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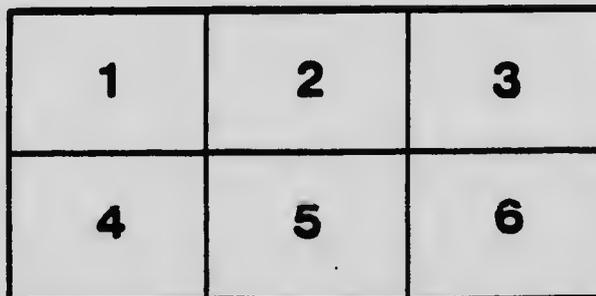
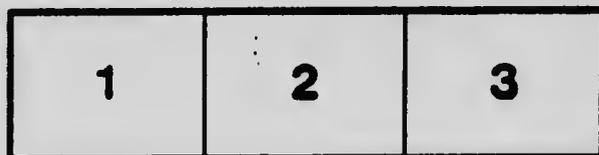
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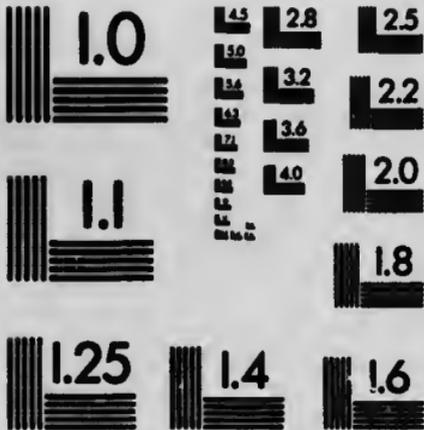
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FRUIT BRANCH

Currants and Gooseberries

E. F. PALMER

The purpose of this bulletin is to give, in as few words as possible, some idea of the extent and importance of the currant and gooseberry industries of the Province, and the most approved methods of culture for the home garden and commercial plantation.

Both the currant and the gooseberry favor a northern climate and do not thrive in hot and dry climates. They are a complete failure in the Southern States of the Union and along the Gulf coast. Ontario seems especially adapted to the culture of these fruits and they can be grown successfully over the greater part of the Province. Some varieties will be found tender in certain districts but there are excellent hardy varieties which will thrive well in the lesser favored localities.

The area of small fruits under cultivation in 1901 is given in the Dominion census as 8,116 acres, and for 1911 Ontario is credited with 13,940 acres, an increase of 71.7 per cent. This includes all small fruits, strawberries, currants and gooseberries, raspberries, etc. In 1910, Ontario produced 2,019,319 quarts of currants and gooseberries or practically sixty-five per cent. of the total production for Canada. The production of strawberries for the same year (fiscal year 1911; crop year 1910) is given as 9,386,135 quarts, and of other small fruits 6,844,253 quarts. The increase over 1901 in the production of all small fruits is figured to be 12.1 per cent. or a little over two million quarts.

A blank form with questions pertaining to currants and gooseberries was sent to the various county representatives and out of twenty-seven replies received, representing twenty-seven counties, only two reports stated that currants were grown to any extent commercially in that county, and five others reported a few commercial patches. The report concerning gooseberries showed even less interest, seven counties reporting a few commercial patches. No reports, however, were received from Halton, Wentworth, Lincoln and Kent counties concerning these fruits.

Every county reported that both currants and gooseberries were grown in the home gardens to a greater or less extent, some counties very little, others quite extensively. Every county with two exceptions reported currants profitable, and with three or four exceptions, gooseberries were also reported profitable. Only about half of the counties stated that the patches were cultivated, pruned and sprayed, and that, not generally, there being on the whole a lack of interest on the part of the fruit growers and farmers concerning those fruits.

From the Rainy River District a most encouraging report came, stating that currants and gooseberries have been very successful where they have been tried.



FIG. 1.—Picking Industry and Lancashire Lad gooseberries in Mr. J. E. Henry's orchard. Note the wide distance between the rows to facilitate spraying.

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Various causes are assigned for the lack of interest in the different counties, the chief ones being lack of help, excessive railroad rates to markets, poor transportation facilities involving several changes in transit for express shipments, little demand for the fruit, and no profits.

The currant and gooseberry have had a share in the increased acreage of small fruits, but, while the area devoted to these two fruits has been gradually increasing, and is doing so especially at the present time, they have not yet been given the acreage and cultivation that they deserve. The public, as a whole, has not been educated to a correct appreciation of these fruits as a valuable addition to the more ordinarily used kinds, and further, as they are among our hardiest cultivated fruits, their value in the northern districts where tree fruits grow with difficulty or not at all, is hard to estimate. Both fruits are easily grown, and this fact together with their value for culinary purposes should insure there being at least a few bushes in every home garden. If the fruits were grown at home, when possible, instead of being bought, much larger quantities would be consumed.

Where it is possible then, one cannot do better than grow these fruits for home use. When it is not possible to grow them the opportunity for the commercial grower comes in, and it is to the commercial grower that the urban population must look. And while the urban population has increased tremendously during the ten years previous to 1911, yet the increase in the production of currants and gooseberries has been only twelve per cent. In other words the urban population—the consuming population—has increased and is increasing much more rapidly than the planting of these fruits. As indirect proof of this one has but to compare prices ten years ago with those now being received by the growers. In 1901 growers received eighty cents to \$1 for black currants. For 1912 and 1913 the returns were \$1.75 to \$1.95 per eleven quart basket, an increase of practically 100 per cent. Red currants and gooseberries, too, have shown greatly increased returns. In 1900 red currants could hardly be given away, while for 1912 and 1913 they averaged to the grower sixty-five to seventy-five cents per eleven quart basket of good quality fruit.

Many growers at present claim that the money to be made out of currants and gooseberries is small. In this regard I would like to quote a paragraph from Mr. L. B. Henry's address before the 1913 Ontario Fruit Growers' Convention. Mr. Henry spoke as follows: "A few years ago the price of currants went down so low that they became unprofitable. Black currants were selling in 1899 and 1900 at sixty-five cents for a twenty pound basket, and at that time you could not sell red currants at any price. But from that time up to the present prices have steadily risen until in the last two years we have been getting very fair results from these crops. In fact as high as ten-and-one-half cents per pound; lately some at six-and-one-half cents and red varieties less."

There is little doubt that if growers now gave more attention to their gooseberry and currant plantations, the added returns would more than justify the extra outlay. There are no fruits that respond more quickly to good treatment than currants and gooseberries. They will stand a good deal of neglect, but if we want large fruit and productive bushes, we must take good care of them.

There is another point to remember too in connection with planting currants and gooseberries. It is this: that though these fruits may sometimes return comparatively small profits yet they serve or should serve as a "filler-in" crop. That is, varieties should be planted which will mature their fruit when there

would otherwise be a slack time in the fruit season. The labor is then profitably employed where otherwise it would practically have to "kill time"—an expensive operation for the grower, constituting an overhead charge on the orchard that is very seldom included in estimates of cost of production, etc.

When commercial growing is undertaken several points have to be carefully considered, chief among which are the facilities for gathering and marketing the fruit. Naturally a near market is desirable since it reduces the cost of shipping, but where no near market is available, this need not prove the deciding factor in the location of a site as currants and gooseberries, especially gooseberries, will ship long distance with little or no injury. Other small fruits will not begin to stand the same length of shipment.

ORIGIN AND HISTORY OF THE CURRANT.

The currant, as compared with some of our other fruits, is of comparatively recent origin. Before the middle of the sixteenth century it was apparently unknown to cultivation, and it was during the fifty years following that it received its modern improved form. Further, it is only during the past half century or a little better, that there has been any extensive improvement of the fruit in this country. Previous to this time currants were simply currants and were commonly known as reds, whites, and blacks. During later years, however, keener competition in the markets has brought about considerable improvement both in size of fruit and in quality. Many new varieties have been originated, though there are growers who still believe that the old Red Dutch variety is superior to any of the more recent introductions. Culture and fertility often appear to have a greater influence on this fruit than parentage, and it is undoubtedly true that with good culture the Red Dutch will surpass the newer varieties under neglect.

The cultivated varieties of the red and white currants are derived from *Ribes rubrum*, a native of the northern parts of America, Europe and Asia. Varieties of the black currants derived from *Ribes nigrum*, a native of northern Europe and Asia. Although not found in America in the wild state, the black currant seems to have found no difficulty in adapting itself to our conditions. One variety of black currant, the Crandall, comes from an American species *Ribes aureum*, better known as the flowering currant. It is, however, a different species from the ordinary black currant.

The currant is in all cases a northern plant, found in cool damp situations, and it objects to any radical change from these conditions. It does not prosper in hot and dry climates, for though the plants may look well, they are comparatively unproductive. Favoring a northern climate as it does, the currant succeeds well over a very wide area in Ontario. For this reason, and also being easy of culture, it is one of the best fruits for home planting. Anyone who has the space should grow sufficient at least for home use.

For various reasons the currant is not so generally used in Ontario as most of our fruits. Few people care to eat it in the raw state as most varieties are too acid for dessert purposes. When cooked, it is usually made into jelly and for jelly making it is unsurpassed. In the colder parts of Ontario where tree fruits do not succeed so well, the currant, on account of its hardiness and ease of culture, as stated above, finds considerably more favor.

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ORIGIN AND HISTORY OF THE GOOSEBERRY.

Like the currant, the gooseberry was apparently unknown to the ancients, and it was probably about the sixteenth century that it was first cultivated in Europe. Since that time a wonderful improvement in the size of the fruit has taken place. The Dutch are thought to have made the first marked improvement, but its present development has been largely brought about in England.

Varieties of English and European gooseberries are derived from the species *Ribes Grossularia*, a native of north Europe. Varieties of this species have not succeeded well in America until lately, being very subject to Gooseberry Mildew which was thought to be very difficult of control. The past few years, however, have demonstrated that the mildew can, if properly treated, be successfully combated.



FIG. 2.—Black currant plantation of Mr. J. E. Henry, Winona.

The American gooseberries are derived chiefly from *Ribes oxycarpon*, a species native to America. Concerning the origin and history of our varieties, W. T. Macoun, Dominion Horticulturist, Ottawa, writes in his *On Bush Fruits*, 1907, as follows:—

“As late as 1846 no cultivated varieties of American species of gooseberries were mentioned by writers, the first reference according to Bailey, being in 1849, in the *Northern Fruit Culturist*, by Goodrich, where the author writes: ‘We have it from good authority that native sorts have been discovered both in New Hampshire and Vermont well adapted to garden culture.’ In 1847 the Houghton’s Seedling was exhibited at a meeting of the Massachusetts Horticultural Society, this being the first improved form of the native gooseberry of which there is a record. This variety was originated or found by Abel Houghton, Jr., Lynn, Mass. It is probably a seedling of the native species, *Ribes oxycanthoides*. The first improvement on the Houghton was the Downing, a seedling of the Houghton, which was originated by Charles Downing, Newburgh, N.Y., and first brought into notice in 1853. It is thought by some authorities to have been a hybrid between Houghton and *Ribes Grossularia*, the European

species. The Downing is still more largely planted in America than any other variety of gooseberry. This is doubtless largely due to the fact that comparatively little has been done towards improving the gooseberry in America during the past fifty years. The most work seems to have been done by Dr. Wm. Saunders, Director of the Dominion Experimental Farms, the originator of the Pearl, Red Jacket, and many other seedlings and crosses not yet on the market. These varieties were all originated in London, Ont. There is a good field for work in improving the native gooseberries, as there is no apparent reason why the size should not be equal to the best English varieties. The quality of the American varieties is considered by some to be better than the average English gooseberry, but the flavor is not nearly as good as the best English sorts."



FIG. 3.—Red currants and corn in a Burlington orchard.

The native species of gooseberries in Canada are found growing very far north, so that eventually its culture, as with the currant, will extend to those districts where other bush fruits and tree fruits are too tender to stand the long and severe winter.

The gooseberry as now grown is objectionable on account of its thorns, and although this may seem a trifling objection to many, yet it is an important consideration when picking times comes around. Breeding and selection will, no doubt, in time produce a good commercial thornless gooseberry. An English variety has been recently introduced which is said to be thornless. Also at the Central Experimental Farm, Ottawa, there are several young seedlings which are perfectly free of thorns, though probably it will be some time before a commercial thornless variety is originated from them.

For culture in Ontario, the American gooseberries, perhaps, have most to recommend them, the mildew being the great drawback to the English varieties. American varieties have vigor, hardiness, ease of propagation, and superior quality.

being inferior only in size, which selection and breeding could overcome in time. The English varieties, however, have been largely planted of late years, as good methods have proved that the mildew can be effectually controlled. Then, too, the jam factories are taking large quantities of these varieties, and it is probably to this fact mostly, that the stimulus in planting English gooseberries is owing. Also English gooseberries usually bring a higher price on the market on account of their size and fine appearance.

PROPAGATION.

The Currant.—Currants are usually propagated from cuttings. The cuttings should be made about six to eight inches long and care taken to make the base of the cutting square across and just below a bud. This facilitates cal-



FIG. 4.—Whitesmith gooseberries growing under peach trees. Orchard of J. E. Henry, Winona.

lusing over of the cut and therefore rooting. The upper cut should be made at least half an inch above the top bud so that there is no danger of the wood drying out past that point. A strong growth is desired from the top bud, and if the wood is cut closer than half an inch, the growth is likely to be weakened.

After the cuttings have been made as described, they may be planted right in the nursery row—the usually recommended plan—or they may be heeled in. Another method, and one which is possibly better than either of the foregoing, is that followed by Mr. J. E. Henry of Winona. He takes the cuttings in the late winter and stores them in the cellar, thoroughly covering them with damp sawdust which holds moisture better than sand. This covering with sawdust encourages a mass of rootlets to start. Early in the spring the cuttings are set out.

If the method of taking the cuttings in August or the beginning of September and planting right in the nursery row is followed, they will be ready to start a good growth the following spring—providing the fall has been favorable. It is well, however, to cover the cuttings with a strong mulch to prevent heaving caused through intermittent freezing and thawing of the ground. The cuttings are placed six to eight inches apart in furrows about three feet apart, and in a well-drained location where there is no danger of standing water at any time. The furrow should be deep enough so that only the top bud or two of the cutting is above ground. This is important as the more of the cutting there is below ground, the more roots will be formed and the stronger the plant will be. There is also danger of the cutting drying out too much before rooting if too much of it is exposed. Place the cutting in the furrow in a slanting position and firm the earth well about them. In a favorable season these cuttings should callus well before winter and perhaps throw out a few roots. During the winter it is advisable to mulch the cutting well as previously stated. Cultivation should be thorough and should begin as early in spring as possible, and be continued throughout the season.

If the cuttings are heeled in over the winter, they should be tied in bundles and buried upside down with soil to the depth of two or three inches over them. This heeling in upside down induces callusing of the cutting as the base is nearer the surface than if right side up, and gets more heat and air. In a few weeks the cuttings should have callused well, and they may be left here over winter if a little more soil is spread over them to prevent them drying out; or if the season is favorable, they may be planted out in the nursery; or they may be buried in sand or sawdust over winter in a cool cellar.

The method, however, which I think has most to recommend it, is that followed by Mr. Henry. It involves less labor and handling of the cuttings, and there is no danger, either, of the cuttings becoming harmed through bad weather conditions during the winter. Also, if one may judge from the plantations of cuttings and currants on Mr. Henry's place, it produces plants as good as, or better than any other method.

The Gooseberry.—Gooseberries are propagated by cuttings and by layering. As cuttings are apt to be very unsatisfactory, being hard to start into growth, layering is probably the safest and best method to use. Propagation by cuttings would be essentially the same as for the currant so that it need not be again discussed. American varieties give fairly satisfactory results by the cutting method. Both English and American varieties are sometimes propagated from green wood cuttings in greenhouses.

Where mound-layering or layering, as it is more commonly called is practised the bushes should be pruned severely in the autumn. This will induce a strong growth of young wood the following season. Early in July when these shoots have about completed their growth, earth is heaped around and through the bushes, most of which operation can conveniently be done with the use of a plow. The work is completed by heaping up earth until only the tips of the shoots are above ground. The earth is then well packed leaving a mulch of loose soil on top to conserve the moisture.

American varieties will have rooted well by autumn, when the separate plants may be transplanted to the nursery row at once or left till the following spring. English varieties will not be ready for transplanting till the following autumn as they usually take a year longer to root well. As with the American varieties,

the plants may then be separated and planted out in nursery rows. It is advisable especially in the more northern sections, to delay planting till the spring, or else heavily mulch the transplanted plants to prevent unfavorable weather conditions heaving them out.

SOIL AND LOCATION.

Currants and gooseberries are surface feeding plants, which fact largely determines their soil requirements.

Currants will do well on most soils, but prefer a cool, moist, fairly heavy soil, as their natural habitat would indicate. A rich well-drained clay loam will be found most suitable. Gooseberries require a similar type of soil, though a little heavier and moister. In dry soils gooseberries are apt to suffer from premature falling of the foliage, thus exposing the fruit so that it becomes scalded by the sun's rays. The surface of light soils, unless shaded by trees, gets very hot in summer, which is not best for the fruit as it induces mildew. A northern exposure is to be preferred for both currants and gooseberries as such a location is not so likely to suffer in a dry season. A northern site too, may in part offset the disadvantage of an unfavorable soil.

Some reduction in the intensity of the sun's rays will be found advantageous, especially with gooseberries, shading and the cooler atmosphere helping to control the mildew. Gooseberries, too, are susceptible to sun scalding. They scald very easily if left out in the hot sun, or if the bushes are very open. Currants and gooseberries therefore often thrive well in the orchard. One of the most successful growers of gooseberries in the Niagara district has part of his gooseberry plantation in the peach orchard. He considers this block of gooseberries as the most profitable he has, and says that the plants thrive better under the peach trees and bear far better than where the fruit is grown in the open; also the fruit is cleaner and freer from mildew, and the pickers find their work more agreeable in the shade of the peach trees. Further, there are two crops coming off the land—gooseberries and peaches. This shading is, of course, most satisfactory and necessary in those districts, such as the Niagara, which have a much warmer climate than that naturally favored by gooseberries. Mulching tends to accomplish the same end, since it keeps the soil shaded and cool. The above remarks apply equally as well to currants, which will also be found to do better in shaded locations, especially in the southern parts of our Province.

The same grower, in discussing further his gooseberry plantation in the peach orchard, states that in his experience English gooseberries thrive best on sandy loam soil. This is somewhat contrary to the generally accepted practice, but is likely explained wholly or in part by the shade from the peach trees, which would offset the need of a heavier soil, that is, a cooler soil. Mr. R. B. Whyte of Ottawa states that; "Mildew, the great enemy of the English gooseberry in this country, results from planting in sandy soils. The roots of gooseberry bushes run close to the surface and consequently they become scorched. They should be planted in soil that wont heat, such as heavy clay loam." This apparently conflicts with the statement of the Niagara fruit grower, but, as noted above, the shading probably accounts for the difference in opinion.

PLANTING.

Preparation of the Soil.—Thorough preparation of the soil is necessary before planting currants or gooseberries. They are heavy feeders so that the land should receive a heavy dressing of well-rotted stable manure, be plowed deep, and

subsoiled if necessary. The manure, if well worked in, will help in putting the soil in the desired condition.

Time to Plant.—Fall planting is generally to be recommended as currants and gooseberries start growth very early in the spring. Also they can be planted comparatively early in the fall—September—giving the plants ample time to become established before cold weather sets in. Spring planting, if done early enough, has few objections, but the trouble is that, there being so much other work to be done at that season the planting is liable to be neglected until after the plants have started growth, for, as stated above, currants and gooseberries start growth very early in the spring. This check will seriously affect the first season's growth.

Distance of planting.—The usually recommended distance of planting is four feet apart in the rows with the rows six feet apart. Currants are often given a little more room, especially the black currants, which are stronger growers. If it is intended to cross cultivate the land, five feet apart each way will be found a good distance to set the plants. Cross cultivation is commonly only needed at intervals. Allowing the plants plenty of room will facilitate spraying and picking. Planting six by six feet would, perhaps, be a better distance to recommend generally for red currants and gooseberries, and seven by seven feet for black currants. Mr. J. E. Henry, of Winona, has his black currant rows seven feet apart with a nine-foot space every third row, this extra large space being partly to facilitate spraying with a power sprayer.

The following table shows approximately how many plants to the acre there will be with different distances of planting.

DISTANCE.	PLANTS.	DISTANCE.	PLANTS.
3 ft. by 5 ft.	2,900	5 ft. by 7 ft.	1,240
3 ft. by 6 ft.	2,400	5 ft. by 8 ft.	1,100
4 ft. by 4 ft.	2,700	6 ft. by 6 ft.	1,200
4 ft. by 5 ft.	2,200	6 ft. by 7 ft.	1,040
4 ft. by 6 ft.	1,800	6 ft. by 8 ft.	900
4 ft. by 7 ft.	1,550	7 ft. by 7 ft.	900
4 ft. by 8 ft.	1,360	7 ft. by 8 ft.	780
5 ft. by 5 ft.	1,740	7 ft. by 9 ft.	700
5 ft. by 6 ft.	1,450	8 ft. by 8 ft.	680

When planting gooseberries under trees, Mr. L. B. Henry of Winona, recommends the following method: "Supposing that the trees are twenty feet apart, plant two bushes in each tree row, placing the bushes six-and-one-half feet from each tree with a seven-foot space in the centre. This gives more room than when planted in the open, but the bushes will grow larger in the shade."

Planting.—The soil should be in a fine mellow condition as deep as plowed, and then marked both ways the required distances with furrows in one direction. It is well to make the furrows deeper than the plants are to be set so that a little fine top soil may be placed under each plant. Root prune the plants before setting as the roots are usually more or less bruised and torn from digging out of the nursery row. The plants will root stronger from smoothly cut roots than from jagged and frayed ends. Set the plants a little deeper than they were in the nursery row. Pack the soil firmly about the roots with the feet. It is very essential that this firming of the soil be thoroughly done, as otherwise there is danger of the soil drying out the following summers. Also the soil being in

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close contact with the roots allows of the plant making a stronger start. After firming the soil, a layer of loose fine earth should be at the surface to act as a mulch and prevent the packed soil beneath from drying out. This mulch also helps to keep the soil beneath cool and moist.

When a few plants only are to be planted for home use, care must be taken to dig a hole big enough so that the roots of the plant may be well spread out. If a spade is just used to pry a hole in the ground and the plant set in that it cannot be expected to thrive.

Choice of Plants.—Strong, well-rooted one-year-old plants are as good as two-year-old plants, and cost less money. It is, however, essential to have them well-rooted. One-year-old plants are easily set, suffer less check in transplanting



FIG. 5.—Another view in Mr. Henry's peach orchard, showing English gooseberries interplanted.

than two-year plants, and make a better growth than they would during the same time in the nursery row. Two year plants are quite often the cull stock left at the end of the first year after the best year-old plants have been sold. They are grown for a second year and then often sold as No. 1 two-year-olds.

SUBSEQUENT CULTIVATION.

Conservation of moisture, and coolness of soil, especially for gooseberries, are two very important considerations with these fruits, hence cultivation must be thorough and frequent. Where the climate will permit, a very good plan is to plow the land in the fall, leaving a furrow down the centre of each row to drain off the surplus moisture. This plowing and also all further cultivations must

be shallow, as the currant and gooseberry are both surface feeders. When the plants are young cultivation in the middle of the rows may be fairly deep, but as the roots extend across the rows, and take up practically all of the land, the cultivation will have to be shallower else the roots will likely suffer considerable injury. If this fall plowing is found to be doing any considerable damage it should be discontinued, and the land worked up with the aid of harrow tooth or spring tooth cultivator. If the land is properly disked, plowing may be omitted.

The land should be worked down with a cultivator or disc as early as possible in the spring whether plowed the previous fall or not. As a rule spring plowing will be necessary if fall plowing is not done. Later cultivations should be given, especially after heavy rainfalls, to keep the top soil in a fine, loose condition so as to conserve the moisture and keep the land cool. About a week after the crop has been harvested all cultivation should cease in order to allow the young wood to ripen up thoroughly before winter sets in.

Plenty of moisture and a cool soil are especially important in gooseberry culture so that its cultivation should, if anything, be more thorough than that of the currant. Both moisture and a cool soil are important factors in controlling gooseberry mildew.

FERTILIZERS.

Currants and gooseberries are gross feeders and must have their food readily available and close at hand, as the roots do not spread far or deeply. Thorough cultivation should therefore be supplemented with liberal applications of fertilizers. Barnyard manure is best with perhaps potash and phosphoric acid applied extra in some form. Manuring need not be heavy, of course, until the plantation has come well into bearing, when annual applications should be made. There is little danger of over-fertilizing the currant or gooseberry plantation; in fact, as usually grown the fertilizer end of the industry is one of the most neglected. Cultivation and manuring must be thorough if good results are to be obtained from these fruits. They will thrive fairly well under neglect, but there are no fruits that will respond more quickly or fully to proper treatment.

Apply well-rotted barnyard manure in the fall and supplement this with a dressing of potash and superphosphate early in spring, especially if the supply of manure has been deficient. Card states in his book of bush fruits that currants contain about 0.11 per cent. of phosphoric acid and 0.27 per cent. of potash, while stable manure contains only about one-third more potash than phosphoric acid, hence the need of additional potash. The Massachusetts State Experiment Station found that applications of potash fertilizers increased in every case quality and productiveness of currants.

PRUNING.

Currants.—Proper pruning of currants is essential to the production of good crops of high quality fruit. The fruiting habit of red currants and black currants differs somewhat, so that the pruning of one is slightly different from the other. Red currants bear their fruit on spurs from wood two or more years of age, while the black currant bears the most and best of its fruit on wood of the previous season's growth. Hence in pruning black currants we must look to the production of a plentiful supply of young wood, and in red and white currants, two and three year wood. Older wood produces inferior fruit.

The old plan of training the plants to a tree form is now seldom used. The plants are less productive, and if attacked by the currant borer, the whole plant is

destroyed instead of one or two shoots. The bush form plan is the generally used one.

In pruning red currants the object in view should be to practice a system of renewal, having vigorous young growth always coming on to take the place of the older branches as they become unproductive. Branches four and five years of age are less productive and should be removed. Two and three-year wood is the most productive and therefore most desirable.

Some pruning may be necessary at the end of the first year after planting to get the bush into shape and regulate the number of main stems to be left. From four to eight main stems properly distributed will bear a good crop of fruit and future pruning should have in view the maintenance of this number of branches two and three years of age and a few others coming on to take their places. It is safe to plan to keep all wood over three years old cut out. Some growers, according to Card, in "Bush Fruits," recommend that no wood over two years old should be left. Broken branches and unnecessary young growth should also be cut out, or shortened back so as to form fruiting spurs.

The young vigorous shoots that are to take the place of the older canes should be shortened in to prevent the bush from becoming straggly, and to force the development of fruit spurs evenly along its whole growth instead of mostly at the ends of the branches. Thus the load of fruit will be more evenly distributed, and the bush will be able to support a large crop of fruit without breaking down.

Pruning may safely be done any time when the wood is dormant though, perhaps, it is as well to delay pruning until shortly before growth begins in the spring. This avoids any chance of the wood drying back and, if there has been any winter killing of unripened wood, it can then be observed and cut out. Also buds are easily injured in late spring pruning. Pinching back the young growth is followed in some countries, the object being to develop fruit spurs. In this climate it might have the tendency to force buds into growth that would not become well ripened before winter set in.

The pruning of black currants varies from that of red currants only in so far as the main object is the production of plenty of one year wood. Pruning is therefore usually more severe than for the red currant as practically a complete renewal of wood has to be obtained each year. Old growth must be kept well cut out.

Gooseberries.—Mr. W. T. Macoun, Dominion Horticulturist, in his bulletin on Bush Fruits, discusses pruning the gooseberry as follows:—

"As the gooseberry makes much more wood than it is desirable to leave, severe pruning is necessary. English varieties are usually trained to a single stem, but this is not necessary, although the freer circulation of air when trained in this way may help to prevent the spread of mildew. The usual custom in America is to grow the gooseberry in bush form. The bush should at first be brought into a good shape by leaving a few of the strongest shoots regularly distributed to make an open head. Five or six of these shoots are quite sufficient to leave at first. As the bush gets older, new shoots are allowed to grow to take the place of the older ones, as the pruning should be done with a view to having only vigorous bearing wood. Fruit is borne on year-old wood and from spurs on older wood. It usually is not desirable to have any wood more than three years old. The best time to prune is in the autumn or winter. The weakest young shoots should be cut off at the ground, also all the stronger shoots not required for fruiting or to take the place of the older branches to be cut away. The side shoots from the older branches should be headed back or cut out altogether so as to maintain a fairly open head, making it as easy as possible to pick the fruit and yet leave sufficient wood to produce a good crop and to shade the fruit from the sun, as in a hot, dry time gooseberries are liable to be injured by the sun. Branches more than three years of age they should be removed to

make way for younger wood. It is advisable to cut out all branches which touch the ground as there will then be a better circulation of air, and the fruit will be kept off the ground. Gooseberries will often begin to bear the second year after planting, but there will not be a full crop until the fourth season. If the soil is kept in good condition by an annual application of well-rotten barnyard manure in the autumn, harrowed in the following spring, and if the bushes are kept sprayed and well pruned, the plantation will not need to be renewed for many years."

The important point to remember is that the finest fruit is borne on the young wood. After two or three years of bearing the wood begins to fail and produces inferior fruit in smaller quantities. There should always be strong, vigorous growth coming on to take the place of the older wood as it is cut out. Also excessive sunlight induces mildew, as well as scalding, and in pruning this point should be carefully borne in mind. The bush must be kept fairly open to facilitate picking, etc., but at the same time the fruit thrives better where it is shaded from the direct rays of the sun.

RENEWAL OF PLANTATION.

In commercial planting it is unusually recommended to renew the plantation of both fruits after eight to ten years. The bushes will live and bear much longer than this, but they will not be as vigorous and bear as much or as fine fruit as younger bushes. However, with good care, liberal fertilizing, and proper pruning, bushes may be kept in a profitable condition for many years.

It is a safe rule to replant as soon as the first trace of waning vigor is detected. The advantage of young and vigorous plants will more than repay the cost of replanting. Bushes in the home garden may be renewed and reinvigorated by cutting back to the ground and manuring heavily.

PICKING.

In picking red currants care must be taken to see that the pickers do not strip the fruit off the stem, leaving the stem attached to the bush. When the fruit is stripped off in this manner, the skin is often broken and the fruit quickly spoils. Pickers should be instructed to take the whole bunch off intact. Varieties of currants which have a long clear space of stem at the base of the clusters, as for example, Fay, have quite an advantage, as they can be easily picked without crushing any of the fruit. Black currants are picked by stripping the fruit, leaving the cluster stem on the bush.

The thorny nature of the gooseberry bush complicates the picking of the fruit to some extent, and apart from making the picking a more or less disagreeable task, it increases the cost of the operation. When picked green, the fruit may be stripped off, the picker wearing gloves to protect the hands. After stripping, the fruit is run through a fanning mill to clean out the leaves. Ripe fruit is too easily crushed to be gathered and cleaned in this manner. The berries must be picked singly. For jam-making gooseberries are picked as soon as they reach full size, but before they begin to soften—"hard ripe."

Currants and gooseberries should never be picked when they are wet, as if packed up and shipped in that condition they will soon spoil. For near markets currants should not be picked until almost fully ripe, while for a distant market, the fruit should be picked while still firm, though colored.

Pickers are usually paid about fifteen cents per eleven quart baskets for red currants and gooseberries, and, as they will pick from ten to twelve baskets in a day under average conditions, they make fairly good money at it. Thirty-

five cents per basket is paid for black currants, four to five baskets a day being the average pick.

YIELDS.

Bailey, in his *Farm and Garden Rule Book*, gives the average yield to be expected from currants and gooseberries at 100 bushels per acre. For gooseberries this seems very low.

In his book on bush fruits, Card estimates that under proper management the currant ought to yield from 100 to 150 bushels per acre, while he records a yield of 320 bushels per acre. Such a yield is, however, out of the ordinary, and should not be taken as a basis for estimates.

Mr. W. T. Macoun, of the Central Experimental Farm, Ottawa, states that the Rankin's red currant, the largest yielder with them, averaged for four years at the rate of 8,107 lbs. or over 202 bushels per acre. The Red Dutch averaged over



FIG. 6.—Crate commonly used in British Columbia for shipping currants. The dimensions of the crate are 23 in. long, $16\frac{1}{2}$ in. wide and $5\frac{1}{8}$ in. deep, and it holds twenty-four 4-5 quart baskets $5\frac{1}{4}$ in. by $5\frac{1}{4}$ in. by 2 in.

183 bushels to the acre, the Saunders black currant 163 bushels, and the Kerry 159 bushels per acre.

With gooseberries, Card estimates that full grown vigorous plants ought to yield from five to eight quarts per plant, or roughly speaking, from 300 to 500 bushels per acre, with plants four by six feet apart. At the Central Experimental Farm, six bushels of Pearl Gooseberry have averaged over a period of five years at the rate of 310 bushels per acre, while the highest individual yield was estimated at a rate of over 680 bushels to the acre. These bushes were planted six feet by four.

Mr. L. B. Henry, of Winona, states that their Whitesmith patch of 600 bushes planted in the peach orchard averaged six quarts each, or 112 bushels for the whole patch. Estimating this per acre, plants five feet by seven, the yield would be about 230 bushels. These figures are not as high as those given by Card, but are mostly actual figures, and therefore entirely reliable, and indicate what yields may be expected under intelligent and proper management.

MARKETS AND PRICES.

Prices for currants and gooseberries are uniformly higher now than they were several years ago, and there is every indication that prices for good fruit will remain good. Twelve or fourteen years ago currants could hardly be disposed of at any price, while during the last two years, prices on the Toronto markets have ranged from sixty-five cents to \$1 and over per eleven-quart basket for red currants. In 1900, the growers received sixty-five cents per twenty lb. basket for black currants, while the ruling price during 1913 was \$1.50 to \$1.75 per eleven-quart basket, much of the fruit selling at \$2. White currants find practically no sale whatever.

Mr. L. B. Henry, Winona, was kind enough to supply the writer with the following prices taken from their shipping books:—

Black currants, 1901, 80 to 90 cents; 1912-13, \$1.75-\$1.95.

Red currants, 1901, 50 to 60 cents; 1912-13, 60-75c.

Gooseberries (English), 1912-13, 90 cents to \$1.

Gooseberries (American), 55 to 60 cents.

(All prices net to grower per eleven-quart baskets, f.o.b. shipping point.)

Prices in detail on the Toronto market during the season of 1913 were as follows:—

TORONTO MARKET, 1913.

Date.	Red Currants.	Black Currants.	Gooseberries.
July 4	.....	.....	.....
10	\$0 65 to \$0 85	.....	\$0 65 to \$1 35
15	75 to 85	.....	60 to 1 25
22	85 to 1 00	.....	75 to 85
29	85 to 1 00	\$1 50 to \$1 75	85 to 1 00
Aug. 13	75 to 85	1 75 to 2 00	75 to 1 00
		1 00 to 1 50	.....

All prices given for 11-quart basket.

Jas. E. Parnall, Western Market Commissioner for Ontario, reported from Winnipeg on August 8th, 1912, as follows:—

"A few crates of red currants coming forward from Ontario, arriving in good condition. Demand good, selling from \$3.20 to \$3.40 per crate of 24 boxes. Market wants more. Some Washington currants in, costing, laid down here, \$2.75 per crate of 16 quarts. Size and quality of fruit not equal to Ontario fruit, but appearance and size of package about equalizes the appearance and quality of fruit. Had our fruit been in same class of packages better prices would have been realized, for in some cases the bottom boxes were damaged."

The McNaughton Fruit Exchange, Winnipeg, out of mixed cars of fruit sold as follows:—

Aug. 3.—Red currants, \$1.90, 6 qt. basket.

Aug. 13.—Red currants, \$2.05, per 24 box crate; fruit a little over-ripe.

Aug. 15.—Black currants, \$1.60 per 6 qt. basket.

Aug. 16.—Red currants, \$2.10 per 24 box crate; fruit in bad shape.

The prices given are wholesale for 1912. 1913 figures are not available, as Ontario had no markets commissioner in the West that year. However, prices during 1913 ranged uniformly higher than for 1912.

Currants and gooseberries, if picked at the right time, and properly handled will stand long distance shipment such as to the Western market with very little, if any, deterioration. When they arrive in bad condition, the fault can usually be traced to over-ripe fruit, picking when wet, or careless handling and improper load-

ing of the car. Of course part of the trouble, too, can often be traced to poor transportation facilities cars being from one to several days too long on the journey out.

Apart from the markets briefly touched on in the foregoing remarks, the jam factories are taking increasingly large quantities of currants and gooseberries each year, at fairly remunerative prices. The English gooseberries are favored by the factories on account of their larger size.

PACKAGES.

Currants and gooseberries are usually sold in the eleven quart basket, and for local markets such a package will suit. For long distance shipment, however, currants should be put in packages where there will not be such a great bulk of



FIG. 7.—Crate commonly used in British Columbia for shipping plums and prunes. Used also for shipping currants and gooseberries. Dimensions $15\frac{1}{2} \times 15\frac{1}{2} \times 4\frac{1}{4}$, to hold four Veneer Tin Top baskets as shown.

fruit together as in the eleven quart basket. If packed in the twenty-four box crate, they will carry much better and arrive in a much more satisfactory condition. Gooseberries may be shipped to the west satisfactorily in the eleven-quart basket. Two types of fruit packages commonly used in British Columbia for shipping currants and gooseberries are shown in the accompanying illustrations.

In this regard it might be well to note what Jas. E. Parnall has to say in reference to packages in the paragraph quoted above. He states that Ontario fruit was better quality than the American fruit, but this was equalized by the inferior appearance of the Ontario packages. It would appear from this that Ontario growers are actually losing money through shipping their currants and gooseberries in the present packages. Appearance of package counts for a great



FIG. 8.—Fay.

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deal with the ultimate consumer and it is the tastes of the ultimate consumer which, in the final analysis, have to be catered to.

COSTS AND RETURNS.

Following are the figures of two leading fruit growers, and although any such figures can be merely approximate and not actual results, yet they are valuable as showing reasonably accurately the cost of the various cultural operations, and the probable returns under proper management.

Mr. Robt. Thompson, St. Catharines, was kind enough to furnish the writer with the following estimates:—

	One acre Red Currants	One acre Gooseberries
Rent of land per year (one acre)	\$10 00	\$10 00
Taxes	2 50	2 50
Preparation of land	4 00	5 00
Cultivating during season	3 40	3 40
Spraying materials	14 00	14 00
Pruning	4 00	8 00
Fertilizers	18 00	18 00
Picking and packing	70 00	60 00
Crates and marketing	50 00	25 00
Cost of management	15 00	15 00
Depreciation and annual share of cost of plants and planting	22 00	30 00
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	\$212 90	\$190 90
Selling 200 24-box crates red currants at \$1.60..	320 00	
Selling 300 11-qt. baskets gooseberries at \$1.00....		300 00
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Net profit	\$107 10	\$109 10

Mr. Thompson further estimates that the cost of plants and planting for one acre of currants (1,400 plants to the acre) is \$76, and gooseberries (1,320 plants to the acre) \$208. The last items of expenditure given, \$22 and \$30, in the tabulated estimates are reckoned as a fair proportion for each year to bear of depreciation and the initial cost of plants and planting as noted above. The yields given are those to be expected from patches four to eight years planted in the case of currants and five to ten years with gooseberries.

The figures given below were supplied through the courtesy of Mr. L. B. Henry, Winona:

	One acre Black Currants	One acre Gooseberries
Rent of land per year (one acre)	\$15 00	\$15 00
Taxes	2 00	2 00
Preparation of land	5 00	5 00
Cultivating during season	5 00	5 00
Spraying and materials	5 00	10 00
Pruning	10 00	10 00
Fertilizers	15 00	15 00
Picking and packing	70 00	60 00
Baskets and marketing	19 00	28 00
Cost of management	25 00	25 00
Depreciation and annual share of cost of plants and planting	20 00	30 00
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	\$191 00	\$205 00
Selling 350 baskets black currants at \$1.75	350 00	
Selling 315 baskets of gooseberries at 90c.....		315 00
	<hr/>	<hr/>
Net profit	\$159 00	\$110 00

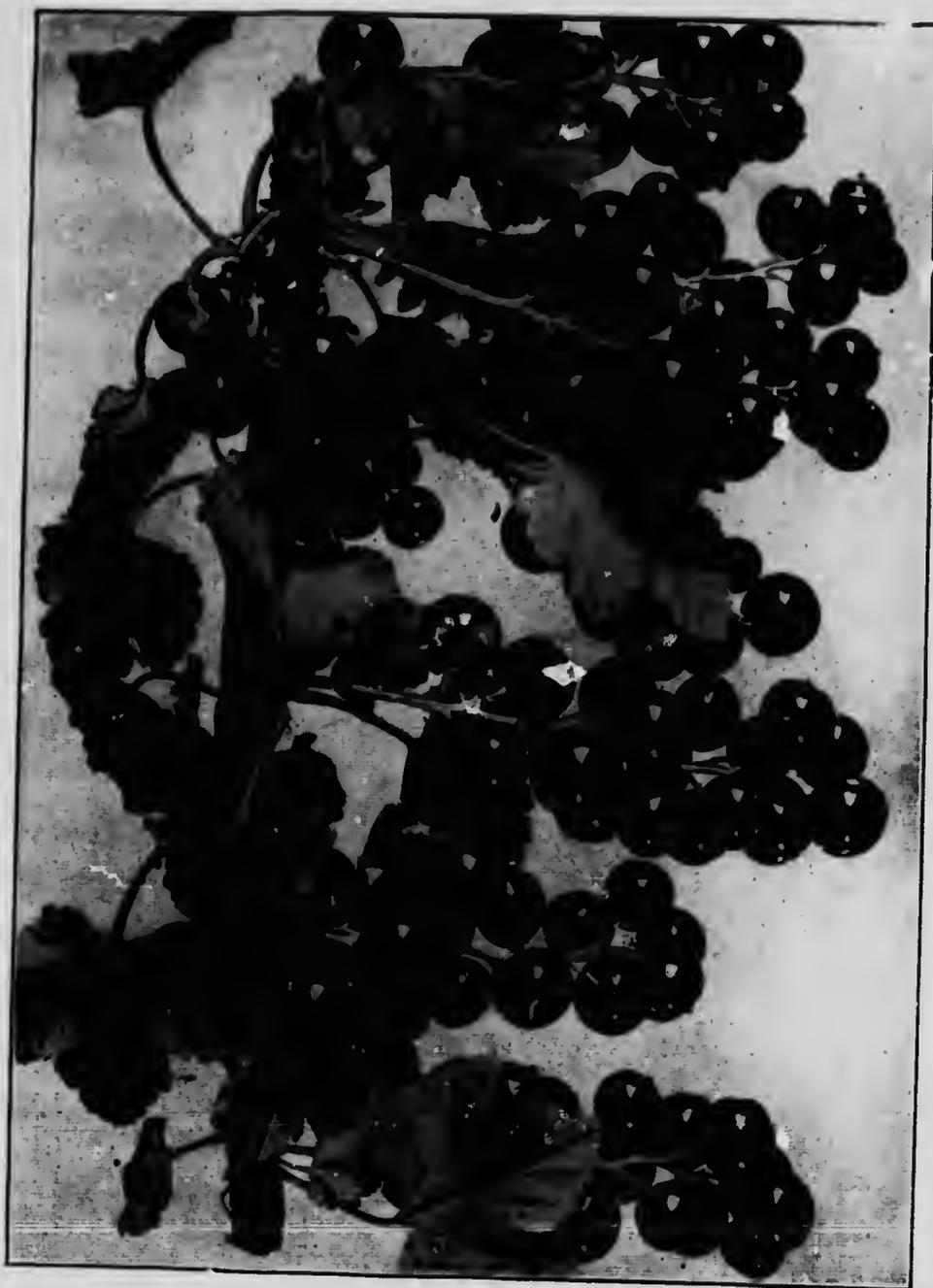


FIG. 9.—Wilder.



FIG. 10.—White Grape.



FIG. 11.—Champion.

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Mr. Henry states that the initial cost of plants and planting would be \$72.50 for black currants (1245 plants to the acre) and \$190.25 for gooseberries (1,200 plants to the acre). As in Mr. Thompson's estimate, the last item of expenditure is intended for depreciation and a fair annual share of the above initial expenditure.

Mr. Henry's currant figures are for the black, and Mr. Thompson's for the red varieties, hence the difference in yields and returns.

USES OF CURRANTS AND GOOSEBERRIES.

The currant is unequalled for jelly-making, and for this purpose the red varieties are preferred on account of their higher color. The currant, also, owing to its acidity is valuable for addition when cooking, preserving, or making jelly from other fruits lacking acidity or sprightliness. Black currants are especially adapted to the making of jam and pies. They are also considered to be of medicinal value in cases of inflammation or soreness of the throat, and moreover, the beverage said to allay this inflammation is an exceedingly pleasant one to drink under any circumstances. Black currant jam and red currant jelly would be welcome additions to any home.

The gooseberry is pre-eminent as a stewed fruit and for pie-making, either from fresh or canned stock. They make excellent jelly also. In the fresh and fully ripe state they are a most desirable fruit for eating out of hand, especially the English varieties, and there is no doubt that in time this quality of the gooseberry will be more generally appreciated. It is a great pity at the present time that more of this fruit is not consumed in this way. Those who know rank the gooseberry as one of the finest dessert fruits if allowed to ripen on the plant, and as there are none of the ill-effects usually attendant on the eating of the green fruit one need have no fear on that score.

VARIETIES.

The selection of varieties is an important point and should be given careful consideration. Some varieties succeed well in some localities and are highly recommended by the growers of that district, while they are looked upon as a more or less failure in other localities. It is well, therefore, when deciding upon what varieties to plant to make careful enquiry as to what varieties are succeeding best for that district. For example: Mr. Macoun has found that the red currants of the Fay type are too tender for the Ottawa district. The Versailles, Fertile d'Angers, Fay, Cherry, and Wilder amongst others have all been found to suffer from injury to the buds during winter.

No technical descriptions of varieties will be attempted in this bulletin, the commercial value only of the different varieties being considered. For technical descriptions the reader is referred to "Fruits of Ontario," published by the Department of Agriculture.

RED CURRANTS.—The usually recommended varieties of red currants for Ontario are: Cherry, Fay, Red Cross, Victoria and Wilder, and to this list I would add Greenfield (recommended by Mr. W. T. Macoun) and Perfection.

Of the above varieties the *Cherry* and *Fay* are probably the most extensively grown in Ontario. They are very similar in appearance except that the bunch of the *Cherry* is more compact. The stem of the *Fay* is longer than that of the *Cherry*, thus facilitating picking. Both are heavy croppers and very desirable varieties.

The *Wilder* is largely planted in the States, and is highly thought of there, but is comparatively little planted in Ontario as yet. It is certainly worthy of



FIG. 12.—Black Victoria.



FIG. 13.—Eclipse.



FIG. 14.—Downing.

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more general planting in this country for the milder districts as it has been found tender in fruit bud at Ottawa. Its mild flavor and good quality make it an excellent sort where a table fruit is desirable.

The *Red Victoria* is one of our best currants for all round purposes. It combines long, well-filled bunches of good-sized fruit of medium quality with hardiness and productiveness. It will succeed well where Cherry, Fay and Wilder would be tender.

The *Red Cross* is one of our newer varieties. It is becoming popular for market and home use on account of the large size of the fruit and its productive habits. An objection to it is that the bunches are of only small to medium size.

Perfection and *Greenfield* are comparatively little known, though they are two very promising varieties. The *Perfection* is a strong grower, though reported to be rather slowgrowing when young. It is a very productive variety bearing exceedingly bright, attractive-looking fruit of very large size in well-filled clusters. It should prove a very desirable and profitable variety for home and market purposes. The *Greenfield*, originated by S. Greenfield, Ottawa East, Ont., is described by Mr. Macoun as being a productive variety of very large fruit, well-filled bunches, quality above medium. Mr. Macoun, in recommending it, says: "I do not know whether it could be obtained in the trade, but we could supply cuttings to anyone who might write for them."

The *Prince Albert*, a late variety, bearing fruit of medium size in long, well-filled bunches, should perhaps be included in the above recommended list. It is a good late variety and would be found useful in lengthening out the season.

WHITE CURRANTS.—Except for home use, the planting of white currants is not to be recommended, as there is practically no demand for them on the market at the present time. The *White Grape* variety will be found excellent for home use, being mild and of very good quality. For eating out of hand it is one of the most desirable varieties, whether red or white.

BLACK CURRANTS.—*Black Victoria*, *Champion*, *Lec. Boskoop Giant*, *Saunders* and *Naples* are the usually recommended varieties. Mr. W. T. Macoun considers that five varieties, *Kerry*, *Clipper*, *Eclipse*, *Climax* and *Collin's Prolific* which have been under observation at the Central Experimental Farm are equal to or better than the varieties generally planted throughout the Province. The first four of these were originated by Dr. William Saunders from seedlings which he took from London, Ont., to the Central Experimental Farm at Ottawa in 1887.

Mr. B. Henry, in discussing the varieties of black currants before the 19th Fruit Growers' Association Convention spoke as follows: "As regards black currants, I only grow one variety, having found it to be the best with us, that is the *Black Naples*. It is a strong and vigorous grower and is very prolific. The buds are borne on short clusters and very well distributed over the bush.

"The *Champion* is not so vigorous. It comes in about five days to a week later than *Naples* and this may be a point in its favor, as it can be planted along with the *Naples* and will make a yield that will surprise you. But we have found one fault with it—the fruit does not ripen evenly; that is to say, the fruit may be ripe on some parts of the bush and partly green on the other sections and for that reason it requires more time to pick the fruit properly.

"The *Victoria* is another black currant which is very well known. It is very vigorous, perhaps more so than any other variety I have mentioned, but in our district it is not as heavy a cropper as *Naples* or *Champion*. I have no doubt some of you will think that is wrong, because I have heard that *Victoria* in some districts is one of the best currants there."



FIG. 15.—Houghton.

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The *Victoria* ripens unevenly like the *Champion* and is also of late season, though not quite as late as *Champion*. The fruit is large, but in medium-sized clusters only.

The *Boskoop Gian'* black currant has been attracting considerable attention of late, and if it lives up under general culture to advance promises, it should prove one of our most valuable commercial varieties combining, as it does, size and quality of fruit, size of bunch and productiveness. It is most highly commended by growers who have given it a good test.

The *Saunders*, another of Dr. Saunders' seedlings, is a most promising commercial variety, and has been under general culture for some years now. It is a very productive variety and a strong grower.

Kerry is considered by Mr. Macoun to be one of the most promising for commercial purposes on account of its great productiveness and quality of fruit. *Clipper* and *Climax* are also strong growing productive new varieties of medium to late season, and with *Eclipse*, an early season currant, are very highly thought of at the Central Experimental Farm, Ottawa. In a table Mr. Macoun has worked out, based on the productiveness of the different varieties of black currants, *Saunders* comes second, *Kerry* third, *Clipper* sixth, *Eclipse* seventh, *Collins' Prolific* eighth and *Climax* ninth. Three other varieties, *Ogden*, *Ontario* and *Eagle*, occupying first, fourth and fifth places respectively, are not considered as good as the former varieties for various reasons, such as quality, evenness of ripening, etc. It is worthy of more than passing notice that the usually recommended varieties occupy the last half of the table mentioned, which included thirty-three varieties. *Lee* is twenty-second, *Champion* thirtieth, *Victoria* thirty-first and *Naples* thirty-third. Locality, of course, might have something to do with this low showing of these varieties, though Mr. Macoun thinks not, but thinks the newer varieties, *Kerry*, etc., are simply better.

If *Kerry*, *Clipper*, *Eclipse* and *Climax* cannot be obtained from any of the nurseries, cuttings can be secured from the Central Experimental Farm, Ottawa. *Collins' Prolific* has been on the market for some time, and is considered one of the best commercial late varieties, though, quality and productiveness combined, it is not equal to the former varieties.

GOOSEBERRIES.—*Pearl*, *Downing*, *Red Jacket*, *Smith's Improved*, of the American varieties, and *Whitesmith*, *Industry* and *Keepsake*, of the English varieties, are generally considered to be the best.

The *Pearl* and *Downing* gooseberries are very similar in size and appearance, the *Pearl* averaging perhaps a little larger. These two and the *Red Jacket* or *Josselyn* are the three most popular gooseberries of American origin. They are all free from mildew, vigorous and very productive. The *Downing* is probably the most widely planted in Canada. The *Smith's Improved*, a seedling of *Houghton*, originated on the American side and is well recommended by American growers. It is not as well known in Ontario as the *Pearl* and *Downing*, but is highly spoken of by several Canadian growers. L. B. Henry highly recommends it, placing it before *Red Jacket*.

Houghton, an American variety not included in those recommended, is a very productive variety of good quality, sweet-flavored fruit, and until the advent of the *Downing*, it was the most popular gooseberry. The fruit, however, is small, though it is a very hardy variety and perhaps should therefore be included in the recommended list. It will thrive where many of our otherwise better varieties will suffer from the severe winters, probably being the only variety of merit that will thrive in the Prairie Provinces.



FIG. 16.—Whitesmith.

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The *Whitesmith* is probably the best of the English varieties grown to any extent in Ontario. It, and *Industry*, are commonly supposed to be freer from mildew than other English varieties. The experience of Mr. Macoun was that they both mildewed rather badly at Ottawa. Thorough spraying, however, will control the mildew.

Mr. R. B. Whyte, of Ottawa, has several very promising varieties of English gooseberries and seedlings of the same in his garden. The value of those that succeed with him for other parts of the Province is, however, hard to estimate, as the conditions under which his gooseberries grow would be impracticable for commercial culture. His best varieties and seedlings are, however, certainly worthy of trial.

THE MOST IMPORTANT DISEASES OF CURRANTS AND GOOSEBERRIES.

L. CAESAR, PROVINCIAL ENTOMOLOGIST.

POWDERY MILDEW OF THE GOOSEBERRY (*Sphaerotheca mors-uvae*).—This disease is the greatest obstacle to the successful growing of European varieties of gooseberries in Ontario. It attacks the American varieties also, but only to a very small extent, and is sometimes found on currants, rarely doing much damage to them. Affected gooseberry plants show the disease first on the young leaves and tender tips of the new growth. It then spreads to the young fruits soon after these are formed. All the diseased parts are soon covered over with a white powdery substance from which numerous summer spores are carried by the wind from place to place. Later in the season this whitish covering begins to brown and thicken, forming a dense felty coat over the affected parts including the fruit. In this brown substance the winter spore cases are formed and from these in spring the disease is spread. As a result of the fungus the growth of the twigs is stunted and the affected fruits dwarfed and rendered useless. Frequently nearly the whole crop is ruined.

It is usually believed that warm climates and lack of air circulation favor the disease.

Means of Control.—Bordeaux mixture has given poor results. Potassium sulphide, 1 ounce to 2 gallons, has given fair satisfaction, but the best results have been obtained from lime-sulphur. At least three applications should be given. The first should be shortly before the buds begin to burst, using the same strength as for the dormant spray on apples, namely commercial lime-sulphur diluted about 1 gallon to 9 or 10 gallons with water, or a specific gravity strength of about 1.030. The second application should be soon after the leaves appear, but before the blossoms open. Use lime-sulphur specific gravity 1.015 (commercial diluted 1 gallon to 20). The third shortly after the fruit has set. Use lime-sulphur specific gravity 1.010 (commercial 1 gallon diluted to 30). The fourth application may be made in about 10 days after the third and may be a little weaker. Care should of course be taken to see that every particle of the plants is covered each time. It will also help to prune the plants or support them so that no branches will rest on the ground.

CURRANT ANTHRACNOSE (*Pseudopeziza ribis*).—This disease attacks the various kinds of currants, being most destructive on the white and red, and usually doing much less damage to the black. It seems to be only rarely found on the gooseberry. The leaves alone are attacked. On them the disease causes small brown areas, chiefly on the upper surface. When these spots are very abundant the leaves

become a sickly yellow color and drop off, thus interfering with the plant's power to store up food for the coming season.



FIG. 17.—Powdery Mildew of Gooseberry. (After Close.)

Means of Control.—Very few careful tests of control measures have been made, but there is little doubt that the first three applications mentioned above for the control of gooseberry mildew, followed by a fourth application as soon as possible after the crop has been harvested would control the disease. Bordeaux mixture



FIG. 18.—Currant Anthracnose on Leaf.
(After Duggar.)

4-4-40 or lime sulphur may be used. If the latter is chosen the first application may be at the strength mentioned above for mildew, but the second application need not be stronger than specific gravity 1.010 (commercial 1 gallon diluted to 30), nor the third than about 1.009 (commercial 1 gallon diluted to 23 to 35) nor the fourth than about 1.008 (commercial 1 gallon diluted to 35 to 40).

CURRENT LEAF-SPOT (*Septoria ribis*).—This disease attacks the various kinds of currants and gooseberries, and seems to be quite common throughout the Province. As it, like the one mentioned above, causes spots on the leaves and when very severe in its attack causes them to turn a sickly yellow color and drop, much after the manner of the Anthracnose, it is very easy to confuse the two diseases. A microscopic examination, however, shows that the spores are very different in appearance. Moreover the spots caused by Anthracnose are, as a rule, brown throughout, while those caused by the Leaf-spot have usually white or grayish-white centres and brown borders.

Means of Control.—Some tests with lime-sulphur made by the writer show that the disease can be prevented by spraying. For best results at least four applications should be given. The first before the buds burst, using lime-sulphur specific gravity strength 1.030 (commercial 1 gallon diluted to 9 or 10); the second just before



FIG. 19.—Currant Leaf-spot. (Original.)

the blossoms appear, specific gravity 1.010 (commercial diluted 1 gallon to 30); the third soon after the fruit is set, specific gravity 1.009 (commercial 1 gallon to 33 to 35); and the fourth as soon as possible after the fruit is picked, using a slightly more diluted strength. Bordeaux mixture instead of lime-sulphur has also been used satisfactorily to control the disease.

THE CHIEF INSECT PESTS OF CURRANTS AND GOOSEBERRIES.

L. CAESAR, PROVINCIAL ENTOMOLOGIST.

THE IMPORTED CURRANT WORM OR CURRANT SAWFLY (*Pteronus ribesii*).—The most common and destructive insect attacking both currants and gooseberries in Ontario is the Imported Currant Worm or, as it is commonly called, the Currant Sawfly. The larvæ are greenish caterpillars almost three-quarters of an inch long when full grown and with black heads and many black spots over the body. The adults are four-winged insects known as Sawflies. The female is about the size of a house fly and has a black head and conspicuous honey-colored body; the male is smaller and blackish. Adults appear soon after the leaves come out and lay eggs

in chains along the veins of the underside of the leaves. These soon hatch and the young larvae feed on the foliage, often being most numerous in the central parts of the plants, and doing much damage there before attacking the outer leaves. The foliage in many a plantation is almost entirely destroyed, only the main veins and the fruits being left. There are two broods in a year, the larvae of the second appearing about the time the currants are ripening. When the larvae are full grown they enter the ground and make earthen cocoons. The winter is spent in there.

Means of Control.—Fortunately this pest is easily controlled by spraying with arsenicals. The first application should be with 2 pounds of Arsenate of lead to 40 gallons of diluted lime-sulphur, or of Bordeaux mixture applied just before the

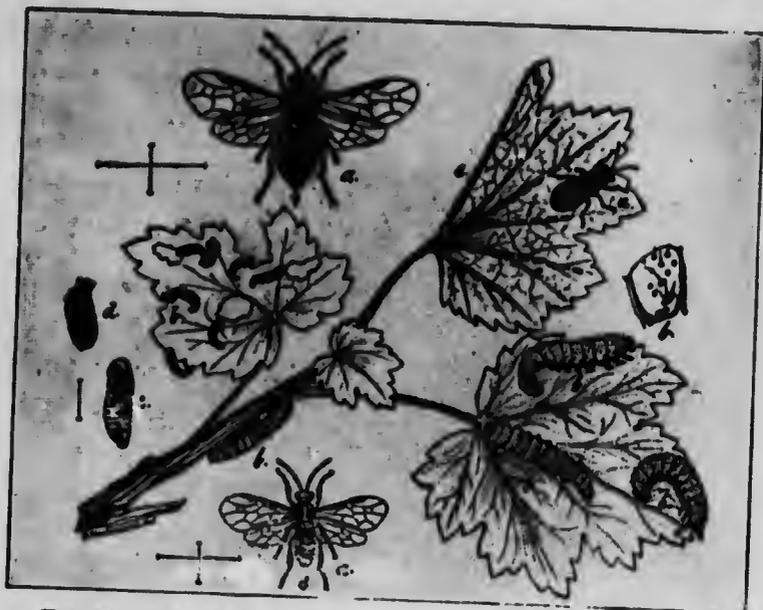


FIG 20.—Imported Currant Worm: (a) Female and male adults enlarged (the lines to the left show the natural size); (b) larvae, those to the left immature, the others about mature; (c) pupa enlarged; (d) cocoon formed in the soil; (e) eggs laid on under surface of leaf. (After Luger.)

blossoms appear and repeated soon after the fruit is set. See to it that all the inner and lower leaves are covered. The lime-sulphur or Bordeaux is added to control diseases. If the second brood is seen to be present, hellebore, 1 ounce to 1 gallon of water, should at once be used. The hellebore should be fresh, as it loses strength if exposed to the air. It is unsafe to use arsenicals on the fruit at this stage.

THE IMPORTED CURRANT BORER (*Aegeria tipuliformis*).—Most currant and, to a lesser extent, gooseberry plantations are attacked by a borer which works in the canes, especially in the larger ones. Affected canes not infrequently become sickly and in the following season die. The borer is the white larva of a clear-winged moth about half an inch in length, blackish in color with several narrow yellow bands around the body. It looks somewhat like a wasp. In Ontario the moths appear in June and may often be seen in considerable numbers on the leaves. They lay eggs in the axils of the leaves or on any little opening on the canes and the young larvae on hatching bore into the pith where they feed till full grown.

They winter here. If an infested cane is cut through the darkened pith shows clearly the work of the borers. There is only one brood each year.

Means of Control.—It is impossible to do anything against this pest by spraying, and the only practicable means of control seems to be not to grow currants in tree, but in bush form, and to practise a system of pruning by which the wood is not allowed to become old, but is removed after bearing one or at the most two crops, and new shoots allowed to grow up to take their place. All prunings must be burned before the end of May, or the moths will emerge from them. Any dying or sickly canes should also be promptly removed throughout the season and either burned or the borers inside them killed.

THE CURRANT APHIS (*Myzus ribis*).—The leaves of currants and, to a lesser extent, of gooseberries are often severely attacked by green plant lice, aphids, which feed upon the under surface and cause the leaves to curl downwards. The parts



FIG. 21.—Imported Currant Borer; moth, larva and empty pupae case still attached to exit hole. The dark hole in the end of the cane shows where the larva has tunneled in the pith. (After Luggler.)

of the upper surface between the veins are usually elevated in large irregular blisters that are often reddish in color. Affected leaves in many cases are so much weakened that they die. The aphids pass the winter in the egg stage. Eggs are very small, black and glossy and are placed in the axils of the buds and the wood. They hatch a few days before the buds burst and the young aphids at once proceed to feed upon the developing buds and leaves. Reproduction in early summer is very rapid, and enormous numbers of the insects may be found. Natural enemies, however, both parasitic and predaceous, usually bring them under control in midsummer.

Means of control.—Arsenical mixtures are useless as aphids are sucking insects; hence contact poisons must be applied. Of these probably the best is Black Leaf 40, a tobacco extract. The only objection to this is that it is somewhat expensive. It should be used with lime-sulphur as soon as the eggs have hatched, that is, a day or two before the buds burst. This will destroy most of the insects and, if another application combined with the lime-sulphur or Bordeaux mixture is given just before the blossoms come out, almost every aphid can be destroyed. Of course, in the latter case the spray must be shot up from beneath so that the under surfaces may be covered. The lime-sulphur or Bordeaux is added with the object of controlling diseases (see under Leaf-spot above). Kerosene Emulsion or Whaleoil Soap, 1

pound in 6 gallons of water, may be used instead of Black Leaf 40, but should not be combined with lime-sulphur. It is almost useless to spray after the leaves have become curled because it is then impossible to hit all or nearly all the aphids.

RED SPIDERS (*Tetranychus bimaculatus*).—Red Spiders are mites that feed on the under surface of the leaves of numerous plants. They have sucking mouth parts and cause currant leaves to become brownish or reddish-yellow in color and therefore unhealthy in appearance. Such leaves in dry weather, when the plants need them most, dry up and die. The mites have the habit of spinning a very fine web on the undersurface of the leaves, beneath the protection of which they feed and lay their eggs. Red Spiders are not all red, as one would expect; frequently most of them are a pale green or nearly transparent whitish color. They can just be seen with the naked eye. The eggs are like little glistening drops of dew. The spiders winter in the soil around the base of the plants.



Fig. 22.—Currant leaves curled by aphids. (After Close.)

Means of Control.—If lime-sulphur is used for the various spray applications mentioned above and the under surface of the leaves is well covered there will be little trouble from this pest. Wet weather also helps to control it, as the mites thrive best in dry seasons.

SAN JOSÉ AND OYSTER SHELL SCALES.—Currant bushes frequently, and gooseberry bushes sometimes, are severely attacked by either the San José or Oyster Shell Scale. If no remedial measures are taken the former of these insects will soon kill affected plants, and the latter will weaken them and occasionally cause their death. For a full description of the appearance and habits of these insects see Bulletin No. 219.

Means of Control.—Prune the bushes out well so that every part can be thoroughly sprayed and use lime-sulphur, specific gravity strength 1.032 to 1.035 (commercial lime-sulphur 1 gallon to about 8), a little while before the buds burst. Very badly infested bushes should receive two applications before the buds burst.

Many other insects and diseases attack currants and gooseberries in Ontario, but as they seldom do much damage it has not seemed desirable to give an account of them here.

