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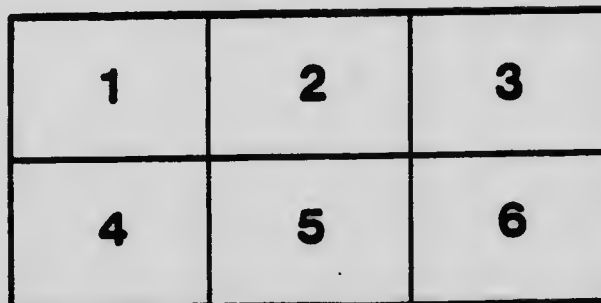
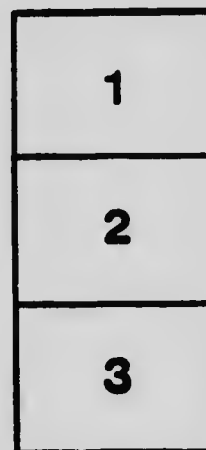
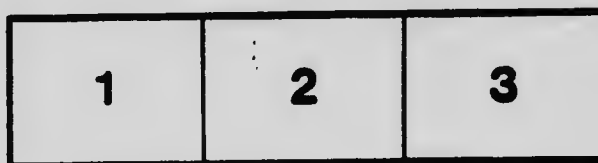
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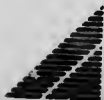
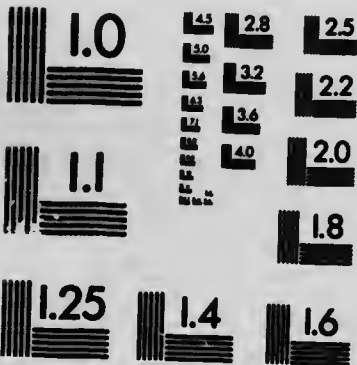
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# Ontario Department of Agriculture

## FRUIT BRANCH

### Plum Culture in Ontario

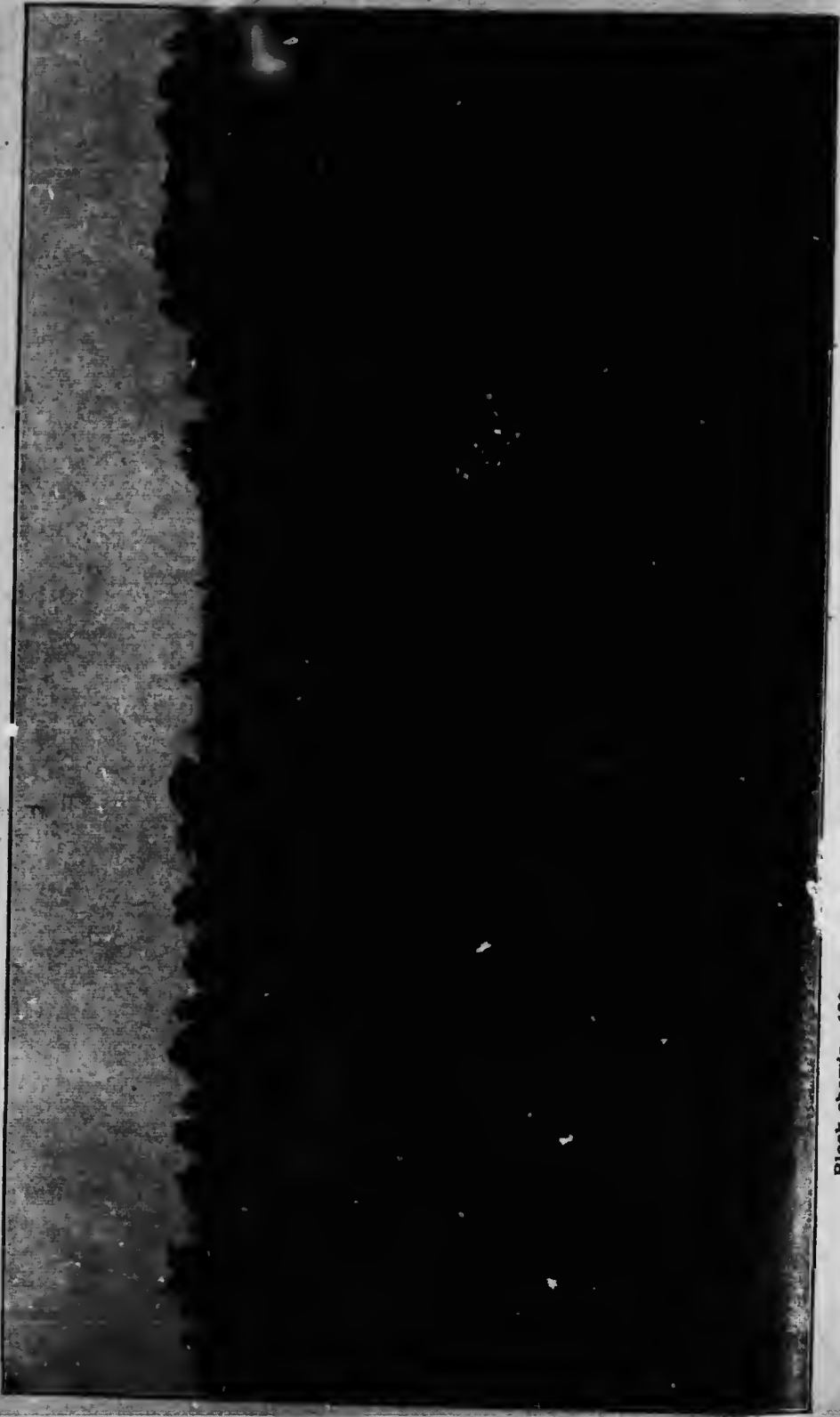
F. M. CLEMENT.

Of the important tree fruits plums and pears have received least attention at fruit meetings, and in the agricultural press during the last few years. Apples are worth a great deal more money to the Province, and as a consequence are more generally popular, and take the leading place in the discussions. Peaches, though adapted commercially to limited areas in the Province, have through the energy and organization of the growers been boosted excessively in tender fruit sections. Even in cherries, of late, a few are quoting the large profits that have been made and are to be made from them, and the plantings are rapidly increasing. 1914 crop and low prices will, however, check this advance for a time. Pears have begun to grow in popularity because of the more gradual upward trend of prices and the more successful control of blight, but plums at date of writing are not holding their own in the Province, and except for a few growers who are making a success of them the interest is dead. Prices are from medium to low, few trees are being planted, their care is incidental, or secondary, and they are almost everywhere considered a sideline, not a specialty. The purposes of this Bulletin, therefore, are:

1. To sum up the status of the industry as a whole.
2. To study causes of the lack of interest.
3. To study the cultural methods of the most successful growers.
4. To describe a few varieties that are important commercially.
5. And to offer suggestions for future development.

#### (1) PRESENT STATUS OF THE INDUSTRY.

The census returns for 1911 show a decrease in the number of trees in the Province. In 1901 Ontario was credited with 1,685,719 trees. Of this number 99,091 were bearing and 686,628 were non-bearing. In 1911, the last year for which the census figures are available, Ontario was credited with 1,124,022 trees, 67,827 of which were bearing and 356,195 were non-bearing. The number of bearing trees had decreased by 330,433, or 48.1 per cent., while the total decrease was 561,697 trees, or 33.3 per cent. The greatest decrease is in the non-bearing



Block showing 130 var ... d in, 1906 and later at the Experimental Farm, Vineland.

stock, for during the last decade conditions do not seem to have been such that growers cared to take a chance on future markets. The yields in the census years above mentioned were 337,108 bushels and 331,278 bushels, or approximately a million baskets each year. The latter figure is, however, no indication of the decay or growth of the industry, as the two seasons may have been very variable. They indicate, however, a fair average yield.

Compared with this, pears have decreased by 105,253 trees, or 12.4 per cent.; apples have decreased by 1,775,362 trees, or 18.6 per cent.; vineyards have increased by 3,629 acres, or 66.7 per cent.; small fruits have increased by 5,824 acres, or 71.7 per cent.; cherries have increased by 151,389 trees, or 22.1 per cent.; and peaches have increased 399,356 trees, or 31.1 per cent. The total number of fruit trees in the Province has decreased by 1,835,118, or 13 per cent., or about 2-5 the per cent. decrease in the plums.

The question now arises as to whether the consumption of plums has fallen off, or if the consumption has not fallen off, since the amount produced has not decreased to any great extent, who has supplied the plums for the ever-increasing number of persons in Canada who desire this fruit.

Prunes should in part be considered plums, and in the following table prunes and plums are considered one fruit, because as the consumption of dried plums and prunes increases the consumption of fresh plums must decrease.

Following are the imports of "prunes and plums, dried unpitted" for consumption in Canada as furnished by the Customs Department at Ottawa:

Year.	Quantity.	Value.
1895 .....	2,798,256 lbs.	\$75,232.00
1900 .....	4,013,089 "	156,178.00
1905 .....	6,034,815 "	147,637.00
1910 .....	10,145,969 "	384,127.00
1913 .....	8,942,599 "	466,868.00
1914 .....	10,592,068 "	550,175.00

The marked increase in the consumption of dried plums or prunes to me indicates quite clearly that some other fruit has suffered a decrease in consumption, and that the consuming public is willing to pay for a good article that may be had at a reasonable price at such times of the year as desired.

During the same period of years the imports into Canada of "fresh plums" for consumption, as furnished by the Customs Department, were as follows:

Year.	Bushels.	Value.
1895 .....	25,417	\$22,638.00
1900 .....	38,854	38,849.00
1905 .....	53,593	66,473.00
1910 .....	69,529	158,756.00
1913 .....	151,650	267,563.00

These figures show a steady increase and seem to indicate that the plum growers of this country have not been awake to their opportunities. Or, as mentioned previously, it may be that the consumer prefers the imported product because of the uniformity and neat packing of the fruit.

For the years 1911, 1912 and 1913 the importations by months of fresh plums for consumption in Canada are as follows:

Months.	Bushels.	Value.
April, 1911 .....	....	....
May .....	....	....
June .....	2	\$22.00
July .....	11,014	41,816.00
August .....	28,957	78,192.00
September .....	32,254	85,008.00
October .....	17,922	32,266.00
November .....	1,006	1,905.00
December .....	22	22.00
January 1912 .....	....	....
February .....	1	6.00
March .....	2	20.00
	<hr/>	<hr/>
	97,246	\$239,256.00
April, 1912 .....	10	\$10.00
May .....	....	....
June .....	23	151.00
July .....	20,073	46,636.00
August .....	42,802	89,711.00
September .....	74,452	111,332.00
October .....	11,799	17,521.00
November .....	825	1,178.00
December .....	301	425.00
January, 1913 .....	....	....
February .....	....	....
March .....	349	606.09
	<hr/>	<hr/>
	151,650	\$267,580.00
April, 1913 .....	3	\$23.00
May .....	....	....
June .....	1,430	6,220.00
July .....	25,519	91,435.00
August .....	30,017	95,446.00
September .....	50,407	99,142.00
October .....	14,403	21,019.00
November .....	1,729	3,100.00
December .....	2	7.00
January, 1914 .....	....	....
February .....	3	24.00
March .....	8	35.00
	<hr/>	<hr/>
	123,531	\$316,560.00

Our heaviest shipping months, or when Ontario growers are putting most plums on the market, are August, September and October. At the same time the imports into Canada are heaviest during these months, and this in the face of a duty of thirty cents a bushel.

From the foregoing figures and statements it is possible to draw certain conclusions.

(1) Plums and prunes grown in Canada show a marked decrease in number of trees, value and interest during the last few years.

(2) The imports of fresh plums into Canada show a steady increase during the same period of time.

(3) The imports of dried plums and prunes into Canada show a marked increase during the same period of time.

Therefore (1) either plums are produced under more favorable natural conditions elsewhere and the imported product is of a higher quality than ours.

(2) Or the fruit can be produced cheaper elsewhere than we can produce it.



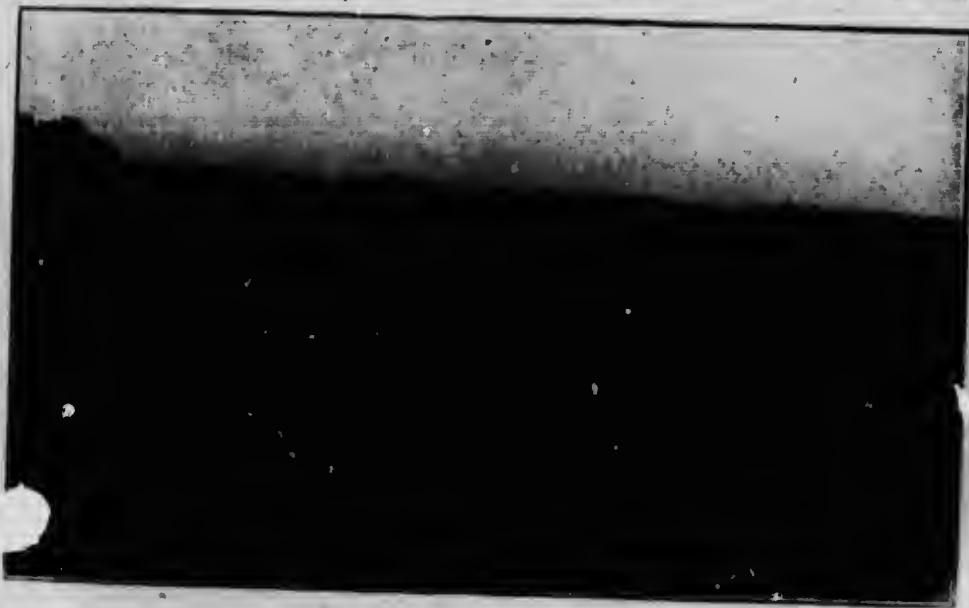
(3) Or the organizations of our competitors are more complete than ours and their methods of packing and sale are superior.

In the opinion of the writer the last two reasons are the main causes, namely:

(1) Cheaper production.

(2) Better organizations, including packing and selling.

Before discussing directly the two factors mentioned, I wish first to draw attention to conditions in two adjoining counties, both fairly heavy producers of plums, one in Ontario, Canada, and the other in the State of New York. Niagara County, N.Y., has approximately 180,000 plum trees, or about 1-5 of the total number in the State. The orchards are large, a great many of them ranging from six acres up. In some cases the varieties, or perhaps I should say the rows of the different varieties, are badly mixed, but a large number of orchards contain quite large blocks of one variety. Niagara or Bradshaw is the favorite. The land on which



Plum orchard at Lockport, N.Y.

they are growing is valued at about 50 to 60 per cent., or less, than that in the adjoining county mentioned. The cultivation methods are *extensive* and *thorough*; less money is spent on fertilizers, and the aim of the grower is to make his money from a large quantity grown cheaply, and marketed as cheaply as possible.

Notice, again, *large orchards, large blocks of one variety; cheaper land, extensive cultivation methods; marketed quickly*. In Lincoln County (and a part of Wentworth County, included in the Niagara Peninsula) we have *very few large orchards, many varieties badly mixed, intensive cultivation methods, high-priced lands*, and an attempt to market the fruit over a long season no matter what the rush of other fruits. A few growers can take exception to this, as they have large orchards of good varieties and are making money from them, but the general condition is as stated.

The men immediately across the border—and these men have the largest orchards—prefer, at present prices, to sell in Canadian markets, and on the statements of the growers themselves I have it that with a minimum of a cent and a quarter to a cent and a half a pound—with now and then a good year—the fruit

is a very profitable one to grow. Quantity and quick handling at a fair average price is the motto.

The imports at Queenston Bridge for the season of 1911 were 6,740 bushels; for 1912, 3,789 bushels; and for 1913, 363 bushels. This is one port only, and represents largely the quantity that was drawn across the bridge in wagons for canning purposes. Queenston is the port between the two counties before mentioned through which the largest share of the trade passes, but the figures do not take into consideration any that may have entered at Niagara-on-the-Lake or Niagara Falls.

This one port is mentioned only as an example, and to still further emphasize the fact that there is an opportunity in plums where conditions for production are similar to those of our neighbors.

The question of cheaper production is covered largely in the comparison drawn above, but that of methods of packing and sale is not included, as the trade there is local—the large cities of the middle and eastern States—whereas the greater part of the fruit of our competitors is sold either in our Prairie Provinces or the large cities of the East.

Nearly all Ontario plums are sold in the two sizes of fruit baskets, eights and elevens, so well known to all growers. The baskets are also known to the trade and are an indication of their origin. This fruit is sold largely for cooking or canning purposes. The American product is largely in smaller baskets packed in cases, all fruit carefully placed and the packages faced. These are to be seen in our fruit stores at all times during the plum season; and it is this trade—the fancy trade that seems to have been neglected by our growers. Trade in fancy packages is necessarily not as extensive as the general trade, but still it is profitable.

It cannot be developed in a year, but if it is given "careful consideration" by our fruit men in the same manner that box-packed pears and apples have been in the last few years a certain amount of the trade at least will fall to the Ontario shipper.

In order that at least a fair idea might be obtained of the present commercial plum areas of the Province a list of questions was sent each of the District Representatives. The replies were for the most part very general, but gave some idea of the industry in the particular county. From the replies the Province might be divided into three parts:

(1) The colder Northern parts where plums are grown only in the home garden as a hobby or not at all.

(2) The western part of Eastern Ontario and all of Central and Western Ontario, except a few locations where they are grown locally and marketed in the nearby towns and villages; where local production supplies, or almost supplies, the local demand.

(3) The centres where the commercial orchards are situated; Lincoln, Wentworth, some favored spots on Lake Huron in Grey County, on Lake Erie in Elgin, Kent and Essex, and on Lake Ontario in Prince Edward County.

It is with these latter districts that we are mostly concerned at present, so far as production is concerned, and also the first division in which are situated many small towns that would take regular shipments during the season from the commercial districts.

It must not be supposed from the above remarks that every man in the State of New York is an expert plum grower, or that every man in Ontario is making a failure, because such is not the case, and that is not the idea that the writer intends

to convey. The percentage of men in New York who are making money from plums is probably a little higher than in Ontario, but not all are specialists. Plum specialists are scarce, and the idea that the writer means to convey is that certain phases of the methods and plans of our American friends could be profitably adopted by us. Those particulars have been enumerated, and it is hoped that the suggestions thrown out will be of some interest and value to Ontario plum-growers.

The question might rightly be asked, how do successful plum-growers consider plums compared with other fruits as a profitable line to follow? The general idea is that plums are a secondary consideration, and one prominent grower remarked to me that he believed the last dollar had been made in plums, and that he would not take the trees as a gift if he had to set them out and wait for them to bear. It was the exception rather than the rule to find a man who gives his plums the same attention as he gives other fruits, but still they yield fair returns.

The situation is summed up quite well in a letter from a prominent grower in the State so often mentioned, which is here quoted in part: "Plums were very low here also, but I got better prices than I expected, from 8 to 10 cents per 7 lb. basket loaded on the car here; prunes 15 cents a basket. My plums and prunes were never better and more perfect than this year, and the largest crop I ever had. Plums and prunes pay fairly well, as they come into market when one is not very busy, and they generally bear abundantly."

## (2) THE CAUSES OF THE LACK OF INTEREST.

Many causes or reasons might be assigned for this lack of interest in the plum industry of the Province, but I believe the principal ones may be found in the following:

- (1) The prevailing prices have been low.
- (2) A large number of poor varieties were planted in the decade previous to 1901 and the few years following.
- (3) Low prices did not seem to warrant the adoption of careful cultivation, pruning and spraying methods, and as a result much fruit has been of low quality, and large quantities were in a state of over-ripeness or decay before they reached the consumer.
- (4) The other fruits are more popular with both producer and consumer, and the plums are crowded out in favor of the more highly praised and advertised fruits. Plums and the culture of plums have scarcely been discussed at fruit conventions during the last few years.

**Low PRICES.**—Prices and net returns are the key-note of growth or decay in any business, and around this hang the other reasons for lack of interest.

The following returns, worked out by L. B. Henry, B.S.A., of Winona, and by whose courtesy I am permitted to use them, are of great interest and value in that they show the variation in price from year to year and the variation in price of the different varieties. They represent the gross returns of five good growers—not average or poor growers—in the Winona district, per eleven quart basket for a period of ten years. These figures I consider very reliable, and represent what a man who understands his business might expect.

	Bradshaw.	Medium Blue and Burbank.	Lombard.	Fancy Blue and Red.	Reine Claude
1903.....	21.1	21.2	11.9	19.6	19.5
1904.....	44.8	33.3	35.0	45.2	52.5
1905.....	31.6	19.3	14.0	24.0	35.3
1906.....	42.0	42.0	41.9	48.4	41.1
1907.....	78.3	63.7	60.0	77.9	95.6
1908.....	25.3	29.2	15.9	29.4	32.4
1909.....	26.5	27.3	15.0	33.0	36.4
1910.....	28.0	27.3	25.0	33.2	47.0
1911.....	35.3	32.7	35.1	42.5	42.9
1912.....	33.7	26.9	26.3	33.0	36.5
Average .....	36.6	32.8	23.0	33.4	44.2

In "Medium Blue" are included Gueii and Quackenboss. In "Fancy Blue" are included Glass Seedling, Monarch and Grand Duke.

The year of lowest prices was 1903, when the average of all varieties was only 18.6 cents per eleven quart basket gross. The year of highest prices was 1907 when the average for all varieties was 75.1 cents gross; certainly an exceptional price for plums.

Again the average for all varieties for the ten years was 36 cents per eleven quart. This price, though low to many, I consider fair, and consequently it does not warrant the present partially neglected state of the industry. If five good growers received this for all varieties for a period of ten years does not the increasing demand warrant more careful methods of culture and sale and the planting of selected varieties?

Carrying yields and returns still further we have in New York State (1909 census) 919,017 bearing plum and prune trees, with a yield of 553,552 bushels. Ontario (1911 census) has 767,827 bearing plum and prune trees with a yield of 331,278 bushels. The New York product was valued at \$519,192. The Ontario product, at the average rate quoted previously in the table for that year (37.7 cents, average of all varieties), and considering three baskets to the bushel, would be worth \$374,675.48.

Estimating thus, the product of Ontario was worth 48.8 cents per tree on an average, while that of New York was worth 56.5 cents per tree on the average. The figures are admitted to be only approximate averages, but still they are fairly correct. The figures are even for different years, but they illustrate comparative values, and the fact that plums as a whole are worth as much, or more, in the open markets of the neighboring republic as they are in our open markets. In Ontario the average price per bushel was lower in 1909—the year of the last New York census—than in the year quoted (from figures quoted previously), but the yield was higher, so the comparative values per tree will still be the same. The total yield for Ontario is not available for 1909, so we must use the census year. This again, to me, at least, illustrates that the production and marketing methods of our competitors are cheaper than ours, and that the industry could be made a profitable one, if given the same attention as the other branches of the fruit industry.

**POOR VARIETIES.**—Scarcely had the old and tried domestica varieties of plums become widely distributed and well known when the much lauded, much advertised, over praised Japanese varieties were put on the market. A word as to their history will make clear their standing. The first trees were imported in 1870 (Bailey) and fruited in 1876. Commercial propagation began in 1883, or really only thirty-one.

years ago. For twenty or more years they were heralded as the best possible, and it is only within the last few years that they have found their level. But they were planted promiscuously and over-planted, and the whole industry has suffered as a result. Most of the varieties are not equal to the domesticas, and though the tide has found its ocean level it will be some years yet before the results of the mistake are completely obliterated. I do not mean to infer that the Japanese varieties have no place, but that their place is not above the best domestica varieties. It might be said, too, that early ripening domesticas (with the exception of Bradshaw or Niagara) have to a certain extent been over-planted. Some are making money from them in a limited way, but the majority are not. The best growers have of late been watching the expanding markets, and the varieties now being planted are being more carefully selected and for the markets of the near and distant future.

**SPRAYING, CULTIVATION, ETC.**—The percentage of growers who spray and care for their plum orchards as carefully as they spray and care for their other fruits is very small indeed. The interest in their care is such that as a general rule the trees are given such care and attention as time will permit after the other fruits have received their special treatments. In very many cases the orchards are not given any spray treatment after the dormant spray. Other applications would necessitate special effort, and consequently the trees are left untreated. A small percentage are more thorough and produce good fruits. The former and larger percentage are as a consequence not getting the highest returns. The latter are receiving returns commensurate with their efforts. The returns of the more careful growers are quoted previously.

**POPULARITY OF OTHER FRUITS.**—Plums are common property. They grow almost everywhere and nearly all are familiar with their habits. They have not been favored with heavy yields at high prices. When yields are heavy prices are low. We have no big returns to quote for them as we have for the strawberry, the peach, and the apple. At least we have not been quoting them. Their quality, flavor and character is such that they do not appeal to the taste in sufficient degree to be desired in the largest quantities. The production and consumption of prunes, dried, is increasing yearly and making inroads on the fresh plum industry. The former can be purchased from the provision merchant in any quantity, large or small, at any time, whereas fresh plums must be canned or preserved at once or they will spoil.

The plum must be of first-class quality and marketed in an attractive manner if it is to hold its own with its natural competitors.

### (3) PLUM CULTURE OR CULTURAL METHODS.

The history of plums and plum culture dates back to many years before Christ. Plums were cultivated by the Greeks and Romans, and the pits or seeds were scattered from this centre throughout Western Europe. Nor are all our common best varieties products of modern civilization. Our best varieties are European importations or offshoots from them, and we have not a single variety evolved from our native American species that is equal to them. The Japanese varieties are importations, or have been produced from imported stock, and as yet not a single variety has been produced that has maintained a permanent hold on the public—a hold equal to that of the Reine Claudes, Prunes, and Damsons.

In order to more thoroughly understand the discussion later it might be well to outline a classification that covers the common varieties. Each class requires somewhat special treatment or care, and it is well at the outset to make mention of

them. We have in all twenty-four distinct species of plums (Hedrick), and more than two thousand varieties, but we are directly concerned with only four species and about thirty varieties, or even less.

*Prunus Americana* includes nearly all our best native varieties. These are not grown largely in commercial orchards, but are found in many gardens throughout the Province. The principal varieties are De Soto, Hawkeye, Stoddard, Wolf, Wyant and New Ulm. One other variety that is very similar to the above is Cheney, but is a distinct species (*Prunus nigra*).

*Prunus domestica* includes nearly all our best varieties, those that have been imported direct from Europe or developed from the importations. Some of our best varieties are Monarch, Grand Duke, Smith Orleans, German Prune, Italian Prune, Pond Seedling, Quackenboss, Shipper's Pride, Reine Claude, Green Gage, Washington, Yellow Egg, Lombard, General Hand, Gueii, Bradshaw, Moore's Arctic, Glass Seedling.

*Prunus Triflora* includes the Japanese varieties, those that have been imported from Japan or developed here from the importations. Abundance, Burbank, Red June, Willard are the best known varieties.

*Prunus insititia* includes the Damsons, the most important of which are the Sweet Damson, Common Damson and Shropshire Damson. Besides the four above mentioned species we have a number of common and important hybrids, plums that have been produced by crossing. The most important of these are Climax and Shiro.

#### SOILS.

Plums are adapted to a wide range of soils, but like most other fruits have a preference. The domestica or European plums are best suited to clays and clay loams. They will thrive on sands and heavy clays, but the largest and most regular yields of the highest quality fruit seem to be found on the clays and clay loams. It is sometimes written that plums will thrive on wet soils, but in the main the statement is incorrect. They will thrive under damper soil conditions than the peach or cherry, but it does not follow that such a soil is wet. Warm bottomed lands are as much preferred by plums as by any other fruit, but they will maintain their vigor under more adverse conditions.

The Damsons are well adapted to a little greater variations and will thrive to the fullest degree on the heavy clays. Japanese plums, on the other hand, though also adapted to a wide range of soils, may be expected to yield highest returns on the lighter soils. Many of these species are worked on peach roots—especially in the South, and in such cases are adapted to soils that favor that particular fruit.

Soils, generally speaking, are not as important as the drainage of the soil. If the subsoil is sufficiently open to permit of an extensive development of the root system, if it dries off readily in the spring or after a heavy rain, if it is sufficiently open to permit of easy drainage and at the same time holds moisture well under judicious management, be it sand or heavy clay, it is adapted to fruit trees, and plums will thrive on it. It is a mistake to put plums where no other fruit would grow.

There is no objection to a large number of stones in the soil provided they do not interfere with cultivation, as such a soil is usually open and quite fertile.

The above statements will arouse this question: If plums are only a fair investment, and do not pay as well as some other fruit, why should we not reserve the good soil for the better paying fruit? By all means put the plum orchard on the heavier and cheaper land, but only if that cheaper land is adapted to them.

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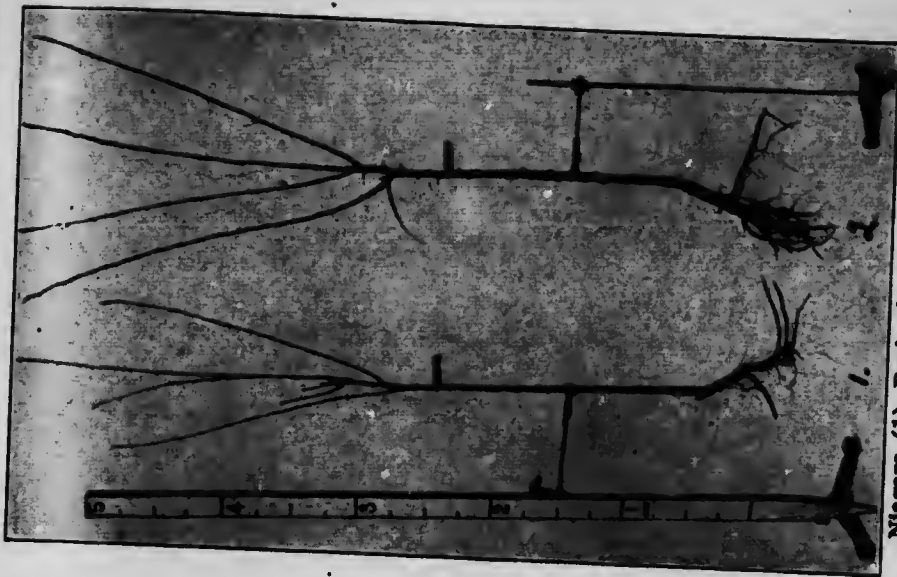
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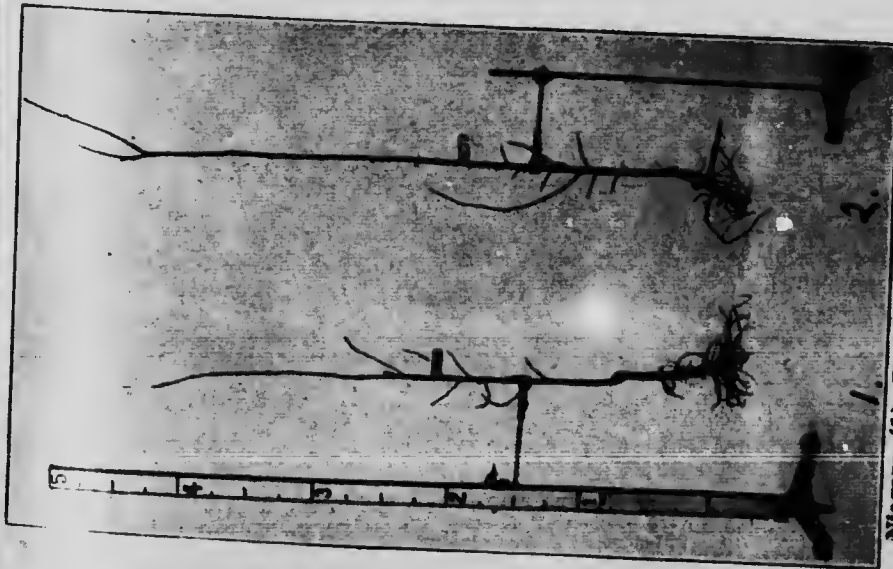
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Niagara (1), Burbank (2), as sold from the Nursery. The former is a first-class specimen tree of the variety, but the latter is too large. The Burbank is a thrifty tree at one year.



Niagara (1), Burbank (2), as usually sold from the nursery—1 yr. The Burbank is large and vigorous, but the Niagara is a small grower. The Niagara is a poor specimen.

Drain it, and fertilize and cultivate it and the plums will respond as readily as any other fruit. Plant them under the best conditions possible in your particular circumstances.

#### PROPAGATION.

Plum trees used in the commercial orchards of Ontario are grown almost entirely by the local nursery firms. A few are imported from the United States, but a large percentage are home-grown.

Seedling stocks (Myrobolan) are obtained from France in the winter and planted in the nursery rows the following spring. At one time St. Julien stocks (*prunus insititia*) a species of Damson were used almost entirely by the nurserymen of the Eastern United States, but they have given way for the Myrobolan. It is generally admitted, however, that domestica and Damson plums make better trees, thrive better and live longer on St. Julien than Myrobolan, and there are to-day many orchards on this stock in the State of New York.

The nurserymen, however, prefer the Myrobolan stock, because it gives a larger and thriftier tree in one year, and is easier to bud successfully. Also it is less subject to disease, and it costs less than St. Julien. Naturally, then, under these conditions the nurseryman is going to use the stock that gives the best growth while in the nursery and makes the most money for him.

The seedling stocks planted in spring are budded the summer immediately following (August), and sold a year from the following spring as yearling trees, or sold two years from the spring following the bud, as first or second class trees of standard sizes according to grade.

The stock may either be dug from the nursery row in the fall and heeled in a dry place near the buildings, or what is more generally the practice, and is the best practice, tied in bundles and piled in the storage houses, where they are held at a low temperature to prevent any starting of the bulbs. Heeling in is also practiced sometimes in the storage cellars, but requires a vast amount of space. In a few cases trees are left all winter in the nursery row, but such a practice cannot be recommended for spring delivery.

In winter the trees in the storage are sorted into sizes or grades and with the opening of spring are packed for delivery.

The larger trees are in greatest demand, but smaller sizes, and especially the good grades of clean straight stock of one and two year old trees are to be preferred. One year old stock of the rapid growing Japanese varieties is recommended. The Reine Claudes and similar types are slower growers, and are much smaller than the Japanese varieties at one year. Two years are required for them to attain their size.

#### SITE.

The site for the plum orchard is generally largely determined by the soil factor. Two other factors are, however, worthy of consideration. Plums when hanging heavily on the trees rot very easily if the weather is at all warm and damp. Brown Rot is especially adapted to warm, humid conditions, and the application of spray materials is much more effective when aided by air circulation and sunlight. The rot spores cannot thrive under dry conditions, and the freer the air circulation the less rot there will be. Do not hide the trees behind a woods or thick hedge where air currents cannot reach them.



The other factor, that of sunlight, is controlled largely by pruning, but proximity to a high hill, or part enclosure by woods, is of considerable importance. The orchard should be as much in the open as possible without undue exposure to heavy winds. Proximity to woods, old fences, etc., is also conducive to rot and insects because of the nearness of the breeding grounds of the curculio. Curculio stings admit rot spores.



Orchard showing the result of too close planting. 18 ft. x 18 ft. is a good average distance.

To get most sunlight and air circulation keep away from the hollows, and unless the soil is too valuable select as good a site as for the peach or the apple.

Another factor of some importance is the freezing of the blossoms in the spring. The Japanese varieties open comparatively early, and if there is any preference they should have it. Japanese varieties cannot be raised in many sections of Ontario because of this. They blossom freely, but fail to set any fruit, or if any does set it turns yellow and falls off soon after. For these varieties a northern slope or one near the water is preferred in all sections subject to late spring frosts.

## PLANTING.

The planting of the nursery stock may be done either in the fall or spring. Spring planting is the most popular time at present, but there is no reason why they should not be set in the fall, if well matured trees can be obtained in late September or in October, or even later. The trees must be well matured for transplanting, and unless good well-ripened individuals can be obtained it is better to wait till spring. Ordinarily they can be obtained. Experiments conducted here with one variety, Reine Claude, over a period of three years, indicate that something is gained by fall planting. Six trees were planted in the falls of each of the years of 1911, 1912, 1913, and in the springs of 1912, 1913, 1914. In every case the fall planted trees show a greater growth; are more vigorous and thrifty. One tree planted in the spring of 1913 died, but all others are still under observation. Some discussion has also taken place with regard to the merits of dynamiting holes for trees. The experiments have not been conducted sufficiently long to report definitely, but the results to date are included in the following table. The wood growth per tree and the diameter of the trunk of each tree, with averages for spring and fall planting, are also included in the table. No fruit has been produced.

Dynamited Holes 1912		Spring Planted 1912		Autumn Planted, Fall of 1911	
Diameter of Trunk	New Growth 1914	Diameter of Trunk	New Growth 1914	Diameter of Trunk	New Growth 1914
Tree 1 1.11	188½	1.58	299	1.66	266½
" 2 1.11	164	1.75	278	1.66	338
" 3 1.43	317½	1.41	138½	1.58	255
" 4 1.27	222	1.34	216½	1.66	274½
" 5 1.34	216	1.43	161½	1.75	237
" 6 1.27	209	1.58	274	1.75	266½
Total 7.53	1317	9.09	1367½	10.06	1637½
Average 1.255	219.5	1.515	227.9	1.676	272.9

There is possibly a labor advantage in fall planting sometimes, but not always. The rush of fruit picking is often more trying than spring cultivation and planting.

If the soil can be put into first class shape and the trees obtained when ready it will pay to plant; otherwise wait till spring.

The distance apart to plant varies a great deal with the different varieties. Some are quick, vigorous growers and make large trees; others are small trees even when matured. Seventeen feet square is a good average, or on rich loam twenty feet square is not too great a distance. The Abundance is a small grower and will adapt itself to a square fifteen feet each way. Burbanks are more spreading and should have at least seventeen feet; eighteen are better. Where it is desired to plant a number of varieties the rows may be kept in straight lines and the trees an equal distance apart in the row, but the rows brought closer together. For instance, the trees in the rows may be eighteen feet apart and the rows eighteen feet apart for the large growing domesticas, but when the rows of Abundance or Lombard are planted they may be planted the same distance apart in the row but fifteen feet between the rows.

Don't make the mistake of planting too closely. Just as much and better fruit will be produced at the greater distance, and it will not all be in the tops of the trees.

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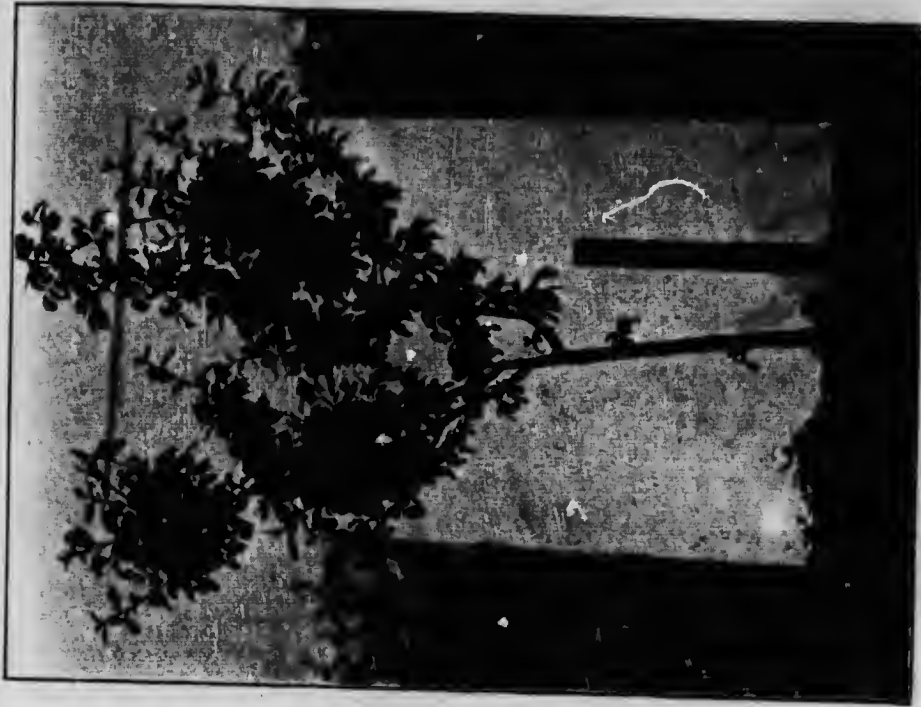
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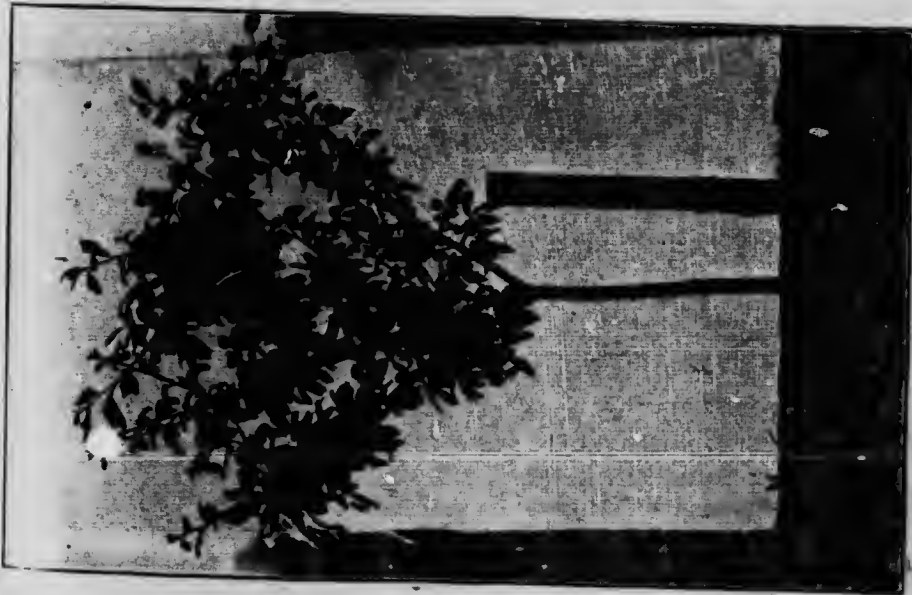
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Reine Claude in midsummer of the third year.



Reine Claude in midsummer of the third year.

### POLLINATION.

The question of pollination is important where large quantities of Japanese and Americana varieties are grown, but not so important where the domesticas are in evidence. Most varieties of Japanese and Americana are self-sterile; that is, the varieties will not pollinate or fertilize themselves. Cross fertilization is much stronger. Damson and Domestica varieties are not self-sterile, as far as the present evidence will permit of a final judgment, but they are stronger and more likely to produce abundantly when cross pollinated. Japanese varieties are readily pollinated by Americana varieties that blossom at the same time.



Reine Claude in midsummer of the third year.

A large block of Burbank or a large block of Abundance will not pollinate freely if isolated, but if the blocks are near each other or the rows mixed through, pollination will be almost certain. The same might be added with regard to Red June. The popular American varieties, De Soto and Hawkeye, are self-sterile, as is also the popular Nigra variety Cheney, but they all cross pollinate readily. On the other hand, a large block of domesticas, say Bradshaws, will produce well even when isolated from other varieties.

The question of the "June Drop" might be taken up here. By this I mean the falling of a large number of fruits soon after the blossoms fall or even when the fruits are the size of beans, and in a few cases very much larger. The fruit turns yellow, shrivels up and falls off.

There are two main causes of this drop—weak pollination and attacks of *Plum curculio*.

No plum can produce seed unless it is pollinated, and fruit cannot form unless the seed is strong and vigorous. Those plums that are not fertilized will drop almost with the blossoms; those that are partly or weakly pollinated will fall later, and only those that are vigorous will grow to maturity.

An examination of the fallen specimens will show that the curculio is also responsible for a large share of the damage. This can only be remedied by careful spraying and general tidy methods.

#### PRUNING.

The pruning of plums as generally practised is a haphazard operation, and I feel that I can safely prophesy that the plum growers fifty years hence will smile at the methods of to-day. For no fruit has pruning received the scientific study that spraying or even fertilizing has. Plums are no exception to the rule, and



A good low-headed Reine Claude, two years planted; was cut back to a whip and headed very low when planted in the spring of 1911.

when we consider the various tree types even in the different species we have a magnitude in variations and habits of growth.

Americanas at best are generally a tangled, crooked, thorny bunch of limbs that it is very difficult to work amongst. The cross and broken limbs must be cut away, but the head left fairly thick to protect the trunk and main limbs. It may be necessary to thin out a little, but sections to which this species is adapted are cold and severe, and heavy pruning is not to be recommended. Low heading is, however, strongly recommended. Even where the snowfall is heavy it is not necessary to have a three or more foot trunk to protect the trees from the rabbits, etc. A trunk of thirty inches as a maximum, and perhaps I should have said twenty-four inches, is less liable to sunscald and winter injury.

Japanese plums are also varied in their habits of growth. We have the extremes in Burbank and Wickson. Burbank is a broad, low growing, flat-topped tree, while Wickson is narrow and upright. Abundance is intermediate, in shape vaseiform, and may be taken as a type. Burbank must be thinned out and headed in as much

as from one-half to three-fourths of the new wood. Its heavy bearing qualities make it necessary often to thin very heavily. Burbank also bears some fruit on the new or one-year wood. Besides thinning out and heading in, as mentioned, the tree must be pruned upward.

With Wickson the dense top must be thinned, but the pruning must be to induce growth downward, not upward. This variety, as far as growth and pruning are concerned, resembles somewhat the Yellow Transparent apple and requires much the same treatment.

The domestica plums vary as much as the Japanese, and with a few rules they must be left. The illustrations will be somewhat of a guide, but only a guide, as the requirements of each variety are very varied.

- (1) Cut out all cross and tangled limbs.
- (2) Let some sunlight in at the top, but not as much as with the apple.
- (3) But little heading in is necessary.
- (4) Thin out so the sunlight is fairly evenly distributed throughout the tree.
- (5) Prune horizontal trees upward and upright trees downward.
- (6) Study the fruiting habit; that is, examine all buds and spurs and find out how the buds are borne and which ones bear blossoms and fruit. Are they on one, two or three-year wood, lateral, terminal, or on spurs. Pruning can be done intelligently only when these things are observed.

The illustration on page 17 is a good type of a spreading tree and that on page 19 of an upright tree.

The fruit buds are for the most part borne on spurs, on wood older than one year. Some Japanese varieties bear on one-year wood—Burbanks partly—and in such cases the cutting back of new growth thins the fruit. This will not apply to Domesticas and Americanas. Fruit buds are generally in clusters of from two to six or seven and sometimes more on a spur. Their size and form is very similar to leaf buds and their denomination is more to be determined from position than any other characteristic. The central bud may be considered a leaf bud and the near lateral buds fruit buds.

The general opinion is that plums do not require as severe pruning as some other fruits, but nevertheless we sometimes see pruning carried to the extreme with no harmful results. The writer has visited orchards where the trees (Bradshaw), were as open headed as any Baldwin apple in Ontario, headed in severely at the top and all growth forced downward. In one orchard of this type the trees were set about 20 by 30 feet, diagonally, and were good yielders of fruit of good quality. The writer has also visited orchards where the other extreme was practised. On one orchard in particular the trees were planted 10 by 12, pruned high, all the lower limbs and ground were shaded, and yet for the first foot or two in the tops the trees promised well and the owner claimed a profitable orchard.

What then are we to do in the face of the greatest extremes. Individual tastes only can answer. The habits of the varieties must be studied and the trees pruned accordingly.

#### CULTIVATION, FERTILIZING, AND COVER-CROPPING.

The three above headings are each in themselves worthy of discussion and scientific investigation, but at present it seems that as far as practical results are concerned they are best discussed together. Thorough cultivation is the cheapest fertilizer obtainable. Cover crops add the humus that breaks down, and makes not only its own substance available, but also the locked up plant food in the soil.

Cultivation destroys the weeds that would absorb plant food at the critical season of the year; it conserves the moisture that dissolves the fertilizer, it prepares the soil for the covercrop, the seed of which is to be sown in what is usually a dry season of the year.

We talk covercrops, fertilizer and soil moisture and I repeat, each is important, but the lion's share of their possible values is dependent on thorough cultivation. Cultivate repeatedly during the season for cultivation and the moisture problem will partly be solved; cultivate repeatedly to break down the cover crop you have plowed under, and it will work for you; cultivate to incorporate the humus with the soil, to make it sufficiently open to admit air freely and plant food will be liberated from the clay and made available to the plant. Cultivate to make available the fertilizer you have applied.



Niagara or Bradshaw at the end of the third summer, showing what is possible from a one-year whip very low headed.

The cover crop should be placed second in importance. Just as it is important that the trees be given all opportunity in the spring and early summer to grow, so is it important that in late summer and fall that they ripen their wood and buds for the following season. Sow the cover-crop in July or August depending on moisture and the quantity of fruit on the tree. Crimson Clover, 18 lbs. per acre, Rye,  $1\frac{1}{2}$  bushels per acre, Buckwheat, 40 lbs. per acre, Red Clover, 15 lbs. per acre, Vetch, 30 lbs. per acre or oats 51 lbs. per acre, may be used. Or if chickweed (so popular with many) is plentiful and wants to grow there is no objection to it in the orchard, there is objection if it spreads to other fields—especially strawberry plantations.

Little attention has been paid to scientific fertilization of plums. Even the best growers do not fertilize regularly. Some have tried commercial fertilizers,

but because of inadequate returns they have not come to be used generally. Farmyard manure is most used and even with this the other fruits seem to have the preference and if any is left the plums may get it. A light application, eight or ten tons once every two years is the exception rather than the rule. A few apply light dressings annually, and the returns seem to warrant the expenditure but these are only the few, and the best, but it indicates that plums under skilful management are a paying crop.

Two serious objections might be raised to the foregoing statements *re* cultivation and cover crops. The extreme of cultivation produces heavy tender growth, but thorough spring, not late cultivation, only is advocated. And covercrops tend to harbor curculio and rot. This is the sound objection in some instances, but where the best pruning and spraying methods are followed the danger of infection is reduced to a minimum.

#### PICKING AND PACKING.

Is there anything to be said about the picking of plums? Very little, I am afraid, except to repeat the oft-quoted rules with regard to other fruits.

Because of the lack of confidence in the plum trade, and prices generally, the fruit is often picked roughly—"shelled" so to speak in baskets without any particular care being exercised. This applies more particularly to such varieties as Burbank and Lombard. Baskets containing plums of various sizes in various degrees of maturity, sometimes also some leaves, can be purchased on the large markets during the rush of the season. To some extent at least this is the cause of low prices. The grower has had a large quantity and received a medium price which has paid him well enough, but it has hurt the sale of plums as a whole.

A single decayed plum in a basket soon plays havoc with the fruit nearest it, and the infection soon spreads. Much care should be exercised to prevent such waste. The writer has seen baskets of plums—and other fruits also—spoiling on the hands of the retailer. This may seem to be far from the producer, but when the loss from decay is heavy the good fruit must be sold at a correspondingly high price to protect the retailer from financial loss. This is one of the reasons of high cost to the consumer that the producer does not always consider. A large share of the apparently large retail price is due to loss caused by careless picking and packing methods.

At no time should plums be placed in baskets when they are at all damp. This only hastens the decay. All plums are not ripe when they begin to turn blue; German Prunes, for instance, are not ripe till many days later and should be left till in a better state for shipment. They are better picked a little green than over-ripe though, especially for long-distance shipment. Most of the early Japanese varieties should be picked a little green as they quickly "go down" if over-ripe. The above are the conditions generally. A few men are more careful, and are paving the way. Their plums are graded into "extra fancy," "fancy," "medium," and "Lombard" grades, and as such their fruit is known to the trade. Their baskets of plums carry the same guarantee as their baskets of other fruits and the returns are commensurate with the extra trouble and expense of picking and packing. Wet or damp weather conditions during the ripening and picking season are in some measure responsible for heavy loss from decay in transit and when in the hands of the retailer. Loss at this time can not be avoided except by careful pruning to admit an abundance of air and sunlight into the tree and by the use of fungicides to prevent scab development.



To the Western markets only the best varieties and the best grades should be sent and the fruit must be picked a little greener than for the nearby markets. As soon as the fruit is partly colored and has attained nearly full size it should be picked and shipped at once. The week or more in transit will give them some time to reach maturity. For fancy shipments the fruit should be picked with the stems on the same as cherries are always picked for shipment.

The cost of picking will vary a great deal depending on the quantity of fruit on the tree, the variety and the care that is exercised. On an average it should not cost more than three and one-half cents or four cents per eleven-quart basket.

The packing generally consists in putting the plums into the eight or eleven-quart baskets and tacking on the cover. No special packing methods are followed. A few attempts have been made to market in small baskets, four in a case (the western plumcase), but at present the market does not seem to be ready for Ontario fruit in this case. It might be developed in the same steady, progressive manner the box trade in apples has been developed. Eleven-quart baskets are used almost entirely, but the demand for the smaller basket seems to be increasing. At any rate the fruit carries better in them—the smaller quantity—and it is a much more convenient quantity for the consumer to handle. A very large quantity of the product in New York State is marketed in seven-pound baskets and they seem to give satisfaction.

#### COST OF PRODUCTION.

Cost of production is as important a factor as the selling price. Following are given two estimates that are intended to be a guide only. They represent average costs and average returns. They might be exceeded by a great many growers and a large number will come much under them when they balance their books at the end of the year.

As worked out by L. B. Henry, of Winona, and based on the results obtained through experience in that district and from figures quoted previously:—

For buying 10 acres of orchard, 7 years old, at \$500.00 per acre.....	\$5,000.00
Interest on \$5,000.00 at 6 per cent. ....	300.00
Taxes .....	20.00
Pruning, 40 days at \$1.50 .....	60.00
Gathering Brush .....	10.00
First spraying, 40 barrels Lime-Sulphur.....	40.00
Second spraying, 40 barrels Lime-Sulphur and Arsenate.....	40.00
Third spraying, 40 barrels Lime-Sulphur and Arsenate.....	40.00
Cultivation, 10 acres at \$5.00 per acre.....	50.00
Picking 6,075 baskets at 3 cents.....	182.25
Fertilizer .....	200.00
Delivery to station .....	80.00
Depreciation, 5 per cent for 20 years .....	250.00
Management .....	300.00
<b>Total .....</b>	<b>\$1,572.25</b>

#### Receipts.

6,075 baskets at 29.7 cents.....	\$1,804.25
Cost .....	1,572.25
<b>Profit .....</b>	<b>\$232.00</b>

The above estimates are based on the figures quoted previously: average crop 4.5 baskets per tree; trees planted 18 by 18 feet or 135 to the acre; rate per basket 33.5 cents gross or 29.7 net to the grower for the fruit. (In the latter figure, the cost of the basket is deducted).

The following is worked out by the writer and is based on general conditions where land prices, etc., are not so high, as in the Winona district:

Cost of land, 10 acres at \$200.00 an acre.....	\$2,000.00
Planting and cultivating, fertilizing, pruning, spraying, etc., 8 years at \$23.50 per acre .....	2,250.00
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	\$4,250.00

Estimates based on an average crop of three baskets per tree, the trees planted 135 to the acre at a net to grower price of thirty cents a basket for the fruit.

Interest on investment, \$4,250.00 at 6 per cent. ....	\$255.00
Taxes, 10 acres at \$1.50 .....	15.00
Pruning and picking brush at \$7.00 per acre.....	70.00
Spraying three times, labor and including 150 barrels of diluted spray with arsenate when needed .....	150.00
Cultivation, 10 acres at \$4.00 per acre .....	40.00
Fertilizer, 10 acres at \$15.00 .....	150.00
Picking 4,050 baskets at 3½ cents.....	141.75
Delivery at 1 cent a basket .....	40.50
Depreciation, 5 per cent. for 20 years .....	212.50
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	\$1,074.75
4,050 baskets at 30 cents .....	\$1,215.00
Cost .....	1,074.75
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Profit .....	\$140.25

Or in other words after paying interest at six per cent. on the investment the returns from the above estimates would be \$140.25 or \$14.03 per acre for the management.

It is said that figures won't lie, but they sometimes are misleading. Nevertheless, if the intending planter will use these only for the purpose for which they are intended, using them for a guide only, he may find them helpful.

The personal factor is one that can not be estimated in dollars and cents, and or it depends the whole proposition. What the grower receives in profits is really a dividend on his ability as a managing fruit grower.

### DISEASES AFFECTING FRUIT AND TREE.

**BROWN ROT, *Sclerotinia fruitigena*.**—This is the most serious disease affecting the fruit of the plum and requires very thorough measures to control. The fruit becomes a soft, rotten mass and quickly spreads the infection to other fruit, and particularly those in contact with it. The diseased fruit, if allowed to hang on the tree, shrivels up and dries and will remain hanging all winter.

The disease is a fungus that rapidly develops during warm, moist weather.

**Control:** If the disease is established pick off all the dried or mummied fruits and bury or plow under.

Pruning the tree and thinning the fruit so that plenty of air and sun can find its way to all the leaves and fruits will make conditions that are adverse to its development.

The regular spraying, as outlined under spraying, should keep it under control. Sometimes, however, rot will develop as the fruit is ripening and sprays that mark the fruit can not be used. At this time use ammoniacal copper carbonate.

Copper carbonate, 5 ounces. Ammonia, (20° Baume) three pints. Water, forty-five gallons.

Refer to Bulletin 195, Ontario Department of Agriculture, page 36, for full instructions in making.

**BLACK KNOT, *Plowrightia morbosa*.**—This is the most serious disease affecting the tree. It is a fungus that works in the inner tissues of the limbs and twigs and cannot be controlled by spraying. It shows itself quite plainly by making rough looking knots in various places.

**Control:** All diseased parts must be cut out and destroyed in late fall or winter. Don't wait till late spring or early summer. If the trunk or main limbs are affected the diseased parts may be cut out as thoroughly as possible and the wound painted with red lead. It is recommended, however, that when the trunk is badly affected, to remove the tree entirely to prevent the spread of infection. If a large limb is badly affected it is safer to cut out and destroy than to attempt a remedy. The orchardist can not be too careful about the removal of all infested parts as fast as they appear. Control will not be complete unless the methods are thorough.

**LEAF SPOT OR SHOT-HOLE FUNGUS, *Cylindrosporium padi*,** is a fungus which shows itself by making somewhat cylindrical holes in the leaves. It is not comparatively serious and is controlled by good orchard methods and the regular sprays applied thoroughly.

**PLUM POCKETS, *Exoascus pruni*,** is not common in Ontario, but is worthy of mention. The small green plums become enlarged, soft and spongy. The nutrition of the stone seems to be interfered with, as it does not develop. It also causes a curling of the leaves similar to peach leaf curl.

**Control:** Remove or cut out all signs of disease. The first spray should keep it under control if applied just as the buds are beginning to swell.

**SUN-SCALD** is injury caused by the rays of the sun blistering and destroying the exposed trees and limbs. It might be considered a form of winter injury. The bark cracks and shells; breaking away from the wood beneath, exposing the tissues. When once the bark is broken disease spores are likely to get in and start decay.

**Control:** Prevention is the only remedy. Bank up the tree with earth to a height of about eight or ten inches. Cut ordinary rolls of building paper into about four lengths with a saw and use this to wrap the trunks from the top of the bank to the lower limbs. Put on the paper much the same as a bandage or legging and tie at the top with twine. Wrap loosely but tie tightly.

If the tree is already damaged cut away the loose bark and all decayed and dead parts, if possible, and paint with white or red lead. Or if you prefer it, cover the whole of the exposed tissues with grating wax. Low heading lessens the liability to the trouble. Gummosis or gumming of the wood, is somewhat common and where common is serious. It apparently is the result of mechanical injuries, though it is not proven. Hedrick in "Plums of New York" says, "The disease is least common in species and varieties having hard wood; on trees on soils favoring the maturity of wood; under conditions where sun and frost are not injurious; and obviously, in orchards where by good care the primary causes of gumming are kept out."

## INSECTS.

**SAN JOSE SCALE, *Aspidiotus perniciosus*.**—The most serious insect pest of the plum tree is undoubtedly the San José. It is to be found in most of the commercial plum districts. Here it needs no description, but unless kept well under control the damage will be similar to that on peaches and apples. The trees will become weakened and the fruit will be unsaleable.

**Control:** Spray thoroughly with lime-sulphur just before growth starts. If scale is quite plentiful use the spray as strong as the 1.032 specific gravity hydrometer test. The work must be done thoroughly.

**PLUM CURCULIO, *Conotrachelus nenuphar*,** is the most serious pest on the fruit. It is a rough looking grayish snout-beetle about one-fifth inch in length, the female of which lays eggs in the green plums. The eggs hatch and the larvæ develop in the fruit. The adult beetles also sometimes do damage by eating the leaves, though this is not serious. The larvæ in the plum destroys it and causes it to drop prematurely.

**Control:** All old brush piles, weeds, rail-fences, etc., that are the hiding places of the insects should first be cleaned up or burned. Jarring the trees, causing the insects to fall in nets held below, was once practised, but has now given way to spraying methods. The regular sprays as outlined under spraying will keep this pest under control. In case the regular sprays are not applied three pounds of lead arsenate in forty gallons of water applied as soon as the blossoms fall and again ten days later, will keep them under control. It is much better to use the summer strength lime sulphur than the water as it tends to control Brown-Rot as well.

**SHOT-HOLE BORERS** of various species attack the trunks and main limbs of plums. Their work can be recognized by small gum exudations which, if removed, expose an opening in the bark about the size of a small shot. If a few trees are more attacked than others it is almost a sure sign that those trees are weak or unhealthy.

**Control:** Control measures are not very effective. Remove any brush piles or piles of wood that may be near and clean up all waste. This destroys the breeding grounds. Increase the health and vigor of the tree by heavy applications of barnyard manure. The insects cannot thrive where there is a good sap flow.

**APHIDS**, attack the twigs and foliage of plums very seriously at times. They might be recognized in the spring as tiny green or black "bugs" on the buds just before they burst. In the summer and fall, if plentiful, they give the tree a dark dirty appearance. They do damage by sucking sap from the leaves and twigs.

**Control:** When once they get established they are very difficult to control, as they live on the under side of the leaf which appears to curl around and protect them. Examine the buds just when they are beginning to burst and if present in quite large numbers spray at once with Kerosene emulsion or whale oil soap. At this time they have not the means of protection that is afforded them later.

Other insects attacking the plum are Tent Caterpillars, Tussock Moth, Spring and Fall Canker Worms, and Green Fruit Worm. These sometimes become serious, but not generally, and all should be controlled by the regular spray application. It is always best to spray while the larvæ is small and it can not be too strongly urged to apply the regular applications thoroughly rather than make any special applications later. There are, I believe, about thirty other species of insects listed as attacking the plum or becoming occasional parasites, but the most serious ones, with the treatment for each, is given above.

### SPRAY CALENDAR FOR PLUMS.

**First Spray:** Before growth starts and as near the bursting of the buds as possible use home-boiled lime-sulphur or commercial lime-sulphur or home-made concentrated lime-sulphur, winter strength. It is well to use a hydrometer and test the mixture that is being used before applying. 1.032 or 1.030 specific gravity is an average strength, that is, dilute about one to ten. This controls the Scale insects, some Black-Knot and Black-Rot spores and cleans up the tree generally.

**Second Spray:** This is applied just after the fruit is set. The blossoms will be off but all the fruits will not yet be free from their calyces. Use commercial lime-sulphur about one to fifty or home-made concentrated lime-sulphur about 1.007 test (this would have to be tested in the concentrated form and diluted accordingly), or Bordeaux mixture. To whichever mixture is used add two and one-half pounds of arsenate of lead to each forty gallons of the mixture.

This further tends to control the disease spores and at the same time the curculio.

**Third Spray:** About two weeks after the second spray repeat the application and use the same material at the same strength as for the second spray. This will tend to check any insects or disease spores that may have escaped the former applications.

**Fourth Spray:** This spray is optional and is applied only if disease or insects appear about ten days or two weeks later.

#### (4) THE LEADING COMMON AND COMMERCIAL VARIETIES DESCRIBED.

The following list of varieties is by no means complete, but it is hoped that it will be of some assistance to intending planters. Only those varieties that are most common in Ontario are mentioned and in each case where the variety is of special merit, mention is made of it. They are roughly arranged alphabetically, and in most cases season of ripening is mentioned.

**Abundance.**—This is one of the over-planted Japanese varieties, and perhaps the best known of them all. As the name implies it bears regularly and heavily, but the fruit is soft, rots easily and is a poor shipper. The tree is medium to large and adapted to a large range of soils. Its medium to large fruit of a handsome red color makes it rather attractive to the average amateur, but its commercial qualities do not bear out its appearance. Season early and short, about the second and third week in August. Not recommended for commercial planting on a large scale.

**Burbank.**—This is another one of the over-planted Japanese varieties, as almost every person who grows plums has a tree or two. It bears annually and abundantly; but blossoms early and is consequently sometimes injured by frost. The tree makes rank wood growth and is characteristic in its branching habit of growth. The fruit ripens the latter part of August, and when of fair size brings a fair price. It should be thinned to get size. A few trees will add to the returns if they are properly cared for, but the variety is not recommended for extensive commercial planting.

**Bradshaw.**—This variety also goes by the name of Niagara, and is the earliest good commercial blue plum that we have, ripening about the third week in August. It is the heaviest planted plum in many sections and is a favorite, largely blue in color and of good quality. The tree is vigorous and upright, medium to heavy

bearer, but sometimes comes into bearing late. The fruit is a favorite with the consuming public, and also with the canners, as it comes in at a season that comparatively slack. One of the best plums for commercial planting, but must be marketed quickly as it does not stand long shipment as well as some other varieties.

*Bixby* is one of the midseason American varieties of medium quality, skin thick, flesh tender. It is a good variety to plant only in the colder sections where domesticas will not grow. It is adapted to local trade only.

*Cheney* is the leading native plum. It is the wild plum of Canada and the United States. The quality is fair and the tree productive, but it is recommended only for planting in the parts for home consumption and local trade. It is extremely hardy. Ripens first week in September.

*Climax* is a hybrid plum, but to the grower it is Japanese, as it shows distinctly characteristics of this species. It is quite largely planted in the leading plum section but has not proved a marked success. Its color and beauty make it an attractive plum to grow, but because of irregular bearing habits and comparatively tenderness of tree it is not to be recommended for large commercial planting. The demand for all such varieties is limited. Ripens the second and third week in August.

*Damsons*.—There are a large number of varieties of Damson plums, but the one that is of most interest to us is the Shropshire. Damsons have been grown ever since before Christ, but the variety mentioned above originated in England about 150 years ago. The trees are vigorous, adapted to a wide range of territory and very productive. The small blue fruit is a little tedious to pick, but it grows in such abundance and such clusters that the trees produce large quantities. It is much favored as a canning and preserving plum and as such is, at the present time in much demand on the Western markets. The flavor is tart but pleasant, and is well worthy of more consideration than it has received of late. Damsons are well known to the trade everywhere and are in demand. Season of ripening is late.

*De Soto* is one of the best if not the best American plum for commercial purposes ripening at midseason. The tree has more the habit of the domesticas, bears well and regularly and is extremely hardy. It might be planted for local trade in the colder districts. Fruit is medium size, red in color and as firm and good a quality as the other varieties of the species.

*Emerald*.—This variety is highly recommended by some leading growers. Fruit and commercial value is unknown to the writer.

*German Prune*.—This is in many respects the most popular plum on the market to-day. It is well known to the trade and in great demand. Its large size, blue color, free stone and good eating and cooking qualities as well as its good keeping qualities put it in the foremost rank. The trees are hardy, fairly regular bearers, but are slow coming into bearing. The fruit changes color before it is really ripe and because of this it is sometimes put on the market before it is ready. Season of ripening is late September and early October. The trade in this plum might easily be developed still further and it is worthy of favorable consideration by intending planters.

*General Hand* is a large dessert plum belonging to the Reine Claude Group. It ripens in September and is quite popular in the garden but not commercially.

*Glass Seedling*. This is a large blue plum of medium quality, fair dessert and a good cooker, ripening in September. The tree is hardy and very productive.

and as such is recommended for the section of Ontario just beyond the good commercial districts.

*Golden Drop (Coe's)* is of doubtful value commercially. The tree is only fairly productive; the fruit, not as disease-resistant as most domesticas, is sometimes badly affected by Brown Rot. It is more adapted to its English home and to the American Pacific coast than to Ontario. It might be recommended for the home garden; season is second and third weeks in September.

*Grand Duke.* This is in many respects one of our leading market plums. Its large size, blue color, firm flesh and handsome appearance generally, commend it



A good type of Monarch top-worked on Lombard.

to the consuming public. The tree is fairly vigorous and fairly productive and the fruit ripens the third and fourth weeks in September. It is highly recommended for commercial planting.

*Gueii* holds a doubtful place. It is considered by many to be one of the best varieties because of its early bearing and heavy bearing-qualities. As such it is undoubtedly a money maker. The tree is vigorous and thrifty. The fruit is medium size and poor quality. The fruit is, however, firm, and it is a fair shipper. Many growers condemn it because it is somewhat subject to Brown Rot. It ripens the last week in August and the first week in September. Though it is a large

favorite with many I would hesitate to recommend it for commercial planting except in limited quantities.

*Hawkeye* is another of the midseason American varieties of good quality either as dessert or cooked. It is quite popular but is recommended only for local planting and in home gardens. It is worthy of a place in the orchards of Eastern and Northern Ontario.

*Italian Prune or Fellenberg* has been largely planted in the last few years. It is the leading variety for prune making in the Western States, but in Ontario has not been tried out in large orchards. The fruit ripens in mid-September, is large, blue in color and an excellent cooker. When fully ripe it is first-class for dessert. The tree is medium hardy and medium thrifty and does not seem to be so well adapted to the varied soil conditions as some other domesticas. It does not always bear as heavily as might be expected. Given good soil conditions, and then well cared for, it should prove a leading variety in the commercial districts of Ontario, but I would not care to plant it as a "sure crop" until I had seen it more thoroughly tested. The fruit is in big demand on the leading markets.

*Lombard*. Some growers claim that Lombard has made them more money than any other variety. At the same time there are often years when large quantities are not picked. It is a heavy regular bearer and the fruit unless thinned is likely to run small. It is in demand for canning purposes and is well known to the trade. The money is made from large quantities quickly handled at low prices. It is largely planted all over Ontario and well known to all, but in the light of present prices and developments except where the grower is prepared to spray thoroughly and then when needed thin it, I would not recommend planting it. It rots badly during the ripening season if the weather is at all warm and damp. Spraying and thinning will remedy this and increase the size.

*Monarch*. This is one of the most popular market varieties at the present time. The fruit is large, blue, medium to good quality for both cooking and dessert; it ships well and will keep for some time in the basket without waste if picked before too ripe. The tree is hardy, vigorous and an early and abundant bearer. Though it has been introduced but a short time it is largely planted and well known to the trade. It ripens in late September. It is highly recommended for planting in the commercial orchard.

*Moore's Arctic* is recommended only because of its hardiness. The fruit is medium in size and quality and the tree dwarfish in its nature. The trees in the Experimental orchard at Macdonald College have produced but a few fruits and are not entirely hardy. For sections warmer than this and colder than the commercial plum districts it is recommended. It is a profitable local variety where the less hardy domesticas cannot be grown.

*Pond Seedling*. A large blue plum, that is planted to some extent commercially, but not very productive and somewhat subject to rot. A favorite with some but not recommended for extensive commercial planting; ripens the second and third weeks in September.

*Quackenboss*. This variety is a favorite with many growers because of its large size, handsome blue color and good shipping qualities. The tree is large, hardy and vigorous and usually bears well. It ripens about the last week in September and brings a fair price for home canning purposes. It has a place in the commercial orchard.

*Quaker* is an American variety of some merit and has a place in the home gardens and local markets of the colder sections.



*Red June* is one of the heavily planted Japanese varieties that is not gaining in popularity. It has, however, some points in its favor. It is an early and fairly abundant bearer, blossoms quiet late for a Triflora and the fruit ripens very early, the last of July or first of August. As such it should have some value when well grown. It must be cross pollinated to produce well. It is worth planting in small numbers.

*Reine Claude* has of late years been planted quite heavily because of the demand for canning purposes. It also sells well in the open market. Its yellow color when ripe, and high quality will always give it a place in the plum kingdom. It is considered by many the standard of quality in plums. The tree, however, is tender and not as thrifty as most domesticas, but it bears fair crops regularly. The nursery tree is small compared to other varieties and it is a little more difficult to grow. The price for the last ten years has averaged as high or higher than for any other variety. It is well worthy of a place in the commercial orchard. With this variety might also be classed the plums that go under the name of Green Gage. The fruit ripens from mid to late August.

*Shipper's Pride*. This variety is grown in small numbers in all the plum districts, but has never come into prominence, because it is only a medium bearer and is susceptible to rot. It is a large blue plum of fair quality, good for canning and a good shipper. It is being planted to some extent and is perhaps worthy of the attention it is receiving. It ripens about the first or second week in September.

*Smith Orleans* is planted quite largely but is losing ground. It is medium to large sized blue plum but ripens in late August at a time when plums are plentiful. Scarcely worthy of a place in the commercial orchard with such a large list to choose from.

*Stoddard* is one of the best American varieties, ripening in late September. It is worthy of a place in the garden because of its large size and flavor.

*Shiro* is a comparatively new variety that gives fair promise of becoming a favorite. It ripens early and is fairly large, of a yellow color with flesh so clear that it is semi-transparent. It bears heavily and early and is worthy of a trial in Ontario orchards.

*Washington* is a large plum of the Reine Claude type, of the highest quality but the tree is generally a poor bearer and the fruit bruises easily and rots readily in transit. When marketed in good condition it commands a high price. A few growers, however, consider it a profitable variety and the writer this past season (1913), saw as fine a crop on trees top-worked on Pond Seedling as could be desired. The trees had borne heavily for three successive years.

*Wolf* is another of the popular American varieties that has long held a place and is worthy of consideration in sections where the domesticas are not hardy. Does well at Macdonald College.

*Wyant* is also a good American variety and is worthy of a place along with the varieties before mentioned.

*Willard*, a very early ripening Japanese variety that is raised quite extensively but the fruit is of too poor a quality and the tree too light a bearer to win and hold a place.

*Wickson* is one of the largest plums grown and because of this and much advertising it was quite heavily planted. It has, however, not proven a success commercially and is deserving only of a place in the garden. The tree is tender

and it blossoms too early to always escape frost. It is largely grown in California where conditions are more adapted to its requirements.

*Yellow Egg.* This variety is widely distributed and well-known, but is losing favor because of its susceptibility to rot. Its large size and yellow color make it attractive to the purchasing consumer, but its quality is only fair. It has not won a leading place in years of test in Ontario.

At present plum breeding or variety improvement is not receiving as much attention as some of the other fruits at the Experimental Farm, Vineland, but they are not being neglected and some attempts were made at hand pollination this year. Few plums set, but the results are far from being discouraging. A few seedlings are growing in the nursery plots.



A Shiro plum that gave 7 quarts of good fruit the third year.

The following varieties are under test:—Rockford, Improved Lombard, Arch Duke, Victoria, Gideon, Reine Claude, Moore's Arctic, Fellenberg, Smith's Orleans, Yellow Egg, Pearl, Field, Gueii, Cullin's Golden Gage, Tennant Prune, Early Prolific, King of the Damsons, Duane's Purple, Early Transparent, Blue Permain, German Prune, Moyer, Pond Seedling, Shipper's Pride, Coe's Golden Drop, Mary, Early Rivers, Mallard, Washington, Shropshire Damson, Beauty of Naples, Togo, General Hand, Monarch, Quackenboss, Lombard, Ancaster, Latchford, Warner's Late, Staunton, Monroe, Imperial Gage, Bleaker's Gage, Emerald, Lowry's Gage, Maynard, Formosa, Vesuvius, Santa Rosa, Gaviota, Red Egg, Huling's Superb, McLaughlin, Canada Orleans, Grand Duke, Satsuma, Kelsey, Shiro, Oriental, Bartlett, Diamond, French Da u, Purple Egg, Kingston, America, Prunus Simoni, Burbank, Willard, Cha...t, Earliest of All, Waugh, Czar, Saunders,

Columbia, Bradshaw, Glass Seedling, York State Prune, Lucy Gray, Peter's Yellow Gage, Klondyke, Large Golden Prolific, Riley Damson, Apple, Mathews, Sutton, Imperial Peach, October Purple, Climax, Clyman, Ickworth, Raynes, Thanksgiving, Sultan, Stella, World Beater, Poole Pride, Hawkeye, Daisy, Omaha, Belle de Louvain, Hunt Hybrid, Wolf, Darwin Peach, Goliath, Femmonzi, Wyedale, Belle, Gisborne, Splendor, Improved French Prune, Silver, Uncle Ben, Sergeant, Cox's Emperor, Belgian, Curlew, Sugar Prune, Pacific Prune, Belle de Paris, Saratoga, Reine-Claude, Gabriel Combes. Also we have twelve trees of each of eight leading varieties planted in rows side by side. These are used for the thinning and spraying experiments.

For discussion of the industry we divided the Province into three divisions:—

(1) The colder parts where plums are at present grown only in home gardens—a large part of Eastern Ontario and Northern Ontario.

(2) The Western part of Eastern Ontario and a large share of Western Ontario where plums are grown locally to supply the trade.

(3) The commercial districts, including Lincoln, Wentworth, some favored spots on Lake Huron and Georgian Bay and along the shores of Lake Erie and Ontario in various places.

For district number one, the following varieties are recommended: American and Nigra varieties: Cheney, Wolf, Stoddard, Hawkeye, De Soto, Quaker. The domestica varieties are a doubtful proposition, but the following are worthy of trial: Mount Royal, Perdrigon, Glass and Early Red.

For district number two, the following are recommended: Glass, Lombard, Bradshaw, Mount Royal and Shipper's Pride. For district number three, the following are recommended: Reine Claude, Bradshaw, Damsons, Monarch, Grand Duke, German Prunes and Italian Prunes. To this list might be added: Shiro, Burbank, Quackenboss, Lombard, Coe's Golden Drop and Smith Orleans, and for deep, dry, warm peach soils, Washington.

It is suggested to the intending planter that he read the short description here given and pick from the list the varieties that seem best adapted to his particular conditions and markets. It is recommended also that the planter limit the number of his varieties to about from four to seven rather than plant a few trees of each of a large number of varieties.

The following is the writer's choice of seven varieties for an orchard of seven hundred trees: Shropshire Damson 125, Monarch 125, Grand Duke 125, German Prune 125, Reine Claude 100, Bradshaw 75, and Shiro 25.

If I desired to experiment I would add a few trees each of Fellenburg and Emerald, and if I had the proper soil some Washington.

Any of the varieties given in the descriptive list may be experimented with in the home garden.

#### (5) SOME GLEANINGS AND SUGGESTIONS.

(1) But little attempt has been made to improve our native varieties, and still less attempt has been made to introduce the best that we now have into the gardens and home plantings of the Northern parts of the province. A few trees would add to the interest of the garden, and would in no way interfere with the commercial side of the business.

(2) The tendency is to drop the once greatly lauded Japanese varieties and the poorest of the earlier domestica varieties for heavier planting of Reine Claude, Bradshaw, Monarch, Grand Duke, Italian Prunes, German Prunes and Damsons.

(3) Plums at present prices seem adapted to large scale production; that is in blocks of from about five acres up rather than in small lots of one or two hundred trees or less.

(4) The tendency is to plant larger blocks of one variety that can be harvested quickly and not interfere with the gathering of other fruits. The idea seems to be to gather quickly as cheaply as possible and get them out of the way to make room for something else.

(5) Plums thrive and produce just as well on the heavier and cheaper lands as on the valuable peach and cherry soils.

(6) Plums have few large yields at high prices to their credit but they give a moderate return regularly for the money expended.

(7) Orchards that have been given reasonable care have repaid the owners well for their labor—and a little besides. If plums are worthy of a place on the fruit farm they are worthy of attention.

(8) The time is ripe for planting selected varieties of plums. The demand will have increased very materially by the time they come into bearing.

(9) Plums are worthy of further study and of more attention at our fruit meetings. Interest in better varieties and better quality marketed in a more attractive manner can only be awakened in this way.

(10) This last suggestion I put in brackets because it is the work of organizations not the work of the producers.

[How many consumers know the best varieties of plums and what season they may expect to find them on the market?

How many dealers allow fruit to spoil on their hands, because of direct exposure to sunlight, rough handling, deep piling of baskets, no refrigeration? What percentage of the great difference between the wholesale and retailers prices is due waste caused by:—

(1) Carelessness on the part of the producer.

(2) Carelessness on the part of the transportation companies.

(3) Carelessness on the part of the retailer.

What percentage of waste is due to exposure to dust, dirt and winds when exposed on the fruit stands?

It is a very easy matter to put all blame for certain unsatisfactory conditions on the fruit-grower—he can stand it because he is accustomed to it, but in the humble opinion of the writer as vigorous an educational campaign is needed among the retailers and consumers as among the growers. They are a large part of the business and also require instruction.

#### ACKNOWLEDGMENTS.

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Thanks are due many growers in New York State who willingly and cheerfully guided me through their orchards and explained their methods, and to the state inspectors who directed me to the leading men in their respective districts.

