better results on warm loamy soils than on clay loam. The Americanas and Nigra plums succeed best on clay loam soil, but also do well on sandy loam. All soils should be well drained or success need not be expected. The more severe the climate in which the plums are grown the warmer the soil should be.

If there is danger from spring frosts a northern or north-eastern exposure would be likely to give best results, as the flower buds would not develop as soon as on a southerly exposure. The flower buds of the European and Japanese plums suffer badly in the north, and there is no doubt that a northerly exposure would be best for these plums.

Preparation of the land.—It very often happens that the farmer or fruit grower suddenly decides to plant an orchard. No previous thought had been given to the matter, or if there had, nothing was done to get the land into better condition for the young trees set out to take their chances. No after cultivation will fully make up for neglect of the thorough preparation of the land. Trees should begin to grow thriftily from the time they are planted if they are to obtain a good size before they begin to bear heavily, and if the land is not thoroughly prepared and in good condition when they are planted, growth is likely to be slow. It is much better, if one has no land in good condition, to delay planting a year, and give the soil the necessary attention. The time will not be lost, as the trees will do much better. Land which has been well manured for root crops, ploughed in the autumn, and again ploughed in the spring and thoroughly levelled and pulverized with the harrow should be in good condition for planting the trees. If the subsoil is near the surface the subsoil plough should be used after the ordinary one, loosening the soil from four to six inches deeper than the former.

Sod land ploughed in the autumn, top dressed in the spring with a good coating of barn-yard manure and then ploughed again and thoroughly pulverized with the harrow, should also bring the soil in good condition. A green crop, such as clover



Plum Or hard on Niagara Peninsula.

ploughed under in the spring and the land thoroughly harrowed, would also be a very good method.

Laying Out of the Orchard.—Plum trees require thorough spraying, and this should be taken into consideration when planting, so that the trees will not be set too close. Trees should also have abundance of sunlight to thrive best and produce fruit of good colour, and they cannot obtain this if they are too crowded. There are several good methods which may be adopted in laying out the orchard.

If the trees are planted the same distance apart each way with a view to leaving them all as permanent trees, they should be planted from 15 to 20 feet apart, depending on the varieties chosen. If, however, the branching and upright growing varieties were mixed as might be necessary for good pollination, 18 feet apart would be a very satisfactory distance to plant.

Another good method is to plant the trees a greater distance apart one way than the other. This is a satisfactory system when properly carried out. By this plan trees may be planted successfully 10 feet apart in the rows with the rows 15 feet apart, the latter distance leaving ample room for spraying. When the trees become crowded, every other one may be taken out, thus leaving the permanent trees 20 by 15 feet apart.

A third method is to plant the trees in an apple orchard with the object of getting some profit from the land before the apple trees come into full bearing.

If the permanent apple trees were 35 by 35 feet apart, a row of plum trees 17½ feet apart in the row could be planted between the rows of apple trees. Plum trees could also be planted between the apple trees in the rows. This would leave the plum and the apple trees 17½ feet apart. Planted in this way, large crops of plums can be produced before it is necessary to cut the trees out. As plum trees require weaker spraying mixtures than apples, planting plums among apples is not recommended.

Windbreaks.—If the orchard is not naturally protected from the wind by trees or by rising ground, a windbreak may be planted with good effect along the north and west sides, or any other side from which the greatest injury comes, the object being not to stop the wind altogether, but simply to check its velocity, as if a windbreak is high and very dense it stops the circulation of air in the orchard to a large extent, and this gives very favourable conditions for the spread of both insect pests and fungous diseases. On the other hand, a proper windbreak lessens the force of the wind and thus protects the trees, which will grow straighter and shapelier; it will also very materially lessen the amount of windfalls, and it will permit of growing varieties which will not succeed under ordinary exposure. Wind is one of the most important factors in drying out the land, causing drought. If its force is checked by a windbreak the evaporation of moisture from the soil will not be so great.

One of the best trees to plant for a windbreak is the Norway spruce (*Picea excelsa*). It is a rapid growing evergreen and is hardy almost everywhere where plums can be grown successfully. A single row of these trees planted from 10 to 15 feet apart is quite sufficient. They should grow, if properly cared for, at the rate of from 2 to 3 feet a year until they reach a height of 50 to 60 feet. In very exposed places it may be desirable to plant two rows of trees, the trees forming the second row being planted between and 8 or 10 feet behind the trees in the first row. The first row may be composed of arbor-vitæ, which are rather slow growing, and the row behind made of Norway spruce, if desirable. White pine and European larch are rapid growing trees which may be used for this purpose. Scotch pine is inclined to be irregular in growth, and is, on this account, sometimes not satisfactory. If the tree already mentioned cannot be obtained there are other native trees which will give satisfactory results. The windbreak should not be planted nearer than 40

feet from the first row of fruit trees. The trees in the windbreak may be thinned out somewhat later on if desirable.

Kind of Trees to Plant.—Plum trees one or two years of age will give the best satisfaction. If the planter does all the cultivation himself, small trees will be more satisfactory, as they start more readily than larger ones, but if hired help is employed, a good sized tree is important, as small sized trees are liable to be tramped down or otherwise injured. The paragraph on stocks should be read carefully, as the stock of the plum plays an important part in the growth of the tree.

Planting.—The spring is the best time to plant plum trees, and the earlier it is done the better, providing the soil is dry enough to work without puddling. Plum trees suffer more from late planting than apple trees. The trees may be planted with success in the autumn if the work is done early, as they will throw out roots before winter, but if planted late they are very likely to be killed by drying out. As it is of the greatest importance to get the trees planted early in the spring, and as when ordered from nurserymen in the spring it is difficult to get them as early as required, a good plan is to order them to be delivered in autumn and when received heel them in well drained soil until spring. After the trees are taken out of the soil great care should be taken to prevent the roots from becoming dry before planting, as if they do the tree is almost sure to die. Dipping the roots in a thin mixture of clay loam and water will protect them somewhat, but wet burlap, old bags, or wet straw should also be used. Before exposing the roots of the trees, however, the holes should be made. Many planters seem to have the idea that if they dig a hole barely large enough for the roots to be crowded into they will have good results. Sometimes they do; much oftener they do not. If the whole field has been subsoiled and is in a thorough state of tillage it would not matter so much, as the soil all over would be in the same state of friability, but this is very rarely the case. So that, as a rule, it is necessary to make the hole somewhat larger than will accommodate the roots, spread out to their full extent. It should be made about 18 inches deep, after which the subsoil should be loosened a few inches more, but not removed. In digging the hole, the surface soil should be kept separate from the subsoil or that of poorer quality. Sufficient surface soil should now be thrown back in the hole to make the tree, when planted, about an inch deeper in the ground than it was before. If a tree is not planted deep enough, the roots may become exposed and the tree die. On the other hand, it should not be planted too deep. Before it is planted permanently in the hole, the soil which has been thrown in should be raised and rounded off in the centre. If this is done, the roots of the tree can be spread out much more readily and placed more in their natural position. Roots of plum trees have not many fibres, and it is necessary to spread what are left on the tree, carefully, in order to get the best results. Broken or bruised roots should be cut off before planting the tree.

The tree being now placed upright in the hole and the roots carefully spread out, the surface soil is gently thrown in and worked in among them, by the hand, if necessary. It is very important to have the soil come in close contact with the root fibres, in order that the best conditions may be afforded the tree to begin growth promptly. When the roots are well covered, more good soil should be thrown in, and when the hole is about half full it should be well tramped with the feet, after which the hole should be filled level with the surface of the soil, tramping being done while it is being filled. The surface of the soil should be left loose, as this will help to prevent evaporation of moisture from the soil which has been thrown in. It is not necessary to water any tree if planting is done at the proper season and the soil fairly moist and well compacted about the roots.

If one year old trees are used all side branches should be removed and the trunk pruned back to a height of two or three feet above the ground, leaving the tree a

mere whip. The branches of two year old trees should be pruned back so as to leave only about four buds on each, but from four to six branches are all that are necessary to make a good and symmetrical top, and others should be cut back to the trunk. The Stringfellow method of planting, which consists in cutting back the roots to a stub and the top to about eighteen inches from the ground and planting in a small hole, should be practised with caution in Canada, and is not recommended.

If the orchard is in an exposed position and the trees large and with high trunks, it will pay to tie stakes to them to keep them from getting loose.

In districts where drought is liable to occur, or even in places where the soil is likely to become rather dry, and thorough cultivation cannot be frequently given, it will be wise to mulch the newly planted trees to a depth of from 4 to 6 inches with manure, straw, sawdust, or anything of that nature which will not become a compact mass. If this is placed about the base of the tree and left during the summer it will keep the surface soil loose and prevent evaporation of moisture, and the growth of the trees will be much more rapid. A good mulch may be the means of preventing a tree from dying if the season is very unfavourable or the tree in poor condition. If the mulch is loose when winter sets in there may be danger from mice, and this should be guarded against.

VARIETIES.

Although a large number of varieties of plums is now offered for sale by nurserymen, the number which can be recommended and suggested as worthy of trial is comparatively limited. Few additions have been made of late years to the list of best European plums, the greatest number of new named varieties having come either from the Japanese and Japanese hybrids or the Americana plums. Much improvement has been made in the Americana and other North American plums, and a great many named varieties have been introduced, no less than 165, exclusive of hybrids, having been tested at the Central Experimental Farm. The total number of named varieties of plums tested is 314.

The plum season extends over a period of about three months, beginning about the 1st of August, and ending late in October or early in November, although along the River St. Lawrence below the city of Quebec some European varieties will keep until December.

By a judicious selection, varieties may be planted which will give an unbroken succession of ripe fruit during this period. The market to which the plums are to be sent should also be carefully considered, as if they are to be sent long distances the firmer varieties will be the most satisfactory.

Although the varieties recommended are likely to be the most suitable, the intending planter should learn what varieties are proving the most profitable in his vicinity. This is important, as the districts are large and conditions will vary somewhat from one end of a district to the other. The lines dividing the districts are not arbitrary. It is not possible to make an exact dividing line on one side of which a variety will do well and on the other side of which it will prove a failure. The boundary lines are suggestive only. It is often the case that there will be especially unfavourable locations for orchards in a milder district in which it would be safer to plant the varieties recommended for a colder one. The planter should use his judgment in the matter.

The varieties recommended in the following list are arranged, as far as possible, in order of ripening, beginning with the earliest. It was only through the kindness of a large number of Canadian fruit growers that it has been possible to prepare a list of the best varieties for the different districts. These men have given the results of their experience most willingly, and I take this opportunity of again thanking them publicly for their assistance.

PRINCE EDWARD ISLAND.

Commercial.—Arctic, Bradshaw, Lombard, Field, Quackenboss or Glass, Yellow Egg, Grand Duke, Monarch, Shropshire Damson.

Additional Varieties Suggested for Home Use.—Washington, Imperial Gage, Victoria and Reine Claude.

Japanese plums are not reliable.

NOVA SCOTIA.

Counties of Cumberland, Colchester, Pictou, Antigonish, Inverness, Victoria, Cape Breton, Richmond, Guysborough, Halifax:—

Commercial and Domestic.—Arctic, Bradshaw, Imperial Gage, Gueii, Shipper's Pride, Yellow Egg, Quackenboss or Glass, Shropshire Damson.

Burbank plums succeed in the protected and most favoured localities.

Counties of Hants, Kings, Annapolis, Digby, Yarmouth, Shelbourne, Queens, Lunenburg:—

Commercial.—Bradshaw, Diamond, Yellow Egg, Archduke, Grand Duke, Monarch, Golden Drop (Coes), Shropshire Damson.

Additional Varieties Suggested for Home Use.—Bradshaw, Washington, Imperial Gage, Reine Claude.

Some of the most desirable Japanese and hybrid plums are Red June, Abundance, Burbank, Shiro, and Apple, but these are not so reliable as the European plum.

NEW BRUNSWICK.

Lower St. John Valley, Charlotte, and Albert Counties near the coast:—

Commercial and Domestic.—Arctic, Lombard, Green Gage, Yellow Egg, Quackenboss, Glass, Mount Royal, Raynes.

Remainder of New Brunswick:—

Americana and Nigra.—Aitkin, Bisby, Mankato, Omaha, Cheney, Wolf, Schley Brackett, Hawkeye, Stoddard.

ONTARIO.

Counties of Essex, Kent, Bothwell, Elgin, Norfolk, Haldimand, Welland and Lincoln, and the southern part of the counties of Lambton, Middlesex, Oxford and Wentworth.

Varieties Recommended for Market:—

European.—Bradshaw, Imperial Gage, Shipper's Pride, Lombard, Yellow Egg, Reine Claude (Bavay), Golden Drop (Coes), Italian Prune, Grand Duke, Shropshire Damson, Monarch.

Japanese.—Red June, Abundance, Burbank, Chabot.

Additional Varieties Suggested:—Shiro (Hybrid.)

European Varieties Recommended for Home Use.—Washington, Burbank, Bradshaw, Imperial Gage, Reine Claude (Bavay), Italian Prune.

Counties of Wellington, Dufferin, Waterloo, Halton, Peel and Brant and the eastern part of Oxford, the northern part of Wentworth, the western part of York and the southern part of Simcoe.

Varieties Recommended for Market:—

European.—Bradshaw, Gueii, Imperial Gage, Shipper's Pride, Lombard, Pond, Yellow Egg, Glass, Reine Claude (Bavay).

Additional Varieties.—Mount Royal, Raynes.

Varieties Recommended for Home Use.—Washington, Burbank, Bradshaw, Imperial Gage, Lombard, Reine Claude (Bavay).

The northern part of Lambton, Middlesex and Oxford; the counties of Perth, Huron, Bruce and Grey and the county of Simcoe, with the exception of the extreme southern portion.

Varieties Recommended for Market:—

European.—Bradshaw, Purple Egg, Imperial Gage, Lombard, Quackenboss or Glass, Yellow Egg, Reine Claude (Bavay), Monarch, Grand Duke.

Japanese.—Burbank.

Varieties Recommended for Home Use:—

Washington, Burbank, Bradshaw, Imperial Gage, McLaughlin, Monarch, Reine Claude (Bavay).

The county of York, with the exception of the extreme western portion, and the counties of Ontario, Durham, Northumberland, Prince Edward, Lennox, Frontenac, to Kingston, and Hastings and Addington, within thirty miles of the St. Lawrence River; also the southern portion of Victoria and Peterborough.

Varieties Recommended for Market:

European.—Bradshaw, Gueii, Imperial Gage, Lombard, Quackenboss or Glass, Yellow Egg, Reine Claude (Bavay), Monarch.

Japanese.—Burbank.

Varieties Recommended for Home Use:—

Washington, McLaughlin, Burbank, Bradshaw, Imperial Gage, Monarch, Reine Claude (Bavay), Shropshire Damson.

Counties of Leeds, Grenville, Dundas, Stormont.

Varieties Recommended for Market and Home Use:—

Americana and Nigra.—Aitkin, Bixby, Mankato, Omaha, Cheney, Wolf, Schley, Brackett, Hawkeye, Stoddard.

*European, for trial in most favourable locations:—*Early Red Russian, Lunn, Mount Royal, Raynes, Richland, Gueii, Glass, Aretie, Lombard, White Nicholas, Yellow Egg.

None of the European plums are very satisfactory in this district, as the fruit buds of most varieties are usually killed by winter.

Japanese Varieties.—Not hardy.

The counties of Victoria, Peterborough, Hastings and Addington, except the southern portions; Manitoulin and St. Joseph Islands, and the counties of Renfrew, Lanark, Carleton, Russell, Prescott, Glengarry.

Varieties Recommended for Market and Home Use:—

Americana and Nigra.—Earliest and best native seedlings, Aitkin, Bixby, Mankato, Omaha, Cheney, Wolf, Schley, Brackett, Hawkeye, Stoddard.

European, Suggested for Trial in Most Favourable Locations.—Early Red Russian, Rowley, Linn, Mount Royal, Raynes, Richland, Glass, Montmorency, White Nicholas, Yellow Egg, Perdrigon, Ungarish. None of the European plums are very satisfactory in this district, as the fruit buds of most varieties are usually killed by winter.

Japanese Varieties.—Not hardy.

MOST NORTHERLY DISTRICTS.

Nigra.—Best early native seedlings, Aitkin, Cheney.

QUEBEC.

Counties of Pontiac, Wright, and Ottawa, south of latitude 46°, also the counties of Argenteuil, Two Mountains, Terrebonne, L'Assomption, and Montcalm, Joliette, Berthier, Maskinonge, and St. Maurice, within 25 miles of the St. Lawrence River.

Varieties Recommended for Market and Home Use:—

Americana and Nigra.—Earliest and best native seedlings, Aitkin, Bixby, Mankato, Omaha, Cheney, Wolf, Schley, Brackett, Hawkeye, Stoddard.

European, Suggested for Trial in Most Favourable Locations:—

Early Red Russian, Rowley, Linn, Mount Royal, Raynes, Richmond, Glass, Montmorency, White Nicholas, Yellow Egg, Perdrigon, Ungarish.

None of the European plums are very satisfactory in this district, as the fruit buds of most varieties are usually killed by winter.

Japanese Varieties.—Not hardy.

Counties of Huntingdon, Beauharnois, Chateauguay, Jacques Cartier, Laval, Hochelaga, Chambly, Laprairie, Napierville, St. Johns, and the western part of Iberville and Missisquoi.

Varieties Recommended for Market and Home Use:—

Americana and Nigra.—Earliest and best native seedlings, Aitkin, Bixby, Mankato, Omaha, Cheney, Wolf, Schley, Brackett, Hawkeye, Stoddard.

For Trial or Home Use in Most Favourable Locations:—

European.—Queen May, Brodie, Perdrigon, Ungarish, Linn, Mount Royal, Raynes, Montmorency, Arctic, Glass, Yellow Egg, Richland, Early Red Russian, White Nicholas, Lombard, Dumson.

Japanese Varieties.—Not hardy, except in most favourable places.

Counties of Vercheres, Richelieu, Yamaska, St. Hyacinthe, Rouville, Bagot, Drummond, Richmond, Shefford, Sherbrooke, Brome, Stanstead, and the eastern part of Iberville and Missisquoi, and the western part of Compton.

Varieties Recommended for Market and Home Use:—

Americana and Nigra.—Best early native seedlings, Bixby, Mankato, Omaha, Cheney, Wolf, Schley, Hawkeye, Stoddard, Brackett.

European, for Trial and Home Use in Most Favourable Districts.—Mount Royal, Raynes, Montmorency Glass, Richland, Early Red Russian, White Nicholas, Yellow Egg, Dumson.

Japanese Varieties.—Not hardy.

Counties of Nicolet, Arthabaska, Wolfe, the eastern part of Compton, and the counties of Beauce, Megantic, Dorchester, Lotbiniere, Levis and Bellechasse.

Varieties Recommended for Market and Home Use:—

Americana and Nigra.—Best early native seedlings, Aitkin, Bixby, Mankato, Omaha, Cheney, Wolf, Schley, Brackett, Hawkeye, Stoddard.

European, Suggested for Trial and Home Use in Most Favourable Locations.—Mount Royal, Raynes, Montmorency, Lunn, Queen May, Early Red Russian, White Nicholas, Yellow Egg, Arctic, Ungarish.

Japanese Varieties.—Not hardy.

Counties of Montmagny, L'Islet, Kamouraska, most of Temiscouata, Bonaventure, and Gaspé, on the bay of Chaleur side of Gaspé Basin.

Varieties Recommended for Growing near the St. Lawrence River:—

European.—Arctic, Washington, Bradshaw, Green Gage, Montmorency, Lombard, French Damson, Quackenboss, Grand Duke.

Additional Varieties Suggested.—Mount Royal, Raynes.

Varieties Recommended for Home Use:—

Mirabelle précoce, Washington, Imperial Gage, Green Gage, Montmorency, Arctic, Lombard, French Damson.

Varieties Recommended for Growing Inland:—

Americana and Nigra.—Best early native seedlings, Aitkin, Bixby, Mankato, Omaha, Cheney, Wolf, Schley, Brackett.

Counties of Champlain, Portneuf, Quebec, Montmorency, Charlevoix, and Chicoutimi, east of the St. Maurice River, and southwest of Lake St. John and the St. Lawrence River.

Varieties Recommended.—Best early native seedlings, Aitkin, Omaha, Cheney, Bixby, Mankato, Brackett.

Near the St. Lawrence River, especially in the vicinity of Quebec and below and on the Island of Orleans, the following European varieties would give more or less satisfaction:—Washington, Green Gage, Arctic, Montmorency, Mount Royal, Raynes, Lombard, Damson.

North of latitude 46° as far as plums will grow; also the northeastern part of Temiscouata, Rimouski, and Matane.

Varieties Suggested.—Best early native seedlings, Aitkin, Odegard, Bixby, Mankato, Cheney, Omaha.

MANITOBA.

Varieties Recommended.—Cheney, Aitkin, Odegard, Assiniboine, and best seedlings of Manitoba native plum.

SOUTHERN MANITOBA.

Varieties Recommended.—Cheney, Aitkin, Odegard, Assiniboine, and best native seedlings; also Sand Cherry and Compass Cherries, which are more like plums than cherries. There are a number of promising varieties among Hansen's hybrid plums, such as Etopa, Hanska, Opata, Sapa, Kaga, and Owanka.

SASKATCHEWAN.

Varieties Recommended.—Cheney, Aitkin, Odegard, Assiniboine, and best seedlings of Manitoba native plum.

ALBERTA.

Varieties Recommended.—Best seedlings of Manitoba native plum, Cheney, Aitkin, Odegard, and Assiniboine.

BRITISH COLUMBIA: VANCOUVER ISLAND—SOUTHERN PART.

Commercial.—Most profitable: Englebert, Italian Prune. Others: Diamond, Pond, Golden Drop (Coe's), Grand Duke.

Additional Varieties for Domestic Use.—Peach, Washington.

LOWER MAINLAND.

Commercial.—Most profitable: Monarch, Italian Prune. Others: Bradshaw, Diamond, Golden Drop (Coe's), Grand Duke.

Additional Varieties for Home Use.—Peach, Green Gage, Imperial Gage, Washington.

DRY DISTRICTS, including Lytton, Lillooet, Spence's Bridge, Kamloops, Okanagan Lake, Kettle River Valley.

Commercial.—Most profitable: Italian Prune. Others: Bradshaw, Pond, Diamond, Gueii, Monarch, Grand Duke, Golden Drop (Coe's).

Additional varieties for Home Use.—Peach, Victoria, Yellow Egg.

WEST KOOTENAY.

Commercial.—Bradshaw, Pond, Diamond, Monarch, Grand Duke, Italian Prune, one of the most profitable.

Additional Varieties for Home Use Especially.—Peach, Washington, Victoria, and Reine Claude.

Japanese varieties succeed.

SHUSWAP LAKE DISTRICT.

Commercial.—Bradshaw, Yellow Egg, Gueii, Lombard, Pond, Italian Prune.

Additional Varieties for Home Use Especially.—Peach, Washington, Victoria, Reine Claude.

NEWER AND COLDER DISTRICTS.

Hardest Varieties for Trial.—Arctic, Bradshaw, Gueii, Lombard, Yellow Egg, Quackenboss or Glass.

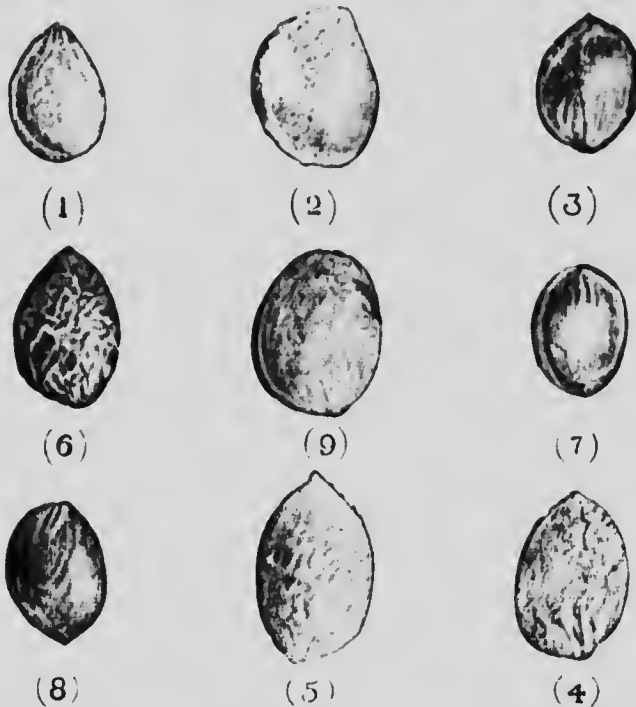
DESCRIPTIONS OF VARIETIES.

The following descriptions were, most of them, made by the author from specimens either grown at the Central Experimental Farm or in other parts of Canada. In some cases, however, especially among the European plums, the descriptions were obtained from other sources which are considered reliable. Where these descriptions are used the author's name is given. The varieties which are described are divided

into the various groups to which they belong. They are limited to those mentioned in the district lists, with the exception of a few new kinds considered promising, but which have not been tested long enough to recommend, and a few of the older varieties.

EUROPEAN VARIETIES.

Abeyweit. Plum seedling from Henry E. Wright, Summerside, P.E.I.—Form round oval; size large; cavity medium depth and width; suture distinct, slightly depressed; apex slightly depressed; colour yellow, well covered with deep red; dots obscure; bloom, none on specimens received; skin moderately thin, rather tough; flesh yellow, juicy; stone medium to below, oval, flattened, cling; sweet, rich flavour, quality very good. A handsome plum and one worth testing. Raised from stone of a plum from California. Bore first time in 1903. Tree a fast grower. Ripens a few



Showing variations in stones of varieties of Americana plums: (1) Wolf, (2) Van Buren, (3) Voronesh Seedling, (4) Wyant, (5) Yosemite Yellow, (6) Yosemite Purple, (7) De Soto, (8) Rollingstone, (9) Hawkeye.

days later than Moore's Arctic and earlier than Lombard. Tree 6 to 7 years old from seed in 1903. Domestic group.

Agen.—A very old French variety of unknown origin.

'Fruit late, season short; one and one-half inches by one and one-eighth inches in size, obovate, the base necked, halves equal, cavity shallow, narrow, flaring; suture very shallow, indistinct; apex roundish or flattened; color, reddish or violet-purple, overspread with thin bloom; dots numerous small, brown, obscure, clustered about the apex and interspersed between russet flecks; stem thick, seven-eighths inch long, glabrous, adhering well to the fruit; skin thin, tough; flesh greenish yellow, tender,

sweet, aromatic; very good to best; stone semi-free or free, seven-eighths inch by one-half inch in size, oval, flattened, with pitted surfaces, rather abrupt at the base and apex; ventral suture somewhat narrow, furrowed, with distinct wing; dorsal suture widely grooved.' (Plums of New York.)

The tree is an upright, spreading variety, and very productive, and one of the best for prunes though the fruit is rather small in some places.

Amaryllis (Seedling of Mirabelle).—Fruit above medium to large, roundish to heart-shaped; cavity medium depth and width, abrupt; stem medium to long, moderately stout; suture distinct, slightly depressed; apex rounded; colour greenish yellow; dots moderately numerous, indistinct; skin moderately thick, moderately tender; flesh yellow, juicy; stone medium size, oval, cling; sweet, rich flavour, quality very good. Grown from seed of Mirabelle in 1890. Began to bear in 1896. Tested September 30, 1912. Originated by Aug. Dupuis, Village des Aulnaies, P.Q.

Arctic (Moore's Arctic).—Fruit medium to below medium in size, roundish or somewhat oval; colour, dark purple, almost black; bloom thin, blue; suture indistinct; flesh greenish yellow, juicy, moderately sweet; quality medium; season early September. Tree vigorous and a good cropper. Hardier than some European plums, but not desirable where the best varieties succeed, as it is too small and not good enough in quality.

Bradshaw (Niagara?).—Fruit above medium to large, obovate; dark purplish red with a bluish bloom; dots few; cavity narrow, shallow; stem medium length moderately stout; suture distinct but shallow; apex rounded; skin rather thick, tough; flesh yellow, juicy, moderately firm, sweet, with a rich flavour; stone semi-cling; quality good. Season middle of August to first week of September. Tree a strong upright grower, and very productive.

Brodie.—Fruit below medium size, almost round; colour, dark purple with a blue bloom; dots obscure; suture merely a distinct line; skin thin, tender, flesh greenish yellow, juicy, moderately firm, sweet, rich flavour; stone small, roundish, semi-cling; quality good to very good; season second and third weeks of September. A good dessert plum, but rather small for market. Specimens received from R. Brodie, Montreal, Que. Tree has been on Mr. Brodie's place since his grandfather's time. Thought to be a seedling.

Diamond.—Fruit medium to large, oval; colour, dark blue, and a heavy blue bloom; dots obscure; cavity narrow, abrupt; stem short to medium, rather stout; suture merely a distinct line, not depressed; flesh yellow, moderately juicy; quality medium. Season medium. Tree a strong grower and very productive.

Early Red Russian.—Fruit medium size oval; cavity narrow, shallow, abrupt; stem medium length slender; suture an indistinct line, no depression; apex rounded; colour dull purplish red; dots moderately numerous, yellow, distinct; bloom thin, blue; skin fairly thick, moderately tender; flesh yellowish green, juicy; stone medium size, long, oval, cling; moderately sweet with an acid aftertaste; quality medium. Season late September. Of the Lombard type. Imported from Russia by Prof. Budd from Dr. Regel, St. Petersburg, during the winter of 1881-2. Prof. Budd, writing in 1890, said of this plum: 'This was sent out quite extensively eight years ago marked "Mixed Arab." The sorts mixed were Early Red, White Nicholas and Black Arab.' Most of the trees proved to be Early Red Russian No. 3. There is still some doubt regarding this plum, which may be the variety sent out by Prof. Budd as White Nicholas. Another variety, called Late Red, somewhat like this one, which may be the true Early Red, ripens at Ottawa during the last week of August.

Emerald.—Fruit above medium size, oval; colour yellow; suture distinct; flesh yellow, juicy, sweet, good, rich flavour; stone free; quality good to very good. Specimens received on August 4th, from E. D. Smith, Winona, Ont. Said to ripen by the

end of July. Originated by the late Warren Holton, Hamilton, Ont. Has not succeeded well.

Engelbert.—A seedling of the 'Date Plum,' originating in Belgium, and of the prune type.

'Fruit mid-season, ripening period short; one and five-eighths inches by one and three-eighths inches in size; oval, swollen on the suture side, halves equal; cavity shallow, narrow, abrupt; suture a line; apex bluntly pointed or roundish; color dark purplish black, over-spread with thick bloom; dots numerous, russet; stem three-quarters inch long, pubescent, adhering well to the fruit; skin thin, sourish, separating readily; flesh golden-yellow, juicy, coarse, rather firm, sweet, pleasant-flavoured, sprightly; good; stone one and one-eighth inches by five-eighths in size, oval or broadly ovate, strongly flattened, with roughened and deeply pitted surfaces, blunt at the base and apex; ventral suture narrow strongly grooved, not prominent; dorsal suture acute, with a shallow, often indistinct groove.' (Plums of New York.)

Tree productive. A good shipping plum, and doing well in Western Canada.

Field.—A seedling of Bradshaw grown in Schoharie County, New York.

'Fruit mid-season, period of ripening short; one and seven-eighths inches by one and five-eighths inches in size; oblong-oval, compressed, halves equal; cavity shallow, narrow, abrupt; suture shallow, broad; apex roundish; color dark purplish-red, overspread with a very thick bloom; dots numerous, small, russet, clustered about the apex; stem three-quarters inch long, sparingly pubescent, adhering well to the fruit; skin thin, slightly sour separating readily; flesh greenish-yellow, medium juicy, sweetish, mild; of fair quality; stone clinging, one inch by five-eighths inches in size, ovate, with roughened and deeply pitted surfaces, blunt at the apex and base; ventral suture broad, distinctly furrowed; dorsal suture acute.' (Plums of New York.)

This variety has done well on Prince Edward Island, and appears hardier in flower bud than some other European varieties. The tree is of an upright-spreading habit and quite productive.

German Plum.—'Fruit small to medium; long oval; cavity very shallow; stem rather slender, medium long; suture hardly more than a line; apex somewhat pointed; colour blue; dots few, scattered; bloom blue; flesh greenish or slightly yellow; stone small, oval, pointed, moderately flattened, very free, quality hardly more than fair; season medium; tree strong, tall grower, productive.' (Waugh). This has long been a popular plum.

Glass (Glass seedling). Fruit large roundish, deep purple with a blue bloom; suture very shallow, indistinct; stem medium length, slender; flesh yellow with a shade of green, juicy, moderately sweet; skin medium in thickness, tender; stone medium size, cling; quality medium. Season, second and third weeks of September. Tree a strong grower and productive where it succeeds well. Very similar, if not identical with Quackenboss.

Golden Drop (Cot's Golden Drop).—'Fruit large to very large; oval with a short neck, the two halves unequal; cavity very shallow and abrupt; stem medium length, stout, suture deep; apex somewhat depressed; colour golden yellow; dots very many, yellow; bloom yellow; flesh firm, meaty; stone medium large, long, pointed, somewhat flattened, ribbed at the edge, half free; quality good; season medium late. Tree a good grower with large, coarse, rough foliage.' (Waugh).

Grand Duke.—'Fruit large to very large obovate; cavity narrow, shallow; stem an inch long; suture rather deep; colour very dark blue; bloom heavy, blue; flesh

yellow, firm; stone oval, hardly flattened cling; quality good; season late. Tree moderately vigorous with a spreading open head. Regarded by many as one of the very best late shipping plums.' (Waugh). This is a favourite plum in some parts of the best plum districts of Ontario.

Greenfield (seedling No. 1, from Samuel Greenfield, Ottawa East, Ont.).—Form roundish oval (broad); size large; cavity shallow; suture indistinct, no depression; apex rounded; colour dark purplish red; dots numerous, small, yellow; skin thin, tough; flesh greenish yellow, juicy, sweet; stone large, oval, cling; sweet, good flavour; quality good to very good. A plum of the Bradshaw type. Promising. Domestica group.

Queii.—'Fruit medium size; oval, cordate; cavity shallow; stem an inch long, pubescent; suture shallow; apex somewhat pointed; colour blue; dots not visible; bloom blue; flesh greenish yellow; stone medium size, round oval, oblique pointed, cling; quality fair; season medium.' (Waugh).

Imperial Gage.—Fruit medium to above medium in size, roundish; colour yellowish green; dots indistinct; cavity narrow, medium depth; stem medium to long, moderately stout; suture distinct but very slightly depressed; skin fairly thick, rather tough; flesh yellowish green, firm, juicy, sweet, rich flavour; stone medium size, oval, semi-cling to almost free; quality very good. Season early September. Tree a strong grower and very productive.

Italian Prune (Fellenberg).—'Fruit medium to large, elliptical, straighter on one side and longer on the other; cavity very shallow; stem nearly as long as the fruit; suture shallow; colour dark blue; dots not many, dull yellow; bloom blue; skin thin; flesh greenish yellow; stone medium size, oval, pointed, rough, ridged at edge, quite free; quality good to extra; season late; tree rather spreading.' (Waugh).

This is one of the most satisfactory European plums both for home use and for market.

Jefferson.—'Fruit medium to large, round or round oval; cavity very shallow; stem medium short; suture, hardly any; apex very slightly depressed; colour greenish yellow; dots many, greenish; bloom white; skin thin and tender; flesh yellow; stone medium size, blunt, with a short neck, slightly flattened, rough, free; flavour, rich and sugary; quality good to best; season medium late; a good tree.' (Waugh). One of the finest varieties for home use.

Kingston Sugar, from R. A. Marrison, Cataraqui, Ont.—Heart-shaped; above medium size, $1\frac{1}{2}$ by $1\frac{1}{2}$ inches; cavity shallow, medium width; stem medium length; moderately stout; suture a distinct line, very slightly depressed; apex rounded; green with traces of yellow; dots indistinct; bloom moderate, bluish skin moderately thick, moderately tough; flesh yellowish-green, juicy; stone medium size, oval, cling; flavour sweet, good; quality very good.

Said to be harder than Lombard and some other sorts. A promising plum. Reine Claude group.

Lombard.—Fruit medium size, oval, slightly flattened at ends; colour purplish red with a thin blue bloom; dots fairly numerous, yellowish, distinct; stem short, slender; suture shallow, indistinct; skin rather thin, tender; flesh yellow, juicy, sweet, but not rich, firm; stone medium size, cling; quality medium; season second and third weeks of September. Tree vigorous and a very heavy bearer. One of the hardiest of the European plums.

Lunn (Montreal No. 60).—Fruit received from W. W. Dunlop, Outremont Que.).—Fruit large, oval, broad (round oval); cavity shallow, medium width, slightly flaring; stem medium length, $\frac{3}{4}$ -inch, stout; suture a distinct line, very little if any depression;

apex rounded, very slightly flattened; colour dark purple; dots fairly numerous, irregular, indistinct, brownish; bloom moderate, blue; skin moderately thick, tough; flesh yellowish green, very juicy, fairly firm; stone large, oval, cling; sweet, rich; quality very good. Season early to middle of September. A fine dessert plum.

Monarch.—Fruit large, roundish oval; cavity deep, broad rounded; stem short and stout; suture hardly visible; colour dark purplish; bloom heavy bluish; flesh yellowish; stone free; quality good; season late. An English variety lately introduced into this country, and thought to be a valuable late shipping plum.' (Waugh). This plum is well worthy of trial.

Montmorency (Reine Claude de Montmorency).—Fruit medium size, almost round; cavity narrow, abrupt, rather shallow; stem short to medium, moderately stout; suture indistinct, sometimes very slightly depressed; apex rounded or slightly flattened; colour yellow and greenish yellow before quite ripe with a light orange blush or dots of orange on sunny side; dots obscure; bloom thin, white; skin moderately thick, tough; flesh yellow, very juicy, moderately firm, sweet, rich; stone small, oval, almost free; quality very good.

Mountain.—Fruit received from W. W. Dunlop, Outremont, Que.—Fruit medium to above medium size, roundish, flattened slightly at ends; cavity medium depth and width, slightly flaring; stem medium to long, moderately stout; suture distinct, usually slightly depressed; apex slightly flattened; colour greenish yellow, more or less overspread with dull coppery red; dots numerous, yellow, distinct; bloom thin, bluish; skin moderately thick, tough; flesh yellowish green; stone above medium, broad, roundish, cling; sweet, rich; quality very good. Season early to middle September. An excellent dessert plum. Well worth propagating.

Mount Royal (Dunlop 54).—Fruit received from W. W. Dunlop, Outremont, Que. Fruit medium size, roundish flattened at stem end; cavity medium to open, medium depth, somewhat flaring; stem short to medium, moderately stout; suture distinct, very slightly depressed; apex rounded, slightly flattened; colour dark purple; dots numerous, distinct; bloom blue, moderate; skin moderately thick, fairly tender; flesh yellow, juicy, firm, sweet, moderately rich flavour; stone below medium, roundish, cling; quality good. Season early to mid-September. Should be a good shipping plum.

McLaughlin.—Fruit medium size, round or even oblate; cavity shallow, with a ridge around the stem; stem strong, rather long; suture very shallow; apex very slightly depressed; colour greenish yellow with a pink blush; dots many, greenish; bloom white; skin thin; flesh yellow; stone medium size, oblique oval, slightly flattened, rough, cling; flavour rich, sugary; quality extra. Season medium. Tree hardy and a fairly good grower. (Waugh.)

One of the best varieties for home use, the quality being exceptionally good. It is of the Green Gage type.

Peach.—Fruit early; thick-set, without a neck; one and seven-eighths inches in diameter; roundish, slightly angular, halves equal; cavity deep, wide, compressed; suture shallow, distinct; apex flattened or depressed, color dark purplish-red; overspread with thin bloom; dots numerous, large, conspicuous; stem eleven-sixteenths inch long, glabrous, adhering well to the fruit; skin tough, adhering; flesh golden yellow, medium juicy, firm, sub-acid, mild; good; stone free, one inch by three-quarters inch in size, roundish oval, flattened, with rough and pitted surfaces, blunt at the base and apex; ventral suture wide, prominent, often distinctly winged; dorsal suture with a wide, deep groove.' (Plums of New York.)

The Peach is an old variety of unknown origin. In Canada it is grown mainly on Vancouver Island and the Lower Mainland of British Columbia, where, though

very susceptible to rot, it succeeds very well. The tree is a very vigorous grower and moderately productive.

Peters (Peters' Yellow Gage).—Fruit medium to large; round oval; cavity medium, shallow, abrupt; stem long, pubescent; suture shallow; apex slightly depressed; colour greenish yellow, sometimes with a slight blush; dots many, yellow; bloom white; skin thin; flesh greenish yellow; stone medium, oval, pointed, hardly flattened; cling; quality good to best. Season early. Tree moderately vigorous and upright. A good amateur variety of the Green Gage type. (Wangh.)

This has succeeded well in District No. 3.

Pond (Pond's Seedling).—Fruit very large; nearly oval, but tapers slightly towards cavity; colour purplish red; bloom purplish; dots numerous, dull yellow, distinct but not prominent; cavity narrow, shallow; stem medium length, fairly stout; suture distinct and but slightly depressed; skin thick, rather tough; flesh yellow, juicy, sweet, good flavour; stone large, rough, cling; quality good. Season early September. Tree a strong grower and quite productive.

Quackenboss.—Fruit medium size or larger; round oval; cavity shallow, flaring; stem rather long; suture a line; colour blue; dots blue; bloom blue; skin thin; flesh greenish; stone oval, pointed, flattened, cling; quality fair to good. Season medium. A good rapid growing tree and fairly productive. (Wangh.)

Ripens in Ontario in second and third weeks of September.

Queen May.—Fruit large, roundish, almost perfectly round; colour greenish yellow splashed with pale green when not ripe; bloom thin, pale bluish; dots small, pale, indistinct; cavity narrow, medium depth; stem medium length to rather long, fairly stout; suture indistinct; apex rounded; skin moderately thick, tough; flesh greenish yellow, very juicy, moderately firm, sweet, rich flavour; stone medium size, almost oval, cling; quality very good; season September. Tree a strong, moderately spreading grower, fruiting heavily when young, but does not live very long. A very promising dessert plum. Specimens received from N. E. Jack, Chateauguy Basin, Que., who is growing trees received from Thos. Clark, Chateauguy. Thought to be a seedling.

Raynes (Dunlop 53).—Fruit received from W. W. Dunlop, Outremont, Que.—Fruit above medium to large; oval, long, flattened on side of suture; cavity medium depth and width, abrupt; stem medium length, moderately stout; suture distinct slightly depressed; apex rounded; colour dark reddish purple; dots small, numerous, indistinct; bloom moderate, blue; skin thin, tender; flesh yellowish green, firm, fairly juicy; stone above medium to large, long, oval, free; moderately sweet; quality above medium. Season early to middle of September. A prolific bearer and should be a good shipper. A prime plum.

Reine Claude (Bavay).—Fruit large, roundish, slightly flattened at ends; colour greenish yellow with green splashes; bloom thin, pale; suture medium depth; stem short, stout; flesh yellow, juicy, melting, sweet, rich, very good flavour; stone free; quality very good; season late September to early October. Tree vigorous, very productive. One of the best both for home use and for market.

Richland.—Fruit medium to above medium size, oval; cavity narrow, medium depth, abrupt; stem medium length, $\frac{3}{4}$ -inch, slender; suture a distinct line, no depression; apex rounded; colour deep purplish red; dots fairly numerous, yellow, indistinct; bloom moderate, blue; skin thick, fairly tender; flesh greenish yellow, juicy, moderately firm; stone medium size, oval, flat, cling; sweet but not rich; quality above medium. Season middle of September. Hardier than most European sorts. Originated on the farm of Randall Elden, Richland, Pennsylvania.

Rowley.—Fruit above medium size, round, dark purplish red with a bluish bloom; dots obscure; suture a distinct line; apex rounded; skin thin, moderately tough; flesh yellow, moderately juicy, firm, sweet rich flavour; stone medium size, oval, slightly flattened, cling; quality good to very good. Season end of August and first week of September. A promising seedling originated by Jos. Rowley, Cummings Bridge, Ont. (near Ottawa). Said to fruit well nearly every year.

Shropshire (Dumson).—Fruit small, oval, cavity, hardly any; stem about one-half inch long; suture none; colour dark blue; dots, none visible; bloom blue; skin firm; flesh greenish, sour; stone small, oval, turgid, cling; quality fair. Tree a good grower and enormously productive. (Waugh.)

This is a popular dumson in Canada.

Splendor.—Was originated by Luther Burbank in 1886 from a cross between Pond and Agen. In 1893 it was sold under the name Cross-bred Prune A.P.-318, to Stark Brothers, Louisiana, Missouri, who introduced it the following year under its present name. The fruit is twice the size of Agen, ovoid, compressed; dark purple; bloom heavy; flesh yellow, rich, sweet; freestone; hangs well to the tree, and ripens its crop all together. (Plums of New York.)

Sugar.—A seedling of the Agen plum originating with Luther Burbank, Santa Rosa, Calif. Fruit intermediate in time and length of ripening season; small, ovate or oval, halves equal; cavity shallow, narrow, abrupt; suture shallow, often a line; apex roundish or pointed; colour dark reddish-purple changing to purplish-black, covered with thick bloom; dots numerous, small, light russet, inconspicuous; stem slender, long pubescent, adhering; skin thin, tender, separating readily; flesh golden yellow, juicy, coarse, fibrous, tender, sweet, mild, good to very good; stone light coloured, with a tinge of red, thin, of medium size, ovate, flattened, rough and pitted surfaces, blunt at the base, acute at the apex; ventral suture rather narrow, distinctly furrowed, slightly winged; dorsal suture with a wide, deep groove. (Plums of New York.)

Tree a vigorous, spreading grower and productive where it succeeds well. It is used quite extensively in prune making in the Pacific States, and has been planted to a limited extent in British Columbia.

Ungarish.—Fruit above medium to large; long oval; cavity narrow, shallow, abrupt, suture distinct, very slightly if at all depressed; apex round; colour dark purple; dots moderately numerous, indistinct, brown; bloom moderate, blue; skin fairly thick, tender; flesh greenish yellow, firm, fairly juicy; stone large, long, oval, free; moderately sweet; quality above medium. Season middle of September. Introduced by Prof. Budd from C. H. Wagner, Riga, Russia.

This plum is somewhat like the Raynes (Dunlop 53). A prune plum. Promising on account of hardiness.

Washington.—Fruit large, roundish, slightly flattened at ends; colour, greenish yellow with a pink blush on sunny side; dots obscure; cavity narrow, shallow; stem short, stout; suture distinct and slightly depressed; skin tough; flesh greenish yellow, firm, juicy, sweet, rich; stone medium size, roundish, almost or quite free; quality very good. Season early to mid-September. Tree a strong grower with a roundish top.

Yellow Egg.—Fruit large to very large, oval; colour deep yellow; bloom white; dots small, numerous, indistinct; cavity shallow, ridged; stem long, moderately stout, suture distinct, slightly depressed; skin thick, rather tough; flesh yellow, juicy, sweet; stone large, oval, cling; quality good. Season end of August to early September. Tree vigorous and productive.

JAPANESE VARIETIES.

Abundance.—Fruit large, roundish; bright to deep red with a yellow ground; dots numerous, yellow, prominent; cavity narrow, abrupt; stem medium length, rather stout; suture distinct; apex pointed; skin thin, moderately tender; flesh yellow, juicy, firm, sweet, rich; stone oval, cling. Quality good to very good. Season August 10 to 25. Tree a strong upright grower, an early bearer and productive.

Burbank.—Fruit large to very large, roundish; colour deep red with dark red on sunny side and about cavity, on a yellow ground; dots numerous, small, distinct, yellow; stem medium length; suture merely a distinct line; apex sometimes pointed; skin thin, moderately tender; flesh yellow, firm, juicy, sweet, good flavour; stone roundish, cling; quality good. Season latter part of August, a few days after *Abundance*. Tree an exceptionally vigorous grower, very branching, and bears early and heavily. One of the most, if not the most, satisfactory of the Japanese plums. The flower buds appear hardier than most European varieties.

Chabot.—Fruit medium to large, roundish, heart-shaped; colour deep, rather dull red; dots numerous, small, yellow; cavity narrow; stem short, stout; suture fairly distinct; apex usually rounded; skin moderately thick, tough; flesh yellow, juicy, firm, sweet; stone below medium size, oval, cling; quality good. Season late. Tree a strong upright grower and bears well. This variety is one of the later introductions and has proven one of the best of the Japanese plums.

Oyama (seedling of Red June).—Form roundish to broad oval; size medium; cavity narrow, medium depth, abrupt; suture a distinct line, not depressed; apex rounded; colour deep red all over; dots obscure; bloom thin, pale bluish; skin moderately thick, moderately tender, bitter; flesh yellow, firm, juicy; stone small, oval, cling; sweet, not of rich flavour; quality, medium to above medium. May be useful on account of hardness of fruit buds. Triflora group. Originated at the Central Experimental Farm.

Red June.—Fruit medium to below in size, roundish, somewhat flattened; colour deep to dark red; dots small, yellow, numerous; cavity deep; stem short, moderately stout; suture distinct but shallow; skin thin, tender; flesh pale yellow, firm, juicy, briskly sub-acid with little richness; stone small, roundish, cling; quality medium. Season last week of July to first week of August. Tree moderately spreading. A medium bearer. This plum is valuable on account of its extreme earliness. This variety was received at the Central Experimental Farm under the name of Botan and Shiro-smomo. The flower buds are hardier than most European varieties, but although there is usually much bloom comparatively little fruit sets, probably because blossoms are self-sterile.

Togo (seedling of Red June).—Form roundish, somewhat heart-shaped; size above medium; cavity narrow, medium depth, abrupt; suture an indistinct, sometimes distinct, line, no depression; apex slightly flattened; colour deep red; dots numerous, small, indistinct; bloom moderate, bluish; skin moderately thick, tough; flesh yellow, firm, juicy; stone medium size, oval, slightly flattened, cling; sweet, acid next skin; quality good. A promising plum. Larger than Red June and better in quality. Hand-sown. Named Togo August 31, 1904, in honour of Admiral Togo. Triflora group. Originated at the Central Experimental Farm.

AMERICANA VARIETIES.

Alma (Caro seedling).—Oval; large, $1\frac{3}{4}$ x $1\frac{1}{2}$ ins.; cavity narrow, abrupt, medium depth; stem slender, medium length, $\frac{1}{2}$ in.; suture a distinct line, not depressed; apex rounded; yellow, thinly washed nearly all over with bright red; dots few, small, yellow; bloom thin, bluish; skin thick, tough; flesh yellow, juicy; stone above medium size, oval, flattened, cling; flavour sweet, rich, but skin slightly astringent and acid; quality good. Americana group. A handsome plum.

American Eagle.—Fruit above medium size, roundish; cavity narrow, medium depth; suture a fairly distinct line; apex rounded; colour deep purplish red; dots numerous, small, yellow; bloom moderate, pale blue; skin thick and tough; flesh deep yellow, juicy; stone medium size, oval, slightly flattened, cling; sweet, rich flavour; quality good. Season mid-September. Would be more promising if colour were brighter.

Assiniboin (seedling of Wild Plum of Manitoba, originating at the South Dakota Experimental Station).—An early, large fruited variety. Fruited and ripened at Indian Head, Sask., 1912.

Bender.—Fruit large, oval, slightly compressed; colour dark red; dots, very many, dull yellow; bloom thick, blue cavity shallow; suture obsolete; skin thick, tough; flesh yellow; stone large, oval, flat, quite free; quality good; season rather early; tree very vigorous, with very large, fine healthy foliage; very productive. (Wagh.)

Planted at the Central Experimental Farm in 1900. Has been highly praised by some growers.

Bixby.—Fruit above medium to large, roundish; cavity narrow, medium depth; suture rather indistinct, slightly depressed; apex rounded; colour yellow, more or less covered with bright red; dots numerous, small, yellow; bloom fairly heavy; skin moderately thick, rather tender; flesh deep yellow, juicy; stone medium size, oval in outline, considerably flattened, cling; sweet but not rich in flavour, no astringency; quality good; season late August to early September.

A very handsome, early plum. Chief fault is unevenness of ripening. Makes good preserves.

Bomberger.—Form roundish to broad oval; size very large; cavity shallow, narrow; suture a distinct line; apex rounded; colour yellow, more or less covered with deep lively red; dots few, small, yellow, distinct; bloom medium; skin thick, tough; flesh deep yellow, juicy; stone medium size, oval, flat; sweet and rich; quality very good. A very handsome plum. More attractive than Hawkeye. Promising. Americana group.

Bouncer.—Fruit very large to large, roundish, somewhat heart-shaped; cavity medium width, shallow; suture a distinct line; apex pointed; colour uniformly deep, purplish red all over; dots numerous, yellow, distinct; bloom moderate; skin thick, tough, flesh deep yellow, juicy; stone large, flat, oval, cling; sweet, rich, very good flavour; quality very good; season mid to late September.

A seedling of Yosemite Purple, originated at the Central Experimental Farm.

A rather late variety.

Brackett.—Form roundish, flattened at ends; large to very large; cavity medium width, shallow; stem $\frac{1}{2}$ inch, slender; suture a distinct line, no depression; apex flattened, indented; colour yellow almost entirely overspread with deep purplish red; dots numerous, yellow, distinct; bloom moderate, bluish; skin thick, tough; flesh deep yellow, meaty, juicy; stone above medium, roundish, flattened, cling; sweet, rich, good flavour; quality good.

Of the same character as Oren and Bouncer, but is better than either of them.

Caro.—Fruit large, roundish; cavity narrow, medium depth; suture fairly distinct; colour bright red, showing yellow in patches; dots numerous, yellow, distinct; bloom light; skin thick, moderately tender; flesh deep yellow, juicy; stone large, outline oval, considerably flattened; sweet, rich, good flavour; quality good; season early to mid-September.

A seedling of Wolf, originated at the Central Experimental Farm.

A promising seedling. More attractive than Wolf and better in quality.

City.—Fruit above medium size, roundish, somewhat heart-shaped; cavity medium width, deeper than most; suture a distinct line, slightly compressed; colour yellow, almost covered with deep red; dots numerous, small, yellow, distinct; bloom moderate; skin thick, moderately tender, slightly astringent; flesh deep yellow, juicy, sweet; stone medium size, oval, considerably flattened, semi-cling; quality good. Season mid-September. Among the good kinds, but quite a number are better.

Comfort.—Fruit medium size, roundish; cavity narrow, shallow; suture merely a distinct line; apex rounded; colour uniformly deep red all over; dots indistinct; bloom moderate; skin very thick, tough; flesh deep yellow, juicy; stone medium size, oval, considerably flattened, cling; sweet, good flavour; quality good. Season mid-September to October. A firm plum, but not large enough to be one of the best. Keeps better than most.

Consul.—Form large, roundish; cavity narrow, medium depth; suture a distinct line; apex rounded; colour deep red; dots moderately numerous, yellow, distinct; bloom light; skin rather thick, tough; flesh deep yellow, juicy, sweet; stone medium size, oval, considerably flattened, almost free; quality good. Season late September to early October. A seedling of Wolf originated at the Central Experimental Farm. Will probably prove a useful late plum.

Corona (Caro seedling).—Large; oval, lopsided; cavity medium size, shallow; suture slightly depressed, lopsided apex knobbed, irregular; greenish yellow over-spread with bright red; predominant colour red; dots indistinct; bloom moderate; skin thick, tough, slightly bitter; flesh yellow to greenish yellow, firm, juicy, meaty, sweet, sprightly flavour; quality good; stone large, flattened, cling. Season late September. Originated at the Central Experimental Farm.

A very promising plum, large, of attractive appearance, of firm texture. Should prove to be a good shipper.

Cottrell. Fruit above medium to large, oblong and roundish to heart-shaped; cavity narrow, medium depth; suture a distinct line; apex rounded; colour yellow, almost covered with bright red; dots rather numerous, small, yellow; bloom medium; skin moderately thick, tender; flesh pale yellow, juicy; stone medium size, oval, much flattened, cling; sweet, good flavour; quality good. Season early to mid-September. Promising, makes a good preserving plum and as attractive-looking.

One of the most promising seedling plums that fruited of those originated at Ottawa is a seedling of the Carp, which is a seedling of the Wolf; a description of this follows:—

Dara (Caro seedling).—Roundish to oval; large; cavity open, medium depth; suture a distinct line, very slightly depressed; apex rounded; colour, yellow, mottled and thinly washed with red; dots obscure; skin thick, moderately tender; flesh yellow, juicy; stone medium size, oval, almost free; sweet, pleasant flavour, skin acid; good quality. A good late plum. Originated at the Central Experimental Farm.

De Sola.—Fruit medium to above medium in size, roundish, somewhat heart-shaped, slightly flattened; cavity narrow, medium depth; suture a distinct line; colour deep yellow, well washed with deep red or dark red; dots obscure; bloom slight; skin moderately thick, fairly tender; flesh deep yellow, juicy; stone medium size, oval, considerably flattened, cling; sweet, good flavour; quality good. Season mid to late September. A good plum on account of its quality and great productiveness, but is not as large as it should be to be one of the best.

Don.—Fruit large, roundish; cavity narrow, medium depth; suture a distinct line; colour uniformly deep, lively red all over; dots numerous, small, distinct; bloom moderate; skin thick, tough; flesh deep yellow, juicy, firm; stone medium size, oval, somewhat flattened, cling; sweet, rich, good flavour; quality very good. Season late September to October. A seedling of Wolf, originated at the Experimental Farm. A very promising plum. One of the best late plums fruited here.

Dr. Dennis.—Fruit above medium to large, somewhat heart-shaped, flattened; cavity narrow, medium depth; suture a distinct line; apex rounded; colour deep red; dots small, numerous, distinct; bloom moderate; skin thick, rather tough, flesh deep yellow, juicy; stone large, flat, broad, cling; moderately sweet, slightly astringent; quality above medium. Season mid to late September. A good variety but not as promising as some.

Firmana (Consul seedling).—Large; oval, wedge, slightly lopsided; cavity medium to large, medium depth; suture indistinct; apex flattened, yellow, mottled and washed with carmine-red; predominant colour carmine-red; dots few, medium size, around apex; bloom moderate; skin medium thick; flesh yellow, firm, somewhat dry; sweet to insipid flavour; quality medium; stone large, bean-shaped, flattened, free; season late September. Originated at the Central Experimental Farm.

A plum possessing pre-eminently the characteristics of a good shipping fruit. Ten fruits weighed ten ounces.

Fitzroy (Rollingstone seedling).—Form roundish, slightly heart-shaped, flattened; size above medium to large; cavity narrow, shallow, abrupt; suture a distinct line, no depression; apex rounded; colour yellow, well washed with deep red; dots numerous, small, yellow, distinct; bloom moderate; skin thick, moderately tender; flesh rather pale, yellow, juicy; stone above medium size, flattened, roundish to oval, practically free; sweet; quality good. A good plum, but cracks some, which may be against it. Freeness of stone a good point. Americana group. Originated at the Central Experimental Farm.

Forest Garden.—Fruit medium size, roundish; cavity narrow, medium depth; suture a distinct line; apex rounded; colour yellow, almost entirely covered with dark purplish red; dots small, numerous, yellow; bloom moderate; skin thick, tough; flesh deep yellow, juicy, sweet; stone medium size to small, oval, considerably flattened, cling; quality good. Season early to mid September. Plum not attractive enough to be promising.

Gaylord.—Fruit above medium to large, roundish, somewhat heart-shaped; cavity narrow, shallow; suture a distinct line, very slightly depressed; apex pointed; colour deep, dull red on yellow ground; dots obscure; bloom moderate; skin thick, rather tough, slightly astringent; flesh deep yellow, juicy; stone medium size, oval, considerably flattened, semi-cling; sweet, good flavour; quality good. Season mid-September. Would be promising if colour were more attractive.

Gloria (Wolf seedling).—Form oval to oblong, somewhat flattened; size large; cavity narrow, shallow, abrupt; suture a distinct line; apex rounded; colour uniformly bright red all over, or yellow mottled with red; dots few, yellow, small, distinct; bloom thin, bluish; skin thick, tough; flesh deep yellow, juicy; stone large, almost or quite free, oblong, considerably flattened; sweet; quality good. Owing to its large size and the almost freeness of stone, this is a promising variety. Americana group. Originated at the Central Experimental Farm.

Hammer.—Fruit large, roundish to oval; cavity narrow, medium depth; suture a line, rather indistinct; colour uniformly deep red all over; dots numerous, yellow, distinct, prominent; bloom heavy; skin thick and tough; flesh deep yellow, juicy, meaty, sweet; stone below medium size, oval, considerably flattened, cling; quality good. Season late September. A very handsome plum having more the flavour of Miner than Americana. This variety cracks badly on the trees, otherwise it would be one of the most promising.

Hawkeye.—Fruit large, roundish; cavity shallow, narrow; suture merely a distinct line; apex rounded; colour yellow, more or less covered with purplish red; dots, small, indistinct; bloom medium; skin thick, moderately tough; flesh deep yellow, juicy; stone large, broad, much flattened, cling; sweet, good flavour. Quality good. Season mid to late September. One of the best.

Hazel (Gloria seedling).—Large; rounded ovate; cavity shallow, medium; suture indistinct, fairly clearly lined; apex rounded; yellow, generally entirely overspread with a dull, rich red; predominant colour dull, rich red; dots medium to large, distinct, yellow; bloom moderate; skin thick, tough, but agreeable; flesh golden yellow, juicy, moderately firm; sweet flavour; good quality; stone large, elongated ovate, flattened. Season mid-September. Originated at the Central Experimental Farm.

A very attractive plum of considerable promise.

Joseph (seedling from Joseph Rowley, Sr., Cummings Bridge, Ont.).—Form oval, flattened; very large; cavity shallow, medium width; suture a distinct line, not depressed; apex rounded, almost pointed; yellow more or less washed and mottled with attractive red; dots numerous, yellow, distinct; bloom medium; skin moderately thick, moderately tender; flesh yellow, juicy; stone above medium size, oval, almost free; flavour sweet, rich, good; quality very good for an americana plum.

An American plum of the largest size. Attractive in appearance and one of the best in quality. Very promising.

Came up in Mr. Rowley's garden in 1904. Bore in 1907 one plum. In 1908 two dozen plums. Measures $1\frac{1}{2}$ inches around base 1908. No American plum trees near, but may have grown from a pit of American plum. September 24, 1908.

Kieth.—Form oval, somewhat heart-shaped; size above medium to large; cavity narrow, shallow; suture a distinct line, not depressed; apex rounded, almost pointed; colour yellow almost entirely covered with deep red; dots obscure; bloom light, lilac; skin thick, tough; flesh deep yellow, juicy; stone medium size, roundish, cling; flavour sweet, rich; quality good. Not as good as some others.

Kilmore (Yosemite Purple seedling).—Size large; form roundish, slightly flattened; cavity medium depth, medium width; suture a distinct line; colour bright purplish red; dots moderately numerous, yellow, distinct; bloom moderate; skin moderately thick, moderately tough; flesh deep yellow, juicy; stone above medium, oval, considerably flattened, almost free; sweet, rich, good flavour; quality good. Promising. Season medium late. Originated at the Central Experimental Farm.

Lester (De Soto seedling).—Roundish, one side a little longer than other; medium to above medium in size; cavity narrow, shallow; suture a distinct line only; apex rounded; yellow more or less covered with bright red; dots moderately numerous, small, yellow, rather indistinct; bloom moderate, bluish; skin moderately thick, rather tough; flesh deep yellow, juicy; stone below medium size, semi-cling, roundish, considerably flattened; sweet, good flavour; quality good. Season mid-September. Worth keeping on account of quality and productiveness. A promising plum. Originated at the Central Experimental Farm.

Lottie.—Form roundish; size large; cavity shallow, narrow; suture an indistinct line; apex slightly flattened; colour yellow, mottled and washed with red; dots obscure; bloom slight; skin thick, tough; flesh sweet, juicy; stone medium size, roundish, semi-cling; sweet, rich; quality good. A handsome plum of good quality. Propagate. Americana group.

Major.—Seedling of Wild Plum of Manitoba, originated at the Experimental Farm, Brandon, Man. A very early variety of good quality, though rather small in size.

Mankato.—Fruit above medium to large, roundish; cavity narrow, medium depth; suture a distinct line; apex rounded; colour deep, dull red with a moderately heavy bloom; dots numerous, small, yellow; bloom rather heavy; skin thick, tough; flesh deep yellow, juicy, sweet, good flavour, not astringent; stone large, flat, semi-cling; quality good. Season late August to early September. Better in quality than Bixby, but not as handsome. A good early plum. Promising.

Marler (Caro seedling).—Roundish to oval; large for Americana, $1\frac{1}{2}$ x $1\frac{1}{2}$ in.; cavity shallow, medium width; stem medium length, moderately stout; suture a distinct line, not depressed; stem more persistent than with most varieties; apex slightly depressed; yellow, covered with bright crimson; dots numerous, yellow, conspicuous; bloom pinkish; skin thick, but moderately tender; flesh yellow, firm, juicy; stone medium size, oval, cling; flavour sweet, rich, good, acid next skin; quality good. Americana group. Originated at the Central Experimental Farm.

A handsome plum, and on account of firmness and good quality should be useful. Hangs on tree well.

Milton.—Fruit medium to large, oval, bright to rather deep red; dots numerous, small, yellow, prominent; suture merely a distinct line; skin thin but tough; flesh yellow, juicy, sweet; stone medium size, cling; quality medium to good. Season last week of August. Tree a strong grower and very productive where fruit buds are not injured by winter. Wildgoose group.

New Ulm.—Fruit large, roundish, pointed or somewhat heart-shaped; cavity narrow, shallow; suture merely a distinct line; apex rounded, almost pointed; colour yellow, more or less covered with bright purplish red; dots numerous, small, yellow; bloom moderate; skin thick, tough; flesh deep yellow, juicy, sweet; stone medium size, oval, considerably flattened, cling; quality good. Season early to mid-September. A firm plum, and should make a good shipper. Too thick and tough in the skin for home use.

Ocheeda.—Fruit medium to above medium size, roundish to heart-shaped; cavity narrow, shallow; suture a distinct line; apex almost pointed; colour, deep red all over; dots numerous, small, yellow; bloom rather heavy; skin thick, moderately tender; flesh deep yellow, juicy; stone medium size, roundish, considerably flattened, cling; sweet, good flavour; quality good. Season early to mid-September. A firm plum and should ship well.

Queen (Golden Queen).—Fruit very large, roundish, oblong, bright golden yellow and of the most delicious flavour; quite unexcelled for canning, and very fine for eating out of hand or for slicing and serving with sugar and cream, as for peaches. Ripens latter part of August to September 10. Tree is remarkable for its unusually fine, upright growth. (Introducer's description.) Originated with H. A. Terry, Crescent, Ia. Has given good satisfaction elsewhere.

Schley, (*Admiral*).—Form roundish; size very large; cavity narrow, shallow; suture a distinct line; apex rounded; colour yellow, well washed with deep bronzy red; dots numerous, small, yellow, distinct; bloom thin, bluish; skin moderately thick, tough; flesh deep yellow, juicy; stone large, oval, flat, cling; sweet, of a rich flavour; quality very good. One of the best Americana plums yet tested. An improvement over Hawkeye. Americana group.

Silas Wilson.—Fruit large, roundish; cavity narrow, shallow; suture an indistinct line; apex rounded; colour yellow, more or less mottled with purplish red; dots very small, yellow, sparse; bloom medium; skin rather thick, moderately tender; flesh deep yellow, juicy; stone medium to above, roundish, broad, considerably flattened, semi-cling; sweet, rich, good flavour; quality very good. Season mid to late September. One of the best Americana plums.

Smith.—Form roundish to broad oval; size large; cavity narrow, shallow; suture a distinct line; apex rounded; colour yellow, mottled and washed with red; dots obscure; bloom light; skin thick, moderately tough; flesh yellow, juicy; stone rather large, oval, nearly free; sweet, rich; quality good to very good. A good plum. Promising. Americana group.

Stoddard.—Fruit large to very large, roundish; cavity narrow, shallow; suture a distinct line; apex rounded; colour deep yellow, almost entirely covered with deep purplish red; dots fairly numerous, small, yellow; bloom light; skin thick, tough, slightly astringent; flesh deep yellow, juicy; stone medium size, broad, flat, cling; sweet, good rich flavour; quality very good. Season late September. One of the largest and best flavoured Americana plums.

Sunrise.—Fruit large, oval; cavity narrow, shallow; suture a distinct line, not depressed; apex rounded; colour yellow, more or less covered with bright red; dots few, yellow, distinct; bloom medium, skin thick, moderately tough; flesh deep yellow, juicy, sweet; stone large, flat, oval; practically free; quality good. Season mid-September. A seedling of De Soto, originated at Central Experimental Farm. Promising owing to freeness of stone.

Swift (De Soto seedling).—Form broad oval, much flattened; size large; cavity narrow, shallow; suture merely an indistinct line; apex slightly flattened, colour yellow, mottled and washed with deep red; dots obscure; bloom slight; skin thick, moderately tough; flesh rather pale yellow, juicy; stone above medium, oval, semi-cling, almost free; flavour sweet, pleasant. A good plum and worth propagating. Americana group. Originated at the Central Experimental Farm.

Terry (Free Silver).—Fruit large, regular, oval; surface smooth but not shiny; colour a clear dark red; dots small, grey; bloom thin, lilac; cavity small, shallow; stem, $\frac{3}{4}$ to $\frac{1}{2}$ inch; suture indistinct; apex rounded; skin thin, tough, acid but not astringent; flesh firm but melting; stone large, ovate, pointed; flattened, acid next to stone, adherent; flavour a mingling of Americana and Augustifolia; quality good. Season end of August. One of the largest and handsomest native plums yet produced. A very promising plum. (Craig.) Planted at Central Experimental Farm in 1902.

U.S.—Form roundish; large; cavity shallow, medium width; suture a distinct line; apex rounded; yellow almost entirely covered with deep purplish red; dots numerous, yellow, distinct; bloom moderate, bluish; skin thick, tough; flesh yellow, juicy; stone medium size, oval, cling; sweet, good flavour; quality good.

Of the same type as Oren and Bouncer, but not as good as either.

Van Buren.—Fruit medium to above medium size, almost round; cavity narrow, shallow; suture only a fairly distinct line; apex rounded; colour yellow, more or less mottled and washed with bright red; dots numerous, small, yellow; bloom light; skin thick, tough; flesh deep yellow, juicy, firm; stone above medium size, roundish, broad, much flattened, cling; sweet, good flavour; quality good. Season mid-September to October.

A handsome plum. One of the latest and best keepers.

Vesta (Gloria seedling).—Large to very large; oval; cavity medium to large, shallow; suture slightly depressed, fairly clearly lined; apex swollen opposite suture; yellow overspread by bright pink to dark, carmine red; predominant colour light, carmine red; dots medium to large, distinct, yellowish; bloom moderate; skin thick, slightly bitter; flesh yellow, juicy, firm, meaty; sweet, distinctive flavour; good quality; stone large, flattened, oval, nearly free. Season late September. Originated at the Central Experimental Farm.

One of the best. Ten fruits weighed 12 ounces. Attractive, large, firm, of good quality; skin somewhat tough.

Weaver.—Fruit above medium size, roundish, somewhat heart-shaped; cavity narrow, medium depth; suture a distinct line; colour yellow, nearly entirely overspread with bright red; dots numerous, small, purple; bloom light; skin moderately thick, tough; flesh deep yellow, juicy, sweet; stone medium size, oval, considerably flattened, almost free; quality good. Season mid-September.

An attractive plum, but not large enough to be promising.

Welcome (seedling of De Soto).—Fruit above medium size, oval, flattened considerably; cavity narrow, shallow; colour rich yellow more or less washed with red; dots very small, yellow, indistinct; bloom thin; skin moderately thick, fairly tough; flesh yellow, juicy, sweet, a pleasant but not rich flavour; quality good; season mid-September. A very handsome plum. Tree vigorous and productive. Originated at the Central Experimental Farm.

Whitaker.—Fruit large, oval, somewhat heart-shaped; colour bright red; suture merely a distinct line; dots numerous, yellow prominent; bloom thin, bluish; skin thin, tough; flesh yellow, juicy, moderately firm, sweet, good flavour; stone medium size, long oval, cling; quality good. Season first and second week in September, does not ripen evenly. A handsome plum. Tree vigorous, spreading and productive where fruit buds are not injured by winter. Wildgoose group.

Wolf.—Fruit large, roundish; cavity narrow, shallow; suture shallow, fairly distinct, not depressed; apex rounded; colour deep red; dots fairly numerous, small, yellow, distinct; bloom moderate; skin thick, tough; flesh deep yellow, juicy, sweet, rich, good flavour; stone above medium size, outline oval, considerably flattened, cling; quality good. Season early to mid-September. One of the best. This does not answer the description of Wolf given by some authorities. Both, however, are good plums.

Wyant.—Fruit large, oblong, flattened; cavity narrow, deep; suture a distinct line; apex almost pointed; colour deep red; dots numerous, small purple; bloom medium; skin rather thick, somewhat tough, astringent; flesh deep yellow, moderately juicy, fairly sweet; stone large, much flattened, oval, semi-cling, almost free; quality medium. Season mid-September. Quality not good enough. This plum is highly recommended in the Western States, but has not proven as good as some others here.

Cosmite Purple.—Fruit large, roundish, somewhat flattened; cavity medium depth and width; suture an indistinct line; colour deep, dull purplish red; dots numerous, small, yellow, distinct; bloom moderate; skin thick, but tender; flesh deep yellow, juicy; stone medium size, oval, considerably flattened, semi-cling; sweet, rich flavour, but somewhat astringent; quality above medium. Season mid to late September.

Yuteca (seedling of *P. Americana*).—Originated by N. E. Hansen, Brookings, S.D.

Tree hardy and a strong grower. Fruit roundish, large; cavity medium width, shallow; stem long, slender; suture a distinct line, not depressed; apex rounded; yellow, almost covered with lively crimson; dots numerous, yellow, distinct; bloom moderate, bluish; skin thick, moderately tough; flesh yellow, firm, juicy; stone medium size, roundish, semi-cling; flavour sweet, rich; quality good. Americana group.

An attractive-looking plum of good quality. Rather promising.

NIGRA VARIETIES.

Aitkin.—Fruit large, oval; cavity narrow, medium depth; suture obscure; apex pointed; colour uniformly deep red all over; dots none; bloom none; skin thin; flesh deep yellow, juicy, moderately sweet, not rich or high flavoured; stone large, flat, oval, semi-cling, no astringency; quality medium to above. Season, last week of August. Tree only fairly productive. Nigra group. The earliness of this plum is the principal point for recommendation.

Cheney.—Fruit large, round to somewhat oval, uneven; cavity narrow, medium depth; suture merely an indistinct line; apex rounded; colour uniformly deep red all over, sometimes paler on one side; dots none; bloom none; skin moderately thick, tough, not astringent; flesh deep yellow, juicy; stone medium size, flat, oval, cling; sweet, moderately rich flavour; quality good. Season late August to early September. One of the best. It soon gets soft, however, after ripening. Tree a strong grower, moderately productive. Nigra group.

Carstesen.—Fruit medium size, roundish, somewhat uneven; cavity narrow, medium depth; suture obscure; apex rounded; colour yellow, nearly covered with deep red; dots obscure; bloom none; skin thin, tender; flesh yellow, juicy, sweet, good flavour; stone flat, roundish, semi-cling, almost free; quality good; season early to mid-August. Tree vigorous, productive. The earliest native plum tested, and valuable on this account. A Nigra seedling, originated by H. P. Carstesen, Billings Bridge, Ont. (near Ottawa).

Rhoda (Cheney seedling).—Large; oval (regular); cavity broad, moderately deep to shallow; suture slightly depressed, faintly lined; apex rounded; dark red; predominant colour dark red; dots small, numerous, indistinct; bloom none to slight; skin fairly thin, tough, peels when ripe; flesh rich orange-yellow, firm, juicy; sweet, rich, pleasant flavour; good quality; stone broadly oval, dark colour, semi-free. Season mid-September. A good plum. Originated at the Central Experimental Farm.

Trou (Cheney seedling).—Roundish, large; cavity narrow, shallow; suture a fairly distinct line very slightly depressed; apex rounded; yellowish, well washed with deep red; dots numerous, small, yellow, distinct; bloom moderate, bluish; skin rather thick, moderately tender; flesh deep yellow, juicy; stone above medium, oval, flattened; sweet, good flavour; quality good to very good. Season mid September.

A promising seedling, better in quality than Cheney. Originated at the Central Experimental Farm.

HYBRID VARIETIES.

America (*Prunus Munsoniana* x *P. triflora*).—Originated by Luther Burbank, Santa Rosa, Calif.

Fruit early, season of medium length; one and three-eighths inches in diameter, roundish oval, halves equal; cavity shallow, flaring; suture shallow, a distinct line; apex roundish; color clear, dark, currant-red over golden-yellow, mottled, with thin bloom; dots numerous, small, whitish, inconspicuous; stem slender, one-half inch long, glabrous, adhering to the fruit; skin thin, bitterish, separating readily from the pulp; flesh yellow, juicy, fibrous, somewhat tender, sweet, not high in flavour; fair in quality; stone clinging, seven-eighths inch by one-half inch in size, oval, pointed, with pitted surfaces, broadly ridged along the ventral suture; dorsal suture grooved. (Plums of New York.)

Tree strong, spreading grower and very productive. Has been found comparatively free from rot in New York State. Would be hardy only in the warmest parts of Canada.

Climax (*Prunus triflora* x *Prunus Simonii*).—Originated by Luther Burbank, Santa Rosa, Calif.

Fruit very early, season short; one and three-quarter inches in diameter, cordate or roundish slightly compressed, halves unequal; cavity deep, abrupt, regular, marked with faint, reddish, radiating streaks; suture deep, broad; apex pointed; color dark red, mottled; bloom of medium thickness; dots numerous, variable in size, russet, conspicuous, clustered about the base; stem thick, nine-sixteenths inch long, glabrous,

parting readily from the fruit; skin thick, bitter, with a tendency to crack, separating easily from the pulp only when fully ripe; flesh yellowish, very juicy, somewhat fibrous, tender and melting, sweet, pleasant flavoured, aromatic; good; stone adhering, seven-eighths inch by five-eighths inch in size, somewhat long-oval, pointed, roughish, conspicuously winged and grooved on the ventral suture; dorsal suture slightly grooved. (Plums of New York.)

A very handsome plum. It is succeeding well in Southwestern Ontario, but is not as productive as some others. The tree is a strong grower, but somewhat straggling in habit. Would be hardy only in the warmest parts of Canada.

Inpka (*Prunus americana* x *Prunus Simonii*, Hansen).—Globular, flattened; size medium, $1\frac{1}{8}$ x $1\frac{1}{2}$ ins.; cavity large, wide, fairly deep; suture distinct, depressed; apex slight, depressed; dark plum colour (i.e., dark crimson maroon); dots numerous, very distinct, whitish; bloom slight; skin thick, tough, but not astringent or bitter; flesh buff colour to whitish; stone small, cling; very rich, velvety, pear flavour, sweet and pleasant; quality good.

A very distinctive flavour which might be objected to by some people, otherwise a good plum for both dessert and culinary purposes.

Kaga (*Prunus americana* x *Prunus Simonii*, Hansen).—Somewhat heart-shaped, about size of Lombard or larger, $1\frac{1}{2}$ x $1\frac{3}{4}$ ins.; cavity deep, abrupt, medium width; suture a distinct line, very slightly depressed; apex rounded; yellow, entirely over-spread with deep crimson; dots numerous, yellow, distinct; bloom bluish; skin thick, tough; flesh greenish yellow, firm, juicy; stone below medium size, roundish, cling; quality above medium to good; sweet subacid, acid next stone and skin, spicy, pear-like flavour.

An attractive-looking plum with many Japanese characteristics. It is highly perfumed. Appears hardier in flower bud than most European plums. Should make a good shipping plum.

Mancheno (*Cheney* x *Manitoba Plum*).—Oval; size $1\frac{3}{8}$ x $1\frac{1}{4}$ ins.; cavity narrow medium depth, abrupt; stem medium length, $\frac{1}{2}$ inch, slender; suture indistinct; apex rounded; yellow, almost entirely covered with deep red; dots obscure; skin moderately thick, moderately tough; flesh yellow, juicy; stone large, flat, cling; briskly subacid, somewhat astringent, little flavour; quality medium.

An attractive-looking plum, and earlier than Cheney. May be useful on this account. Cross by Dr. Wm. Saunders.

Omaha (*P. americana* x *P. triflora*).—Originated by Theodore Williams, Benson, Nebraska.

Tree hardy, a strong grower and productive. Fruit buds hardy. Fruit roundish, almost round; as large as largest Americana, $1\frac{1}{2}$ by $1\frac{1}{2}$ inches; cavity narrow, medium depth; stem short, $\frac{3}{8}$ -ins., moderately stout; suture an indistinct line, little, if any, depressed; apex rounded; yellow, entirely or almost entirely covered with attractive red; dots numerous, small, distinct; bloom bluish; skin moderately thick, tough; flesh yellow, juicy, tender; stone medium size, oval, cling; flavour sweet, good except next stone and skin, where acid; quality good except next skin.

Appears to be a blend of Americana and Japanese. Fruit has perfume of Japanese. Foliage of tree somewhat like Japanese.

Sapa (*Prunus Besseyi* x *Sultan*, Hansen).—Roundish somewhat heart-shaped; size $1\frac{1}{2}$ x 1 in.; cavity open, deep, abrupt; stem slender, $\frac{3}{4}$ in. long; suture a distinct line; apex rounded or very slightly flattened; purple, washed with dark purple; dots numerous, very small, yellow, indistinct; bloom bluish, thin; skin thin, moderately

tough; flesh dark purple, very juicy; stone medium size, oval, cling; flavour briskly subacid, sprightly, acid next skin, slightly astringent; quality above medium.

Tastes a good deal like the better sand cherries, but is larger. Fruit buds evidently hardier than most Japan varieties.

Shiro (*Prunus Simonii* x *P. triflora* x *P. cerasifera* x *P. Munsoniana*).—Originated by Luther Burbank, Santa Rosa, Calif., and said to have in it the blood of the Robinson, Myrobolan, Apricot and Wickson plums.

Fruit very early, season short; one and one-half inches in diameter, roundish-conic, with halves equal; cavity intermediate in depth and width, flaring, regular; suture an indistinct line; apex roundish; color light yellow becoming deeper yellow as the season advances, occasionally with a blush of pink, with thin bloom; dots numerous, very minute, whitish, inconspicuous; stem three-eighths inch long, adhering to the fruit; skin thin, tough, sour, occasionally cracking, separating readily although a thin coating of flesh is left clinging to the skin; flesh light yellow, semi-transparent, the stone being faintly visible, very juicy, fibrous, somewhat melting, sweet, mild, lacks character in flavour; good; stone clinging, seven-eighths inch by five-eighths inch in size, broadly oval, flattened, slightly elongated at the base, with rough surfaces; ventral suture faintly ridged and furrowed; dorsal suture very slightly grooved. (Plums of New York.)

The tree is a strong grower of an upright, spreading habit and productive where it succeeds well, but it is too tender except for the warmest parts of Canada.

Toka (*Prunus americana* x *P. Simonii*, Hansen).—Fruit roundish to heart-shaped; below medium in size (1 x 1½ inches); cavity narrow, medium depth, abrupt; stem medium length, slender; suture an indistinct line, very slightly depressed; apex rounded; colour yellow entirely covered with deep red; dots very small, indistinct; bloom thin, pinkish; skin moderately thick, tough; flesh yellow, juicy, moderately firm; stone medium size, oval cling; sweet with a peculiar aromatic, pleasant flavour, acid next skin and pit. Quality good. Season mid-September. A decided and rather unusual flavour. Not large enough to be very promising unless very hardy.

Tokeya (*Sand Cherry* x *Chinese Apricots*, Hansen).—Roundish, almost oblate, flattened at ends; size 1 x 1¼ ins.; cavity deep, medium width; stem moderately stout, ½-inch long; suture an indistinct line, slightly depressed; apex flattened; dark red; dots indistinct; bloom thin, bluish; skin thin, moderately tender; flesh greenish, juicy; stone medium size, roundish, cling; acid, bitter flavour; quality below medium. Hybrid group.

Not at all agreeable to eat on account of bitterness.

Wickson (*Prunus triflora* x *P. Simonii*).—Originated by Luther Burbank, Santa Rosa, Calif. He considered it a cross between Kelsey and Burbank, but it is thought others to have the blood of *Prunus Simonii*.

Fruit early mid-season, period of ripening long; variable in size, the larger fruits about two and one-eighth inches in diameter, obliquely cordate, halves unequal; cavity deep, abrupt, with yellowish concentric rings; suture often prominent and deep, with a prolonged tip at the apex; colour dark red over a yellow ground, indistinctly splashed with darker red, mottled with thin bloom; dots numerous, small, yellow, inconspicuous, densely clustered about the apex; stem thick, eleven-sixteenths inch long, glabrous; skin thin, tender, separating easily; flesh amber-yellow, juicy, coarse, somewhat fibrous, firm, sweet, pleasant but not high in flavour; good; stone clinging, one inch by five-eighths in size, oval or ovate, pointed, with pitted surface; ventral suture winged; dorsal suture grooved. (Plums of New York.)

Varieties of Plums which are being tested at the Central Experimental Farm, Ottawa.

List of Varieties.

Names of Varieties.	Date of Planting Oldest Trees.	Date of Planting Oldest Trees.	Names of Varieties—Continued.	Date of Planting Oldest Trees.
EUROPEAN PLUMS.		EUROPEAN PLUMS—Continued.		
Abegweit..	1905	Outremont..	1903	
Amaryllis..	1902	Pauline Schleiter..	1901	
Arab..	1898	Perdrigon..	1903	
Arctic (<i>Moore's Arctic</i>)..	1899	Pond (<i>Pond's Seedling</i>)..	1900	
Baker Prune..	1899	Prince Englebert = Englebert..		
Beauty of Naples = Naples..		Quackenboss..	1898	
Benedict..	1906	Queen May..	1903	
Bejonnieres..	1901	Quebec..	1902	
Bohemian..	1893	Raynes..	1903	
Bonne Ste. Anne..	1895	Red Egg..	1898	
Bradshaw..	1899	Reine Claude de Montmorency = Mont-		
Brodie..	1903	morency..		
Canada Orleans..	1898	Reine Claude dorée..	1906	
Chatanqua..	1899	Richard Trotter..	1895	
Columbia..	1898	Richland..	1888	
Cochet père..	1901	Rowley..	1903	
Communia..	1906	Saratoga..	1901	
Czar..	1900	Shropshire (<i>Shropshire Damson</i>)..	1898	
Denniston Superb..	1902	Smith's Early..	1897	
Diamond..	1900	Spanish King..	1906	
Duane (<i>Duane's Purple</i>)..	1895	Smith's Octole..	1897	
Early Red Russian..	1895	Tatze..	1903	
Emerald..	1903	Ungarish..	1888	
Empire..	1900	Voronesh Blue..	1903	
Englebert (<i>Prince Englebert</i>)..	1898	Voronesh Yellow..	1893	
Favorite Hatve..	1908	Wangenheim..	1901	
Fellenberg = Italian Prune..		White Nicholas..	1895	
Field..	1900	Yellow Moldarka = Moldavka..		
General Hand = Hand..		Victoria..	1895	
German Prune..	1895			
Glass (<i>Glass Seedling</i>)..	1898	JAPANESE PLUMS.		
Grand Duke..	1898	Abundance..	1900	
Greenfield..	1905	Berkman's..	1903	
Green Gage..	1899	Botan = Red June..		
Gueil..	1898	Burbank..	1900	
Hand (<i>General Hand</i>)..	1898	Chabot..	1903	
Haaszwet-sche..	1900	Engre..	1903	
Horrigan..	1903	Hale..	1903	
Ickworth (<i>Ickworth Imperatrice</i>)..	1901	Kerr..	1903	
Imperial Gage..	1900	October (<i>October Purple</i>)..	1903	
Italian Prune (<i>Fellenberg</i>)..	1898	Red June..	1903	
Javoe très hative de Babond..	1908	Satsuma..	1891	
John A..	1895	Shiro-Simomo = Red June..	1903	
July Green Gage (<i>Reine Claude hative</i>)..	1908	Willard..	1900	
Kingston..	1900			
Krikoo..	1913	AMERICANA PLUMS.		
Lachine..	1903	Admiral Dewey..	1901	
Lateford..	1907	Admiral Schley..	1901	
Leinsie..	1893	Advance..	1903	
Licola..	1900	Aima..	1907	
Lothard..	1900	American Eagle..	1895	
Lynn..	1903	Anderson..	1907	
McLaughlin..	1900	Atkins..	1907	
Mallard..	1903	Bailey..	1903	
Mirabelle précoce de Floton..	1908	Bender..	1900	
Moldavka (<i>Blue Moldarka</i>)..	1895	Bixby..	1893	
Moldavka (<i>Yellow Moldarka, Voronesh</i>)..	1897	Blackhawk..	1893	
Monarch..	1900	Romherger..	1901	
Monroe..	1901	Bouncer..	1895	
Montmorency (<i>Reine Claude de Mont-</i>		Brackett..	1903	
<i>morency</i>)..	1899	Brittlewood No. 1..	1901	
Moore's Arctic = Arctic..		Brittlewood No. 2 = U. S..		
Mount Royal..	1903	Brittlewood No. 3..	1903	
Mountain..	1903	Brooklyn..	1903	
Naples (<i>Beauty of Naples</i>)..	1900			
Niagara (<i>Bradshaw 1</i>)..	1898			

List of Varieties.—Concluded.

Date of Planting Oldest Trees.	Names of Varieties—Continued.
AMERICANA PLUMS—Continued.	
Bryan (<i>W. J.</i>)	1903
Budd (<i>Prof.</i>)	1903
Caro.	1895
Champion.	1895
City.	1895
Coilage.	1903
Colorado (<i>Colorado Queen</i>)	1895
Colman.	1901
Comfort.	1893
Con-sul.	1895
Cook Choice.	1906
Corona.	1907
Cottrell.	1895
Craig (<i>Prof.</i>)	1903
Cyclone.	1901
Dara.	1913
Deepcreek.	1895
Denuis (<i>Dr.</i>)	1895
De Soto.	1898
Diana.	1901
Don.	1895
Dunlap (<i>Dunlap's No. 1</i>)	1895
Eldorado.	1901
Emma.	1901
Etta.	1901
Firmana.	1907
Fitzroy.	1907
Forest Garden.	1896
Freestone.	1901
<i>Free Silver</i> = Terry.	1901
Galena.	1895
Gaylord.	1895
Gloria.	1907
Golden.	19.
<i>Golden Queen</i> = Queen.	
Hammer.	1895
Hanson.	1901
Hawkeye.	1898
Hazel.	1909
Holt.	1901
Hunt.	1893
Irene.	1895
Ironclad.	1895
Jessie.	1894
Jewell.	1913
Joseph.	1913
Julia.	1901
Kennedy Red.	1897
Kickapoo.	1900
Kieth.	1903
Kilmore.	1909
Lamhart (<i>Lambert's Red</i>)	1897
<i>Large Red Sweet</i> = Plunk.	
Leatherskin.	1907
Legal Tender.	1901
Leonard.	1897
Lester.	1909
Lillie.	1901
Lottie.	1901
Louisa.	1901
Mankato.	1895
Marcellus.	1901
Marjorie.	1903
Matier.	1907
Mary.	1901
Maud Lacey.	1903
Mollie.	1901
Moon.	1899

Date of Planting Oldest Trees.	Names of Varieties—Continued.
AMERICANA PLUMS—Concluded.	
Nellie.	1895
Nellie Blanche.	1901
Newton Egg.	1897
New Ulm.	1895
Ocheeda.	1896
Old Gold.	1897
Omega.	1901
Pearl.	1901
Peffer Premium.	1895
Plunk (<i>Large Red Sweet</i>)	1897
Purple Yosemite (<i>Yosemite Purple</i>)	
Quaker.	1895
Queen (<i>Golden Queen</i>)	1901
Reel.	1901
Rockford.	1892
Rollingstone.	1888
Ruby.	1903
Sada.	1901
Silas Wilson.	1895
Smith.	1901
Speer.	1888
Stella.	1903
Stoddard.	1891
Sunrise.	1895
Swift.	1907
Terry's De Soto.	1903
Terry (<i>Free Silver</i>)	1902
U. S. (<i>Brittlewood No. 2</i>)	1901
Value.	1903
Van Buren.	1890
Van Deman.	1895
Vesta.	1909
Warren.	1901
Weaver.	1895
Welcome.	1907
Wolf.	1888
Wyant.	1896
Yellow Americana.	1907
Yellow Sweet.	1895
<i>Yosemite Purple</i> = Purple Yosemite.	
Yuteca.	1907

NIROA PLUMS.

Aitkin.	1897
August.	1899
Brand Ruby.	1903
Carstensen (<i>Earliest</i>)	1906
Cheney.	1896
Gopon.	1907
Manitoba No. 4.	1895
Manitoba No. 5.	1895
Mill Seedling.	1890
Odegard.	1901
Rhoda.	1907
Smith Red.	1900
Suelling.	1891
Victor.	1907
Whyte.	1893

MINER-LIKE PLUMS.

Bestovall.	1906
Carver.	1895
Clinton.	1895
Col. Wilder = Wilder.	
Eather.	1895
Forest Rose.	1898

List of Varieties—*Continued.*

Date of Planting Oldest Trees.	Names of Varieties— <i>Continued.</i>	Date of Planting Oldest Trees.	Names of Varieties— <i>Concluded.</i>
MINEE-LIKE PLUMS—<i>Concluded.</i>		HYBRID PLUMS—<i>Concluded.</i>	
Idall (<i>Idol</i>)	1895	Excelsior (<i>Kelsey x Wildgoose</i>)	1903
Troquois	1895	Ezaptan (<i>P. Besseyi x Sultan</i>)	1913
Miner	1895	First (<i>Parentage uncertain</i>)	1903
Nebraska	1895	Fourth of July	1913
Oren	1900	Freeche	1910
Prairie Flower	1895	Golden (<i>Gold</i>) (<i>Robinson x Botan</i>)	1903
Rachel	1897	Goosedye (<i>Wildgoose x Duchouse cherry</i>)	1903
Surprise	1900	Gonzales (<i>Parentage unknown</i>)	1903
Wier (<i>Wier's Large Red</i>)	1895	Hanska (<i>P. americana x P. Simonii</i>)	1909
WAYLAND-LIKE PLUMS.		Holland (<i>Kelsey x Lone Star</i>)	1903
Benson (<i>Mollie</i>)	1901	Inkpa (<i>P. americana x P. Simonii</i>)	1909
Golden Beauty	1895	Kaga (<i>P. americana x P. Simonii</i>)	1909
Moreman	1888	Kelbalan (<i>Kelsey x Early Cherry</i>)	1903
Reed	1895	Kelmyro (<i>Kelsey x Early Cherry</i>)	1903
WILDGOOSE PLUMS.		Mancheno (<i>Cheney x Manitoba Plum</i>)	
Downing (<i>Charles</i>)	1893	Nona (<i>P. triflora x P. angustifolia</i> ?)	1903
Dunlop (<i>No. 2</i>)	1895	Occident (<i>Parentage unknown</i>)	1903
James Vick	1897	Omaha (<i>Abundance x Brittlewood</i>)	1906
Milton	1893	Opata (<i>P. Besseyi x Gold</i>)	1912
Roulette	1899	Oyama (<i>Red June x P. americana</i> ?)	1907
Sophie	1895	Pendent (<i>Pottawatamic x Forest Garden</i>)	1901
Van Houten	1901	Preserver (<i>Kelsey x Early Red</i> ?)	1903
Whitaker	1895	Ragland (<i>Kelsey x Yellow Transparent</i>)	1903
Wilder (<i>Col.</i>)	1901	Red Glass (<i>Miner x Quackenbass</i>)	1907
Wildgoose	1898	Red May (<i>Abundance x Wildgoose</i>)	1903
HYBRID PLUMS.		Rupert (<i>Prunus pumila x P. americana</i>)	1901
America (<i>Botan x Robinson</i>)	1901	Sansoto (<i>P. Besseyi x DeSoto</i>)	1911
Ames (<i>P. americana x P. triflora</i>)	1901	Sapa (<i>P. Besseyi x Sultan</i>)	1909
Apple (<i>Parentage unknown</i>)	1907	Scarlet (<i>Wildgoose x Cheney</i>)	1907
Bartlett (<i>Delaware x P. Simonii</i>)	1901	Shiro (<i>Robinson x Myrobahan x Wick-san</i>)	1901
Bursoto (<i>Burbank x DeSoto</i>)	1915	Six Weeks (<i>Abundance x Chickasaw</i>)	1903
Chalco (<i>P. Simonii x Burbank</i>)	1903	Sultan = Occident	1901
Cheresoto (<i>P. Besseyi x DeSoto</i>)	1911	Togo (<i>Red June x P. americana</i> ?)	1906
Climax (<i>Botan x P. Simonii</i>)	1901	Watson (<i>Kelsey x Lone Star</i> ?)	1903
Combination (<i>P. triflora x ?</i>)	1903	Wagh (<i>Chabot x Wayland</i>)	1903
Compass Cherry (<i>Prunus Besseyi x Miner</i>)	1901	Wickson (<i>P. triflora x P. Simonii</i>)	1903
Doris (<i>Parentage unknown</i>)	1903	Yates (<i>Kelsey x Lone Star</i> ?)	1903
Duke (<i>P. Munsoniana x ?</i>)	1903	Toka (<i>P. americana x P. Simonii</i>)	1911
		Tokeya (<i>P. Besseyi x P. Simonii</i>)	

POLLINATION OF PLUMS.

Until recent years the pollination of fruits was given comparatively little study, but during the past twenty years a number of experimenters have been at work investigating the causes of failure in the setting of fruit and have shown the importance of having the blossoms fertilized by pollen which will ensure the setting of the fruit. The plum has received more careful study in regard to pollination than any other fruit. For five years or more Prof. F. A. Waugh gave this question his special attention, and the results which he obtained and the facts which he published have been of great assistance to fruit growers.

As a result of his experiments he found that of all the varieties of plums of American origin which he studied (and he studied most of those on the market), only one variety, the Robinson, was self-fertile. In other words, if a tree of any other



Cheney Plum. (*Prunus nigra*.)

variety of American origin than the Robinson were planted where its flowers could not be fertilized by the pollen from a tree of another variety no fruit or practically no fruit would set. The Japanese plums were almost as self-sterile as the American but the European plums were more or less self-fertile. It will be seen from the above that many varieties of plums are not fertilized at all or only partly fertilized by their own pollen. It is necessary, therefore, that varieties be so mixed in the orchard that proper pollination and a good setting of the fruit will be ensured. Americana varieties of plums should be planted to pollinize Americana varieties, Nigra to pollinize Nigra, although Americana will do, Japanese to pollinize Japanese and



Americana Plum. (*Prunus americana*).

European to pollinize European. Varieties should be planted near each other which bloom at the same time. This is very important, as if the varieties do not bloom at the same time pollination cannot take place. The nurserymen do not as a rule give in their catalogues the relative time of blooming of the different varieties bought from them, but it is necessary for the fruit grower to know this before planting if he is to obtain the best results. The value of bees and other insects in the orchard for assisting in pollinizing the flowers cannot be over-estimated, and where possible, colonies should be kept for this purpose.

The dates of blooming of plums in different parts of Canada were recorded by fruit growers for the Horticultural division of the Central Experimental Farm for five years. These dates have been compiled and the average of each variety thus obtained. The following is a table of varieties of Americana and Nigra plums recommended in this bulletin, giving their season of blooming. This will be of assistance to fruit growers when planting. A table of the European varieties is not given, as the



European Plum. (*Prunus domestica*).

information obtained was not full enough to be perfectly reliable, and furthermore, the intermixing of European kinds is not so important as with American, as most of the varieties appear to be self-fertile. The Japanese varieties described in this bulletin are all extra early and early bloomers, and will thus pollinize one another.

There is ten days' difference between the time of blooming of the earliest and latest varieties in the following table, so that it would be impossible for the early blooming varieties to pollinize the late ones, but the early might pollinize the medium,

and the medium the medium late. The pistils or female organs of the plum blossoms often mature first, often as much as four days before the anthers containing the pollen. The stigmas may remain in condition to receive the pollen for several days. As pollen is not all shed at the same time, the difference in time of maturity of pistil and anthers is not so important as it otherwise would be.

AMERICANA AND NIGRA PLUMS—SEASON OF BLOOMING.

Extra Early.—Aitkin.

Early.—Cheney, Mankato, Odegard.

Medium.—Bixby, Admiral Schley, Omaha.

Medium Late.—Brackett, Wolf, Hawkeye, Stoddard.

PRUNING.

The pruning of the trees is not nearly as important in the culture of the plum as of the apple, and there is more danger of injury by over-pruning than too little pruning. While an apple tree will, as a rule, recover from severe pruning, plum trees often never recover from it. In plum culture it is much better to err on the side of under-pruning than over-pruning. The tree should be pruned when young to a symmetrical top with the main branches so disposed that there will be no bad crotches, after which very little pruning is necessary beyond cutting out dead and broken branches and thinning out where the top is very thick. Some varieties will require more pruning than others, some of the Japanese being especially rampant growers. There is a difference of opinion and a difference of results in regard to the heading back of plum trees. As a rule, very good results will be obtained without heading back. A few strong growing varieties, such as Burbank, however, have to be kept cut back to keep them within reasonable limits, and some of the Americana varieties will break down in winter unless headed back. When trees are headed in, the work should be done early in the spring, at which time the ordinary pruning can be done to best advantage. Wounds should be covered with lead paint or grafting wax.

The following note on useful fertilizers for the plum orchard has been prepared for this bulletin by the Chemist of the Experimental Farm.

FERTILIZERS FOR THE PLUM ORCHARD.

BY FRANK T. SHUTT, M.A., *Dominion Chemist.*

In common with other orchard crops, the requirements of the plum tree, as regards plant food, are chiefly nitrogen, phosphoric acid, and potash, and these essential elements must be present not only in fair quantities but in more or less readily available forms if vigorous growth and an abundance of fruit are to be expected. In addition, lime is frequently of value, since all stone fruits make a considerable demand upon the available lime of the soil, and this, owing to natural causes or exhaustive cropping, may be reduced to mere traces.

Further, all rational systems of fertilization must include the renewal, from time to time, of the vegetable organic matter of the soil, and this may best be attained when the supply of barnyard manure is insufficient, by the growth and turning under of green crops.

Nitrogen and Organic Matter.—Since these, from an agricultural point of view, are intimately associated the one with the other, the latter being the natural conservator of the former, and economy, as a rule, dictating their use in orchards in such an associated form, we may conveniently consider their application under the same heading.

Barnyard manure undoubtedly stands first on the majority of farms of enriching the soil in these constituents and improving its physical condition. In composition—and hence in value—it is extremely variable, but good average samples of fresh manure may be considered to contain: nitrogen 0.5%, phosphoric acid 0.25%, potash 0.45%. The organic matter in fresh manure is usually in the neighbourhood of 25%.

With many orchardists, however, the available supply of manure is insufficient and inadequate for the area to be fertilized, and it is for such that the system of green manuring—as by the growth and turning under of a cover crop—is especially valuable. The important role of the cover crop in the modern systems of orchard soil management is set forth in another place in this bulletin and the whole subject of increasing fertility by means of clover has been very fully explained in Bulletin No. 40 of the Experimental Farms series. It will, therefore, only be necessary here to state one or two of the principal reasons why clover or some other of the legumes should be employed for this purpose of enriching and improving the soil.

A vigorous crop of clover will contain at a moderate estimate, in its foliage and roots:—

Nitrogen	from 100 to 150 lbs. per acre.
Phosphoric acid.	“ 30 to 45 “
Potash	“ 85 to 115 “

It is evident, therefore, that by this use of clover we can with a single crop furnish the soil with as much nitrogen as would be supplied by a dressing of 10 tons of manure per acre. The greater part of this nitrogen is taken by the clover from the atmosphere, and hence is a distinct addition to the soil. The phosphoric acid, potash and lime, it is true, have been obtained from the soil, but have largely been drawn from a considerable depth and hence increase the stores of these elements in the upper layers of the soil. Moreover, the decay of the clover sets free all these important elements of plant food in forms readily utilizable by trees.

One or two words should also be added regarding the value of the organic matter so supplied. This eventually is converted into humus, the importance of which as a soil constituent it is difficult to over-estimate. It not only liberates slowly and continuously its plant food, but vastly improves the soil texture, whether it be a clay or a sandy loam. It increases the soil's power for absorbing and retaining moisture and it furnishes the best material for the development of microbial life, which, as now known, plays so important a part in increasing a soil's fertility.

There is, of course, a possibility of too great an enrichment with nitrogen by this means; this would be indicated by luxurious and excessive growth, dark-green foliage and poor fruiting. Under such circumstances, the use of organic and nitrogenous fertilizers should be discontinued.

To furnish immediately available nitrogen to young trees showing a deficiency of this element (indicated by a sparse development of foliage of a yellowish-green colour), nitrate of soda may be used as a top dressing, at the rate of 100 to 200 lbs. per acre.

Phosphoric Acid, Potash and Lime.—There is probably no better medium for supplying these elements to orchard soils than unleached hardwood ashes. These should contain from 5 to 6 per cent of potash, in the neighbourhood of 2 to 3 per cent of phosphoric acid, and from 30 to 35 per cent of lime. Not only are these constituents in wood ashes in a condition that renders them readily assimilable, but in

many parts of Canada they are cheaper than in any other form of commercial fertilizer. Fifty to eighty bushels per acre is the usual application.

Bone meal should contain from 3 to 4 per cent of nitrogen, and 20 to 24 per cent of phosphoric acid. Since its plant food is only slowly liberated in the soil, it is considered a 'lasting' fertilizer and one well adapted to orchard use. The application is usually about 300 lbs. per acre. Superphosphate will contain from 15 to 20 per cent of phosphoric acid, the greater portion of which should be in a soluble (available) condition. The application is from 200 to 400 lbs. per acre.

Potash can be obtained in the form of muriate (50 per cent actual potash) or as kainit (12 per cent actual potash); 100 to 150 lbs. of the former and 200 to 500 lbs. of the latter are the limits for ordinary application.

Voorhees, in his work on fertilizers, suggests the following mixtures for orchards: (a) one part, or 100 lbs. each, of ground bone, superphosphate, and muriate of potash; and (b) a mixture of one and a half parts, or 150 lbs., of ground bone and one part, or 100 lbs., of muriate of potash.

Soils differ so greatly as to their fertility that it is impossible to state definitely the amounts of these fertilizers that could in all cases be used with profit. From 300 to 500 lbs. of such mixtures per acre on fairly good soils would, no doubt, be ample, but on very poor soils these amounts, according to the experience of many orchardists, might be considerably increased.

Lime.—Where lime only is required, by reason of natural deficiency in this element, the excess of humus, sourness, or the refractory character of the soil, it may be applied at the rate of 1 to 2 tons per acre.

CULTIVATION.

Plum orchards should be kept under a high state of cultivation or otherwise the fruit is likely to be small. The plum requires a large amount of moisture. The surface soil should be stirred about once a week or after every heavy rain until July in order to conserve moisture and to open the soil so that the air can get in freely and assist in nitrification and help promote a thrifty growth of the trees. Trees sometimes produce good crops of plums when they are growing in sod but this is not the rule. It has been found that there is more than twice as much moisture when the ground is cultivated than where there is sod. Furthermore, the cercaria becomes very troublesome in sod orchards, and for this reason, if for no other, the orchard should be kept cultivated. Cultivation should be discontinued towards the middle of July, in order that the wood may ripen in good time and that a good cover crop may be established. Where trees are planted close and cultivation is difficult it will be preferable to mulch the trees with grass or straw than to leave them in sod, as the fruit will be larger and the trees more thrifty.

COVER CROPS.

A cover crop is a crop of some kind the seed for which is planted for the purpose of having a growing crop in the orchard after cultivation has ceased, in order to help use up plant food which has been made available during the summer and which might leach away if the soil were bare. A more important purpose still of this crop, especially in some localities, is to have a covering which will protect the roots of the trees and help to hold the snow in winter. A third important use of the cover crop is to have some vegetable matter to plough under in the spring to improve the soil both by adding humus and by adding nitrogen where leguminous plants are used.

Experiments with cover crops have been carried on rather extensively at the Central Experimental Farm for the past eighteen years, and it has been found that

the most satisfactory plant for this purpose is the common red clover, sown not later than the middle of July at the rate of 10 to 12 lbs. per acre, no nurse crop being used as a rule. The hairy vetch (*Vicia villosa*) has given good satisfaction in some places, especially in the Niagara peninsula, and has the advantage of growing very late in the autumn. This may be sown at the rate of 40 or 50 lbs. per acre with good results. The seed of the Summer Vetch or tires is much cheaper, and where it succeeds may be planted instead. Where it is not especially desired to add nitrogen to the soil, rape makes a good cover crop, sown at the rate of from 4 to 6 lbs. per acre. It is not necessary that the plant used as a cover crop should live over winter.

Sometimes it is not possible, owing to dry weather, to get a good cover crop by sowing about the middle or latter half of July. Experiments at the Central Experimental Farm were made to determine how satisfactory plants in drills two feet or more apart would prove as cover crops. The object of planting this way is that the seed may be sown early enough to produce a good crop and yet the soil be cultivated until the usual time. Soja beans, winter wheat, and hairy vetch were used for this purpose. This method is said to have given good results where it has been tried. If the soil suffers from lack of moisture in the spring, the cover crop should be ploughed under as early in the spring as possible, and cultivation begun. By doing this, much of the moisture which would otherwise be transpired through the leaves of the growing plants would be conserved.

PICKING, PACKING, STORING AND MARKETING THE FRUIT.

Experience only will teach the fruit grower the proper time to pick each variety of plum for storing or shipping, as some may be picked greener and some riper than others. As a rule, however, the European plums should be picked when they are well coloured but still quite firm. It is particularly desirable to pick those varieties which are subject to rot, a little on the green side. The Americana varieties are so juicy that they also have to be picked before fully ripe if they are to be shipped far. The Japanese varieties may be picked earlier than either of the preceding as the colour and flavour will develop well even though harvested when rather on the green side. Plums should be picked with the stems on when it is possible to do so, and on no account should they be shaken from the tree when intended for shipment. A step-ladder to stand on and a strong basket to put the fruit in are necessary. Plums are usually sold in medium sized fruit baskets, the six quart baskets being preferred. It is sometimes advisable when the fruit is especially fine to face the basket, thus giving the fruit a still more attractive appearance, but if this is done the face should represent the kind of fruit to be found lower down. Some varieties of plums will keep for several weeks in cool or cold storage. A temperature of from 36 to 42 degrees Fahrenheit has been found the best for storing this fruit.

The marketing of the plums will depend very much on the location of the orchard. The greatest care should be observed to have the fruit reach the market in prime condition, and if it is consigned to a commission merchant he should be one of recognized integrity.

Thinning the Fruit.—Until quite recent years the thinning of plums on the trees had not been practiced very extensively. Plum orchards have increased so much, however, in size and number that the competition has been keener and the prices lower, and in consequence the most advanced growers are now thinning their fruit, and find it profitable to do so, as the prices obtained for the larger fruit more than compensate for the labour required in thinning. Furthermore, if part of the fruit is picked when green it does not have to be picked when ripe, so there is little extra handling. Some varieties of plum trees bear very heavily, and this is particularly true of the Americana varieties. In consequence, the fruit when unthinned is much

smaller than it would be if there were less of it, and the drain upon the vitality of the tree from the production of so much seed shows itself before long, and it frequently happens, especially in poorly tilled and poorly fertilized orchards, that trees literally bear themselves to death.

The time to thin is after the fruit is well set and when it is fairly certain what the crop is going to be. There is always a dropping of plums during the month of June, caused principally by improper pollination, natural thinning and injury from curculio, and as soon as possible after these have thinned the crop, hand thinning should be done. The Americana plums fruit so heavily, that in an experiment conducted at the Wisconsin Experiment Station, it was found that nearly four-fifths of the crop should be removed in order to get really satisfactory results. When Americana plums were thinned as heavily as this the fruit was left about two inches apart, which was found a good distance in the experiment, but a greater distance was suggested. Experiments in thinning Americana plums at the Central Experimental Farm resulted in the thinned fruit when ripe being considerably larger than that unthinned.

Some varieties of European and Japanese plums are left as much as six inches apart by fruit growers, and at this distance profitable crops are said to be obtained of fruit of the best quality. From one-fourth to one-half the crop should be removed in thinning. The most profitable distance apart to leave the plums will be largely governed by the variety. Some varieties will not need thinning at all, and everywhere trees are bearing heavily, the scarcity and cost of labour may prevent the profitable thinning of the fruit.

PRUNES.

While prunes are not likely to be manufactured commercially on a large scale in Canada, it will be of interest to readers of this bulletin to know something of how they are made.

A prune is a dried plum. Some varieties of plums, owing to the small proportion of juice, are especially adapted to be manufactured into prunes. There are several varieties, somewhat like one another, known as the Prune group. Among these may be mentioned the Italian Prune (Ellenberg), German Prune, and Rayne. California and Oregon manufacture most of the prunes made in America. The dry districts of British Columbia are very suitable for the production of prune plums, but it has not been found profitable to manufacture them for several seasons. The price of labour and fuel are too high, and there is a large proportion of moisture in the plums than in those grown in California or Oregon. In California a large proportion of the prunes are made by drying them in the sun. Another method is to dry them in evaporators. The plums are not harvested until they are ripe enough to fall to the ground. They are graded first of all, to ensure uniformity in curing and then are either dipped in lye for about a minute or pricked by needles in a pricking machine in order to allow the moisture to escape. After this they are rinsed, and then subjected to a temperature of 120° F. to 140° F. at first and then to temperatures ranging from 160° F. to 180° F., the temperature being lowered as the prunes are being removed. It requires from one to four days to dry them, depending partly on how large the plums are. If the plums are not thoroughly cured they are liable to mould and ferment. Considerable experience is necessary to produce a good grade of prunes. After they have gone through the evaporator they are piced in order that they may sweat, which takes from one to three weeks. After this they are graded and packed.

CANNING AND PRESERVING PLUMS. MS.

All good housewives are familiar with the way to can and preserve European plums, but the American varieties require a different treatment in order to get the

most satisfactory results. Some varieties are thick in the skin, while others are more or less astringent, and for these reasons special methods are employed to make the fruit more palatable. The skin of many varieties may be readily removed by pouring boiling water on the fruit and then peeling it. Preserves made from fruit thus treated is very good. The skin of some varieties will not break down in cooking, and peeling is especially desirable in such cases.

American plums are not as good for canning as the European, and, if they are canned, are best for making pies.

The following eight varieties of American plums were preserved, in order to learn what differences there were in these kinds for this purpose:—Bixby, Cheney, New Ulm, Mankato, Cottrell, Bouncer, American Eagle, Silas Wilson. These were preserved with and without the skin. In nearly every case the peeled fruit made the best preserves. The Bixby, however, cooked with the skin on was the best of all those tested, having a better flavour than any of the others both peeled and unpeeled. With some varieties 1 lb. of sugar to 1 lb. of fruit was found to make the preserves too thick; on the other hand, $\frac{3}{4}$ lb. sugar to 1 lb. of fruit, in some cases did not make them quite sweet enough. None of the varieties tested were found markedly astringent, though most of those cooked with the skins had a flavour, not unpleasant, but peculiar to the American plums. The proper proportions to be used in preserving each variety will have to be learned by experience. The following are some of the notes made on the preserves, arranged in descending order of merit:—

Bixby.—1 lb. sugar to 1 lb. fruit, unpeeled; good colour, good flavour, skin tender.

Cheney.—1 lb. sugar to 1 lb. fruit, peeled; attractive amber colour, good flavour.

Cottrell.—1 lb. sugar to 1 lb. fruit, peeled; amber colour, sweet, rich, good.

New Ulm.—1 lb. sugar to 1 lb. fruit, peeled; attractive, pale, good flavour.

Mankato.—1 lb. sugar to 1 lb. fruit, peeled; pale, clear amber, good flavour, but too sweet.

Bouncer.—1 lb. sugar to 1 lb. fruit, peeled; attractive, but too thick, good flavour.

Bixby.—1 lb. sugar to 1 lb. fruit, peeled; too sweet, not as good as unpeeled.

Cottrell.— $\frac{3}{4}$ lb. sugar to 1 lb. unpeeled fruit; attractive colour, not as good as peeled.

Silas Wilson.—1 lb. sugar to 1 lb. fruit, peeled; dull amber colour, good, but too rich.

Bouncer.— $\frac{3}{4}$ lb. sugar to 1 lb. fruit, unpeeled; attractive colour, good flavour, but skin tough.

Mankato.—1 lb. sugar to 1 lb. fruit, unpeeled; fairly attractive colour, but too sweet.

New Ulm.—1 lb. sugar to 1 lb. fruit, unpeeled; attractive colour, good flavour, but tough skin.

Silas Wilson.—1 lb. sugar to 1 lb. fruit, unpeeled; good flavour, but skin tough.

American Eagle.— $\frac{3}{4}$ lb. sugar to 1 lb. fruit; deep red, rather tough skin, medium quality.

Cheney.—1 lb. sugar to 1 lb. fruit, unpeeled; unattractive colour, but skin breaks well.

The following recipes for canning and preserving American plums, published by the late Prof. Goff, of the Wisconsin Experiment Station, were consulted and in part adopted in making the preserves:—

“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 rich 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 coloured 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 flavouring other fruit. 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.—De Soto, 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 coloured. 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. In 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.

Another recipe. *Plum Preserves.*—Take equal weights of fruit and sugar, place in stone jar a layer of fruit, then a layer of sugar, alternating thus until quantity desired is reached. Let stand over night; in the morning drain off the syrup that will have formed, into a porcelain kettle, place same over a 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 for a few minutes longer until it thickens, pour it over the fruit, seal or tie them up.

The following recipe for preserving Cheney plums which would, no doubt, be a good one for other varieties, was furnished the writer by Mrs. Dora M. Robson, Ottawa, Ont., whose jam made from the Nigra or Americana plums was the best we have ever eaten.

"The plums were not quite ripe, being partly red and partly yellow. No ripe or all red plums were used, and to this is attributed part of the success of this formula. The fruit was weighed and put into a preserving kettle at the back of the range, a few of the plums being crushed. The fruit was left here until the slow heat drew the juices out, then the preserving kettle was drawn forward and the plums cooked slowly until they were thoroughly done. One pound of heated sugar was then added to one pound of the fruit, including stones and skin. The fruit was then left on the range just long enough to be sure all the sugar had melted and boiled up once, probably about three minutes. No water was put with the plums."

The skin of the plums in the jam had apparently dissolved, and one would scarcely know but that the skin had been removed before preserving, which was not the case.

Another good native plum jam was sent to us by A. E. Wilson, Clarence, Ont., probably about three minutes. No water was put with the plums."

SPRAYING.

It should not now be necessary to point out the advantages of spraying to control insect enemies and fungous diseases, as so much has been said and written on this subject. The beneficial results where spraying has been thoroughly done and the conditions have been favourable have also been so marked that the advantages of spraying need no further proof. It is, however, found necessary to continually advocate this practice. Fruit growers become discouraged after an unfavourable season for spraying, when the conditions are favourable for the development of fungi and rainy weather prevents the application of mixtures altogether or which if applied are washed off by the rain almost as soon as the work is done. With an experience of this kind fruit growers are often inclined to stop spraying and let Nature take her course. It sometimes happens, however, that the mixtures and solutions have been improperly made or the wrong mixture has been used to destroy a certain insect or disease and the fruit grower wonders why he does not get good results. It is more frequently the case, however, that the spraying is not thoroughly done. The object of spraying is to cover the leaves, fruit and bark with the fungicides and insecticides in order that the latter may destroy the insects or diseases which come in contact with them, and in order that the materials may be distributed evenly over the tree it should be forced out of the pump in a fine mist-like spray, to accomplish which it is necessary to have a good nozzle. If the trees are not covered with the mixtures and solutions at all times when the insects and diseases may be affected by them, the trees and fruit may be injured just in proportion to the thoroughness and continuity with which the work is done. It is, therefore, important that every fruit grower should know the life-history of every insect and disease which injures his trees or fruit, in order that he may know the best time to spray for each enemy. A spraying calendar has been published at intervals at the Central Experimental Farm, in which are given full directions for the preparation of the different formulae recommended and the time when each spraying should be made. These calendars are of great value to fruit growers and should be in the hands of everyone. Although a certain number of applications are recommended for the prevention and control of the different insects and diseases referred to, it may be necessary to make more. If, for instance, a heavy rain came on, say, within 24 hours after a spraying had been made, which washed most of the material off, another application should be made as this might be the very time when the disease or insect which it is desirable to control is making the greatest headway. It is often too late, also, when a spraying for a certain purpose is made, and labour and material are thus practically lost. Spraying is rather expensive when there is a large orchard to cover. It is, therefore, very important that the right mixtures and solutions are used; that they are prepared properly and applied thoroughly, constantly

and at the right time, and that the trees be kept covered with the mixtures and solutions during all the time when injury is likely to occur.

As the mixtures and solutions may have very injurious effects on the trees if improperly made, and as they may prove of little or no value if not applied at the right time, the formulae recommended in this bulletin should be closely followed.

DISEASES OF THE PLUM.

Ripe Rot, Brown Rot, *Sclerotinia (Monilia) fructigena*.—The ripe rot causes serious injury to the plum crop every year in some parts of Canada. Its spread is so rapid that a fine crop of plums is soon rendered almost worthless. The disease is usually first noticed on the ripening fruit by a discoloration of the skin, which becomes brown or black and is soon covered by small pustules or clusters of spores, the fruit rotting and falling to the ground. If the weather is damp and sultry the conditions are most favourable to the rotting of the fruit, and a large proportion of the crop will be destroyed in one day. Sometimes the disease does not show when the fruit is picked, and infected fruit is shipped and rots before reaching its destination, causing serious loss to shipper or buyer. This disease is often not recognized in the spring, at which time it attacks the twigs, fruit spurs and blossoms, causing them to blacken and wither. At this time, also, there is often an exudation of gum from the twigs and spurs, brought about by this disease.

Remedies.—The ripe rot fungus spreads by means of spores which germinate early in the spring and penetrate the twigs from the leaf and flower buds on which they alight. In order to destroy as many of these spores as possible all diseased fruit should be gathered and burned whether it is on the ground or on the tree. This fruit harbours myriads of spores, which endure the winter and are capable of infecting the trees the following spring.

The trees should be thoroughly sprayed in time to destroy the spores before they germinate in the spring. The first spraying should be made with poisoned Bordeaux mixture or lime sulphur wash, shortly before the flower buds open. This is an important spraying, and should be very thorough. After the trees have bloomed they should be thoroughly sprayed again with poisoned Bordeaux mixture, and again in about two weeks. The trees should also be sprayed with ammoniacal copper carbonate when the fruit is beginning to ripen. This will destroy the spores which appear in great numbers on the mature plums, and not discolour the fruit. Plums which touch one another on the tree give very favourable conditions for the spread of the disease from one fruit to another. Being close together, moisture is retained on the skin and the spores which may be on one fruit germinate readily and soon infect the next, and thus the disease spreads rapidly. Thinning the fruit would make the conditions much less favourable for the development of the disease. All discoloured or dead wood should be cut out and burned in the meantime. If spraying is thoroughly done the injury from this disease should be much lessened; but sometimes, unfortunately, the results do not seem to justify the expenditure in endeavouring to control this disease by spraying.

BLACK KNOT (*Plowrightia morbosa*).—The black knot is more feared by some fruit growers than almost any other disease. Its development appears to them mysterious and its control impossible. Many orchards have been completely ruined by the black knot, which spreads very rapidly once it has gained a foothold in the orchard. If trees are treated properly and well looked after from the outset it may be kept in check and even eradicated altogether, if infection does not take place from neighbouring orchards or from planting trees from infected nurseries.

The black knot is a fungus which spreads by means of spores. A spore is blown through the air and alights in the axil of a leaf, on a spur, or on some other part of

the tree where it can get a resting place. When conditions are favourable the spore germinates, penetrates the tree and grows in it. In the spring yellowish swellings appear on the branches, the first visible indication of the disease, and during the months of May and June become darker in colour with a velvety surface which is caused by innumerable spores which cover the exposed part of the lump or knot. These spores are soon blown away and alight on other branches and trees. These germinate and penetrate the tree as already described and new knots develop in time from them. A second crop of spores is produced in autumn or early winter, but these are not liberated from the knot until the latter part of the winter or early in the spring when they are distributed, and alighting on the trees germinate as the others. The mycelium is not all exhausted by the production of the knots in spring, but is capable of producing more from the same knot the following year. The disease is also liable to be carried from one orchard to another, which makes it difficult to control sometimes. To fight a disease which is provided with such sure means of reproduction and dissemination requires watchfulness, thoroughness, and continuous effort until it is eradicated.

Remedy.—If the trees are already badly affected with this disease the best plan is to cut them down and burn them. If moderately affected, the knots should be removed and burned and the orchard thoroughly cultivated and sprayed. Vigorous trees are not so subject to the disease as those making little growth, and vigorous trees will recover more quickly from wounds made by removing the knots.

As the early spores appear in the latter part of spring or early in summer, the knots should be removed as soon as possible after they appear. When they are on small branches these should be cut off three to six inches below the affected part and burned immediately. When this is not practicable without badly injuring the tree the knot should be removed with a sharp pruning knife and the wound given a thorough painting with pure kerosene, after which it should be covered with grafting wax or lead paint. Great care should be taken to prevent the kerosene running on the branch as it may injure it. Old knots which cannot be removed with the knife should get a good painting with kerosene. By putting some colouring material in the kerosene, one can more readily see when a wound has been painted well. All knots should be burned. The treatment already described is only for the knots. Unless the life history of this disease is known a fruit grower might imagine that if the knots were removed as they appeared that it was all that was necessary. This might be all, if the knots were removed before the spores were formed and distributed, but if one knot were missed it would be capable of producing myriads of spores which would soon re-infect the orchard.

The advantages of spraying with Bordeaux mixture were clearly demonstrated in an experiment conducted at the Cornell Experiment Station, the results of which were published in Bulletin No. 81 of that station. It was found that the number of knots was reduced from 2,000 to 165 by spraying.

A large proportion of the late spores which are exposed in late winter or early spring and are ready to germinate when conditions are favourable, would probably be destroyed by an application of lime sulphur wash or Bordeaux mixture when the trees are still nearly dormant in the spring. A second spraying of poisoned Bordeaux mixture should be made just as or before the buds are breaking, which would also be a good time to spray for other diseases of the plum and for insects, and a third spraying should be made at the time when the knots are at the velvety or spore producing stage in order to destroy these spores. A fourth application would also probably be well worth the expense. Every precaution should be taken to prevent the spread of this disease which has destroyed so many plum trees in Canada.

SPOT OR BLIGHT OF THE NATIVE PLUM (*Cladosporium carpophilum*, V. Thumen).—The almost complete absence of native plums during recent years in the Ottawa district and elsewhere in eastern Ontario and the province of Quebec, is due in a

large measure or almost entirely to the disease known as blight. The fruit forms and reaches more than half its size, but colours prematurely. When affected by the disease it shrivels and falls to the ground without ripening. If the fruit is examined when half grown or later, small pale green or yellow patches will be noticed. These gradually enlarge until finally they are about half an inch in diameter, at which time the blotches are darker in colour, of more irregular outline and are raised in the skin. The Americana plums are not, as a rule, seriously affected with this disease, which is principally confined to the Nigra varieties.

Remedy.—The fungus is nearly related to the apple spot and can be satisfactorily treated in much the same way. The trees should be sprayed with Bordeaux mixture just after the blossoms fall, again two weeks later, and a third two weeks after the second application. It is also advisable to spray a fourth time with ammoniacal copper carbonate just when the fruit is beginning to colour. The native varieties ripen early, and if the ordinary Bordeaux mixture were applied the last time, the fruit might remain stained. The ammoniacal copper carbonate does not leave a noticeable stain on the fruit. This remedy has been very satisfactorily used by one grower in particular near Ottawa who has thus been able to grow native plums very profitably. The Americana varieties may be top grafted on the native ones with the result that there will be less disease, as the latter are not as much affected as the native. All other plum trees not looked after or bearing poor fruit should be burned; also all fruit which is diseased.

SHOT-HOLE OR LEAF-SPOT (*Cylindrosporium padi*).—The first indications of this disease are small, yellowish spots with reddish margins, which appear on the young leaves. These spots increase in size and finally reach a diameter averaging about one-eighth to one-sixth of an inch. When fully grown, the central part dries up and drops out, leaving a clean cut around the margin, very suggestive of a shot-hole, after which the disease is named. When these spots occur in large numbers, as they frequently do so much of the leaf is destroyed that it drops prematurely. The early dropping of the leaves prevents the fruit, twigs and buds reaching their full development, and on this account causes serious injury where the disease is troublesome. To control this disease Bordeaux mixture is recommended, the first spraying to be made about ten days after the blossoms fall; the second, three weeks later, and the third, three or four weeks after the second. At the Central Experimental Farm, Americana and Nigra plums have been thoroughly sprayed with Bordeaux mixture from three to five times, without satisfactory results. Some varieties are more susceptible to the disease than others.

PLUM POCKETS (*Exoascus Pruni*).—The disease of plum known as 'plum pockets' does not cause widespread injury, but in some places does occasion considerable loss. The mycelium of the fungus which causes the pockets lives year after year in the same tree, and thus it is not necessary for a tree to be infected by the spores every year in order to perpetuate the disease. The fruit is affected soon after the trees have blossomed and is indicated by the unnatural swelling and bladder-like appearance of the fruit and by its unusual yellow colour. When the spores of the disease which has been working inside the fruit appear on the surface they give the pockets a gray appearance. Later on, the pockets turn almost black and fall to the ground. The leaves and twigs are also noticeably affected with this disease, the former becoming curled and unhealthy looking and the twigs swelling unnaturally. There is no known effective remedy for this disease, but it will probably be much lessened if the affected parts with the pockets are cut off and burned. At the Central Experimental Farm there is no trouble with this disease where the trees are sprayed with Bordeaux mixture, and we would suggest as the most effective spray, that before the flower buds open the trees be sprayed with Bordeaux mixture or lime-sulphur wash.

GUMMOSIS.—The exudation of gum from plum trees, which is known as gumming or gummosis, is quite common in plum orchards. It has been given careful study and

is not attributed to any one disease. The conclusion reached is that any weakening of the tree by severe pruning, by winter, by injury to the trunk or branches, or by diseases or insects of different kinds will cause gumming. It is often very noticeable when trees are affected with the Ripe Rot fungus. It appears to follow any breaking or injury to the wood tissue.

MICE.—Mice often girdle the trees in the orchard in winter, especially when it is in sod or when there is rubbish lying about in which they like to harbour. Everything in the way of rubbish should, however, be removed before winter. Their depredations may be prevented either by wrapping the trunks with building paper in autumn and banking up the earth about the base to the height of about a foot; by encircling the trunk with fine galvanized iron netting; or by using the veneer protectors used to prevent scalding. Where the latter are used the earth should be banked up a little at the base to prevent the mice from going underneath.

If a tree is girdled by mice it usually dies. If, however, as soon as the injury is noticed, the wound is cleaned and covered with grafting wax and wrapped with cloth so that the air is excluded and the wood prevented from drying out, the sap which rises through the soft wood will continue to do so and returning through the inner bark, growth will be made all around the upper part of the wound, and if the latter be not too large there is a chance of its healing over. If, however, the wood becomes dry before the bandage is put on it will almost certainly die. When the wax and bandage are applied the tree should be headed back considerably to lessen the amount of transpiration of moisture, as there will not be as much sap rise as if the tree were uninjured. Girdled trees are sometimes saved by connecting the upper and lower edges of the girdle with scions, which are inserted all around the trunk. Mice may be destroyed in the orchard by using a mixture of one part by weight of arsenic with three parts of corn meal. To use this safely nail two pieces of board each six feet long and six inches wide together so as to make a trough. Invert this near the trees to be protected and place about a tablespoonful of the poison on a shingle and put it near the middle of the run, renewing the poison as often as is necessary.

INSECTS MOST INJURIOUS TO THE PLUM.

The insects which affect the plum and other fruits may be divided into two classes according to the nature of their mouth parts. Those of the first or larger division, Biting Insects, are furnished with mandibles, or biting jaws, by means of which they consume the substance of their food, as caterpillars, beetles, &c. The second class, Sucking Insects, have, instead of mandibles, a beak or tube, by means of which they suck up their food in a liquid form from beneath the surface, as the true bugs, plant-lice, &c. As regards the insects of the first class, all that it is necessary to do is to place on the food plant some poisonous material which will be eaten with the food. With the second class, however, this would be useless, for they would push their beaks through the poisonous covering on the outside of the food plant and extract from the interior the juices upon which they live. For this class, therefore, some substance must be used which will kill by mere contact with their bodies.

INSECTICIDES AND FUNGICIDES.

The following are the formulæ of remedies recommended:—

I.—ARSENATE OF LEAD.

For Biting Insects.

Arsenate of Lead	3 lbs.
Water	40 gallons.

II.—PARIS GREEN.

For Biting Insects.

Paris green	1 lb.
Lime (fresh)	1 lb.
Water	100 gallons.

For dry application.—1 lb. Paris green with 50 lbs. flour, sand plaster, slaked lime or any other perfectly dry powder.

III.—KEROSENE EMULSION.

(RILEY-HUBBARD FORMULA.)

For Scale Insects and Plant-lice.

Kerosene (coal oil)	2 gallons.
Rain water	1 gallon.
Soap	½ lb.

Dissolve soap in water by boiling; take from fire, and, while hot, turn in kerosene and churn briskly for five minutes. To be diluted before use with nine parts of water.

IV.—WHALE-OIL SOAP.

For scale-insects (young)	1 lb. in 5 gallons water.
For aphid	1 lb. in 6 gallons water.

V.—TOBACCO AND SOAP WASH.

For Plant-lice or Aphid.

Soak in hot water for a few hours 10 lbs. of tobacco leaves (home grown will do); strain off, and add 2 lbs. of whale-oil soap. Stir until all is dissolved, and dilute to 40 gallons. Apply early and two or three times at short intervals.

VI.—BLACK LEAF 40.

For aphid	1 ounce in 6½ gallons water.
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VII.—POISONED BORDEAUX MIXTURE.

For Fungi and Insects on Plum-trees.

Copper sulphate (bluestone)	3 lbs.
Lime (fresh)	4 lbs.
Arsenate of Lead (or Paris Green 4 ounces)	3 lbs.
Water (1 barrel)	40 gallons.

Dissolve the copper sulphate (by suspending it inside a wooden or earthen vessel containing 4 or 5 or more gallons of water). Slake the lime in another vessel. If the lime, when slaked, is lumpy or granular, it should be strained through coarse sacking or a fine sieve. Pour the copper sulphate solution into a barrel, or it may be dissolved in this in the first place; half fill the barrel with water, add the slaked lime, fill the barrel with water and stir thoroughly. Add the poison and it is then ready for use.

Stock solutions of dissolved copper sulphate and of lime may be prepared and kept in separate covered barrels throughout the spraying season. The quantities of bluestone, lime and water should be carefully noted.

VIII.—COPPER SULPHATE SOLUTION.

For Fungi.

Copper sulphate (bluestone)	1 lb.
Water	25 gallons.

As soon as dissolved it is ready for use. *For use only before the buds open.*

IX.—AMMONIACAL COPPER CARBONATE.

For Fungi.

Copper carbonate	5 oz.
Ammonia	2 quarts.
Water (1 barrel)	40 gallons.

Dissolve the copper carbonate in the ammonia. The ammonia and concentrated solution should be kept in glass or stone jars tightly corked. It is ready for use as soon as diluted with the 40 gallons water. To be used when Bordeaux cannot be applied on account of staining the fruit.

X.—LIME-SULPHUR WASH.

For San José Scale and Fungous Diseases.

Lime	20 lbs.
Sulphur, powdered	15 lbs.
Water to make	40 gallons.

Slake the lime with only enough water to do it thoroughly. Add the sulphur by dusting it over the lime while slaking; stir well and boil for at least an hour, adding only so much hot water as is necessary for easy stirring. When thoroughly cooked, strain through sacking, and apply hot. For use when there is no foliage.

When concentrated lime-sulphur wash is used it should be diluted for use, when there are no leaves on the trees, to 1 gallon of the concentrated wash to about 9 gallons of water varying with the density of the wash. For use when there is foliage the lime-sulphur should be diluted to 1 gallon of the concentrated wash to 35 to 40 gallons of water. A hydrometer may be used to determine the density of the wash. Arsenate of lead is the best poison to use with the lime-sulphur wash. Arsenite of lime will injure foliage.

THE WORST ENEMIES OF THE PLUM TREE.

ATTACKING THE FOLIAGE.

1. The EYE-SPOTTED BUD-MOTH (*Tractocera ocellana*).—Small, dark brown caterpillars, $\frac{1}{4}$ of an inch in length, with black heads and collars, destroying the buds as they just unfolding and later attacking the leaves, two or three of which they attack together, feeding inside. They also sometimes bore down the centre of the twig. *Remedy*:—Spray early with arsenate of lead, 3 lbs. to 40 gallons, or a strong Paris green wash (Paris green 1 pound, fresh lime 1 pound, water 100 gallons).

2. The CIGAR CASE-BEARER (*Coleophora fletcherella*).—Small orange-coloured caterpillars with black heads, encased in brown leathery cigar-shaped cases, which they carry about with them. They pass the winter as caterpillars on the twigs, and cluster around the opening buds, injuring the foliage and flowers. *Remedy*:—Spray early with the wash mentioned under No. 1 above, or with kerosene emulsion (Formula III.).

3. **TENT CATERPILLARS** (*Malacosoma*).—Two kinds attack the foliage of the plum as well as many other trees. The Apple Tent Caterpillar forms a tent in the fork of two twigs; the Forest Tent Caterpillar does not make a tent but spins a flat mat of silk on the side of a branch or on the trunk; to these resting places the young caterpillars resort when not feeding. The mature insects are thick-bodied, reddish-brown moths expanding from 1 to about 1½ inches across the wings, which are crossed obliquely by two bands. These bands are pale in the first named, but dark in the moth of the Forest Tent Caterpillar. During July the females lay rings of about 200 eggs on the twigs of the trees, in which state the insect passes the winter. *Remedies*:—Collect and destroy the egg clusters during the winter. Spray the trees with poison (Formula I. or VII.) directly the young caterpillars are noticed. All tents should also be cut off and destroyed early before the leaves hide them.

4. **PLANT-LICE OR APIDDES** (*Aphis prunifolia*).—In appearance and habits much the same as the Apple Aphis, clustering on the underside of leaves, sucking out the juices and causing the leaves to become wrinkled and twisted. *Remedies*:—Whale-oil soap 1 lb. in 6 gallons of water (Formula IV.), or tobacco and soap wash (Formula V.), or kerosene emulsion (Formula III.), or Black Leaf 40 (Formula VI.). Begin to spray when the plant-lice are first noticed. Once the leaves have curled it will be almost impossible to reach them all.

5. **THE PEAR-TREE SLUG OR CHERRY-TREE SLUG** (*Eriocampoides limacina*).—In June and August, slimy, greenish-brown, slug-like caterpillars, ½ inch long, feeding on the upper surface of the leaves, often doing considerable damage to plum trees. *Remedies*:—Spray with arsenate of lead, a weak solution of Paris green, or dust with freshly slaked lime, or Paris green diluted with 50 times its weight of some dry powder.

6. **PLUM LEAF CATERPILLARS**.—There are other kinds of leaf-eating caterpillars which occasionally occur in sufficient numbers on the foliage of plum trees to do serious injury. *Remedy*:—Spraying regularly with Formula VII. will prevent injury from these insects.

ATTACKING THE WOOD.

7. **The SHOT-BORER** (*Xyleborus dispar*).—Small blackish beetles, which bore into the trunks and limbs, causing serious damage in apple and plum orchards. *Remedy*:—Wash the trees liable to attack three times, early and late in June and once in July, with the following:—Soft soap, 1 gallon; water, 3 gallons; carbolic acid, ½ pint.

OCCURRING ON THE BARK.

8. **The SAN JOSÉ SCALE** (*Aspidiotus perniciosus*).—Minute, almost circular scale-insects, one-thirtieth of an inch wide, shaped like an inverted saucer, with a depressed ring around a central point; inside this ring, black or dark coloured. This very inconspicuous insect when in small numbers is easily overlooked, but when abundant gives to the bark a dirty, scurfy and grayish colour, as though dusted with ashes. *Remedy*:—Lime-sulphur wash sprayed on the trees when there are no leaves in the proportion of about 1 gallon concentrated lime sulphur to 9 gallons of water, has proved the best remedy.

9. **The NEW YORK PLUM SCALE** (*Eulecanium cerasifex*).—Conspicuous, dark brown, hemi-spherical scales, about ¼ of an inch long by ⅓ of an inch wide, occurring at all times of the year, clustered along the small branches, particularly along the lower sides. The presence of this enemy upon a plum tree may be detected especially in July and August and also in the spring, by the filthy black condition of the bark due to the growth of a fungus upon the copious deposit of honey-dew which is emitted by

the young scale insects during the time of their growth. *Remedies*.—Spray the trees during the winter with kerosene emulsion (Formula III.) diluted with four parts of water, or with the whale-oil soap solution (Formula IV.).

ATTACKING THE FRUIT.

10. The PLUM CURCULIO (*Conotrachelus nenuphar*).—Small, rough, grayish beetles about $\frac{1}{2}$ of an inch long. The females, in the operation of egg-laying, make upon the sides of plums small crescent-shaped marks, with a single hole in the centre of each. An egg is laid in the central spot, from which hatches a white grub; this soon destroys the fruit. *Remedies*.—(1) The mature beetles feed in early spring upon the unopened buds and afterwards upon the young leaves, and may be reached by spraying the trees before the buds open with arsenate of lead (Formula I.) or Paris green (Formula II.), repeating this as soon as the fruit has formed, and spraying ten days later with the poisoned Bordeaux mixture (Formula VII.). (2) The beetles are sluggish in the early morning and drop from the trees if a sudden jar be given to the trunk. This jarring, if repeated every day or two over a sheet or other receptacle, will be the means of greatly lessening the numbers of the mature insects. The beetles drop readily and lie quietly for some time, when they can be easily collected and destroyed.

NOTE.

The operation of 'spraying' consists of applying liquids by means of a force-pump and spraying nozzle, with such force as to break up the liquid so thoroughly that it falls upon the plants treated as an actual mist or spray. The word 'spraying,' however, to many who endeavour to practise this operation, has still little more meaning than doing something in any sort of a way, to fruit trees with a spraying pump. Such terms as 'sprinkling' and 'showering' are inaccurate for the operation here intended. Unfortunately, much of the so-called spraying as usually carried out, could more accurately be designated as sprinkling or showering, which describe a much less careful and less even distribution of liquids.

The above information on insects was prepared for the first edition of this bulletin by the late Dr. James Fletcher. Changes in the formulæ recommended have been made where necessary.

