DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

HORTICULTURAL DIVISION

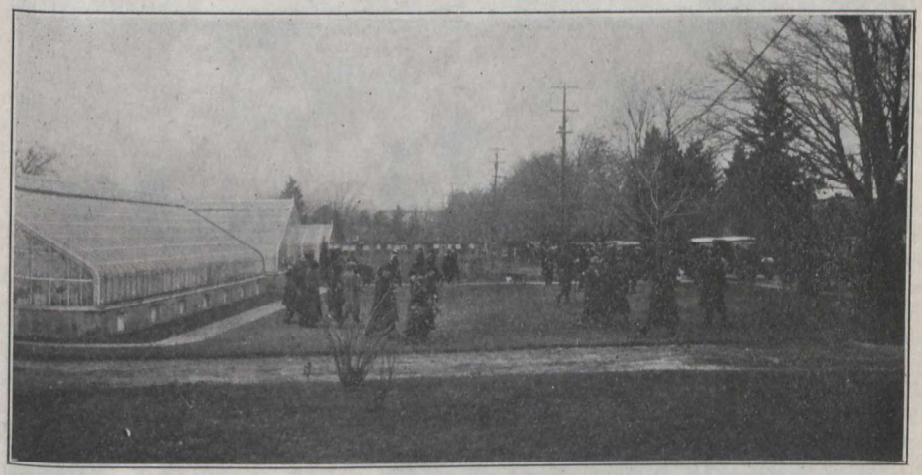
INTERIM REPORT

OF THE

Dominion Horticulturist

W. T. MACOUN

FOR THE YEAR ENDING MARCH 31st, 1921



Visitors at the Chrysanthemum Show, Central Farm

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Frontispiece.

Chrysanthemums in the greenhouse, Central Experimental Farm, Ottawa, Ont. Photo by Frank T. Shutt

REPORT OF THE HORTICULTURAL DIVISION

W. T. MACOUN, *Dominion Horticulturist*

SEASON AND CROPS

The present is the thirty-fourth annual report of the Horticultural Division.

From the year 1898 until 1916 there was published in that report, each year, a fairly detailed account of the character of the season with its bearing on horticultural crops. To bring this up to date a very brief statement may be made here. In 1916 there was a very serious outbreak of apple scab in the district, owing to a wet May and June, but the crop at the Farm was the largest and best in its history. Following this wet weather came a hot July and August and a dry autumn. September being cool, grapes did not ripen. The winter of 1916-17 was not a very cold one and European plums, which seldom fruit at Ottawa, bore a good crop in 1917. The winter of 1917-18 was very cold, low temperatures coming relatively early, and there was great loss from winter-killing in the orchards at the Experimental Farm. Not since the winter of 1903-4 had the number of deaths from winter-killing been anything like so great as this year. The spring and summer following were dry and conditions not as favourable as they otherwise would have been for a recovery of injured trees, and the following winter, being another severe one, more trees died.

The winter of 1919-20 was the severest on herbaceous plants in over thirty years. There was no snow on the ground sufficient to protect them well until January 13, 1920, and the weather being very cold at times before this, the ground froze deeply. Practically every tulip and narcissus bulb was killed, where unprotected. Perennial phloxes and other flowers, generally considered quite hardy, were destroyed in large numbers. April, 1920, was cool, though a good month for work; snow went early and frost was out in most places enough to permit digging on April 12. May was moderately warm with little rain. June was a warm month with a fair rainfall, well distributed. There was little hot weather in July, but a good rainfall. August was a warm month, the hottest day of the summer being on the 8th, when it was 93·5° F. September was warm and October was also favourable, there being no frost recorded during that month until the 29th, when the temperature was 29° F.

The autumn of 1920 was one of the finest experienced since the Experimental Farm was established, and it was not until the night of November 1 that the first really killing frost occurred. Up to this time geraniums were still practically unhurt, and tender plants, such as nasturtiums, were still alive in some gardens. No frost was recorded from April 26 to September 21, and on this date the record was slightly over half a degree, namely 31·4° F. November was mild and, while the ground froze sufficiently to prevent ploughing on the 13th, the temperature dropping to 11·7° F., the weather became mild again and the frost was about out of the ground on the 23rd. There had been a covering of snow since November 16 with but little frost. Winter may be said to have set in on November 16.

The winter of 1920-21 was a mild one with a relatively small precipitation of snow or rain. The ground was, however, covered with snow from November 16 and there was continuous sleighing until early in March. During the very severe winter of 1917-18 the temperature was below zero on fifty-five different days, whereas in the winter of 1920-21 it was below zero only twenty-one days. The coldest day was on January 19, when it was 22° below zero. The only other time it was lower than 12° below zero was on January 18, when it was -20° F. This was one of the mildest winters experienced since the Central Farm was established. There were few thaws, but the temperature on the whole was relatively high. By March 9 grass was showing

in places and the month was a mild one, with frost out enough to dig in some places by the end of the month.

The dates when frost was sufficiently out of the ground to dig, for the years not yet recorded in the annual report, are: 1915, April 5; 1916, April 14; 1917, April 11; 1918, April 15; 1919, April 15; 1920, April 12. The average for twenty-three years is April 12. The dates when the ground froze up or when there was too much snow to continue working the soil were: 1915, December 2; 1916, November 25; 1917, November 22; 1918, November 25; 1919, November 15; 1920, November 16. The average for twenty-three years is November 25.

There was a good crop of apples in 1920 at Ottawa, and the American plum crop was also good, but as the European plum trees had been practically all killed or badly injured in the winter of 1917-18 there was no crop of these. There are very few pear and cherry trees of a bearing age left and there was little or no crop of these fruits this year. The crop of grapes was good and this fruit ripened better than it has done for several years. Currants and gooseberries yielded well, but raspberries were badly injured by the winter of 1919-20, and the yield was only fair. The injury this year was partly at the roots and partly at the tops. Evidently nearly all shoots below ground were killed as there were practically no suckers from the red raspberries this year. The strawberry crop was an excellent one. The season of 1920 was a very good one for vegetables, nearly every kind under test doing well.

MAIN SUBDIVISIONS OF THE WORK OF THE HORTICULTURAL DIVISION

The work of this division is divided into three main sub-divisions, viz., Pomology, including all work with fruits; Vegetable Gardening, including the breeding and selection of new varieties; and Ornamental Horticulture. In addition, there is the work carried on in the greenhouse area, which embraces work with vegetables and flowers, and potted fruits for breeding purposes.

POMOLOGY

Under this subdivision the work being carried on embraces cultural experiments, variety testing, and plant breeding with the following fruits: Apples, plums, pears, grapes, strawberries, raspberries, currants, and gooseberries.. This report does not cover all the above fruits as the experimental work with same is not yet sufficiently complete to warrant the publication of results.

APPLES ORIGINATED IN THE HORTICULTURAL DIVISION

The breeding of new varieties of apples for the purpose of obtaining better sorts than those that are at present available was continued in 1920, and a number of trees came into bearing for the first time, the fruit of which was described. Since the last detailed report was published in 1916 several of the most promising, which have been bearing for some years, have been named, and are being propagated for further test. Certain sorts originated in the Horticultural Division, among which are Melba, Joyce, Pedro, and Mendel, have been so thoroughly tested and are considered so valuable to the fruit-growers of Canada that they are now being propagated in fairly large numbers by the Horticultural Division, and will soon be offered for sale in the hope that in this way they will be quickly disseminated. There is great need for better dessert varieties of summer and autumn apples, and it is expected that some of these new ones will fill this want. The Melba apple is a summer variety of very good quality. It is a seedling of McIntosh Red, and much resembles that well known sort. The Joyce and Pedro also have many McIntosh characteristics, but are in season in September, while the Mendel is a late keeping seedling of Wealthy, having the early and heavy bearing habit of Wealthy.

Following are descriptions of those that have been named recently:—

Currie (Northern Spy Seedling).—Size large, form conical to oblong conical; cavity deep, open; stem medium length, moderately stout to stout; basin deep, open, wrinkled; calyx open; colour yellow thinly washed and splashed with carmine; predominant colour carmine approaching orange red; seeds above medium size, acuminate; dots few, white, distinct; skin moderately thick, moderately tender; flesh yellowish, tender, melting, moderately juicy; core medium; flavour subacid, pleasant, spicy; quality good; season October to January or later. Has a slight resemblance to Northern Spy in colour and shape. Has a suggestion of the flavour of Sops of Wine.

Hume (McIntosh Seedling).—Fruit medium to above medium; form roundish to oblate, slightly ribbed; cavity open, medium depth; stem short, stout; basin deep, medium width, slightly wrinkled; calyx open; colour yellow well washed and splashed with deep to dark attractive crimson; predominant colour deep crimson; seeds medium size, acuminate; dots few, white, distinct; bloom moderate, bluish; skin thick, moderately tender; flesh dull white and yellowish with traces of red, crisp and tender, juicy; core medium; flavour subacid, pleasant; quality good; season late September probably to November. A very handsome apple suggestive of McIntosh in colour, flesh and flavour. Perfumed somewhat like McIntosh.

Merlin (Shiawassee Seedling).—Fruit medium to above medium; form oblate; cavity open to moderately open, deep, russeted at base; stem medium length to short, slender; basin deep, medium width, wrinkled; calyx open; colour pale yellow, splashed and washed with crimson; predominant colour crimson; seeds medium size, acute; dots few, yellow, indistinct; bloom medium, pinkish; skin thin, tender; flesh white with traces of red, crisp, tender, juicy; core medium, open; flavour subacid, pleasant, spicy; quality good to very good; season October and November. Resembles Shiawassee considerably in shape, flesh and flavour.

McSweet (McIntosh Seedling).—Fruit medium to above medium; form oblate to roundish conic, regular; cavity deep, open; stem short to medium, stout; basin open, medium depth, nearly smooth; calyx closed; colour pale yellow well washed with deep crimson and darker splashes; predominant colour deep crimson; seeds medium in size, obtuse to acute; dots few, indistinct; bloom bluish; skin thick, tough; flesh dull white and yellow, very tender, juicy; core small, open; flavour sweet, pleasant; quality good; season late September to mid-December. Resembles McIntosh considerably in outward appearance and in flesh. A good sweet apple.

Omesal (Salome Seedling).—Fruit large; form oblong conical, ribbed; cavity open, medium depth, russeted; stem short to medium length, stout; basin deep, medium width, wrinkled; calyx closed or partly open; colour yellow, well washed and splashed with orange red; predominant colour orange red; seeds medium size, obtuse or acute, almost acuminate, mottled in colour; dots few, yellow, distinct; skin moderately thick, tender; flesh yellowish, coarse, firm, crisp, moderately juicy; core large, open; flavour subacid, pleasant; quality above medium to good; season December to late winter. An attractive looking apple resembling Salome considerably in outward appearance, flesh and flavour. A very good keeper and has proved very hardy though not quite as good in quality as some others.

Orsino (Shiawassee Seedling).—Size large; form oblate to roundish, slightly ribbed; cavity medium depth and width, russeted at base; stem medium length, moderately stout; basin open, medium depth, wrinkled; calyx open or partly open; colour pale greenish yellow thinly splashed and washed with carmine; predominant colour carmine; seeds medium size, acute; dots obscure; skin moderately thick, tender; flesh white with traces of red, tender, melting, moderately juicy; core small;

flavour subacid, pleasant; quality good; season late September to early November. Resembles Shiawassee considerably in flesh and flavour. Attractive in appearance, and a good dessert apple.

Oshtosh (*McIntosh Seedling*).—Fruit medium; form roundish, slightly angular; cavity medium width, medium depth, russeted at base; stem short, stout; basin deep, medium width, slightly wrinkled; calyx partly open; colour pale green well washed with deep rather dull crimson, green about cavity; predominant colour deep crimson; dots moderately numerous, gray, indistinct; seeds medium size, acute; skin moderately thick, tough; flesh white tinged with red, tender, juicy; core small, open; flavour subacid, pleasant, sprightly, aromatic; quality good; season October to mid-December. Resembles McIntosh a little in outward appearance, also in character of flesh and flavour. Distinctly of Fameuse group. Not as good in flavour as McIntosh, but much like it in flavour.

Patricia (*McIntosh Seedling*).—Fruit medium to below medium; form roundish conical; cavity narrow, medium to deep, russeted; stem short to medium, stout; basin deep, open, wrinkled; calyx partly open or open; colour pale yellow well washed with bright crimson; predominant colour bright crimson; seeds medium size, rather light brown, acuminate; dots obscure; skin moderately thick, tender; flesh yellowish with traces of red, tender, melting, juicy; core medium in size, open; flavour subacid, pleasant; quality good to very good; season October to December. Resembles McIntosh considerably in character of flesh and has a marked perfume like McIntosh. A very handsome apple and should prove a good dessert variety. Bears heavily and should be thinned to get best size.

Peace (*Langford Beauty Seedling*).—Fruit above medium to large; form oblate to roundish, regular; cavity deep and medium in width; stem short to medium in length, stout; basin open, medium depth to deep, slightly wrinkled; calyx open or closed; colour yellow, well washed and splashed with deep, attractive crimson; predominant colour deep crimson; seeds medium size, acute to acuminate; dots few, yellow, indistinct; bloom slight, bluish; skin moderately thick, moderately tough; flesh yellowish, crisp, tender; core medium; flavour briskly subacid, pleasant; quality good; season mid-September to mid-October, though it is sometimes in condition for eating until December. Resembles Langford Beauty considerably in outward appearance, flesh and flavour. A handsome apple.

Shishee (*Shiawassee Seedling*).—Fruit above medium to large; form roundish, ribbed; cavity narrow, deep, russeted; stem medium to long, moderately stout to slender; basin deep, open, slightly wrinkled; calyx open; colour pale yellow thinly washed with crimson on sunny side; predominant colour pale yellow; seeds below medium, roundish, acute; dots obscure; skin moderately thick, tender; flesh white, fine-grained, tender, moderately juicy; core small, open; flavour subacid, pleasant, pear-like; quality good; season November and December. No marked resemblance to Shiawassee seedling except in having white, fine-grained, tender flesh.

Spiotta (*Northern Spy Seedling*).—Fruit medium to large; form oblate to roundish, conic; cavity deep, open, russeted; stem short, moderately stout to stout; basin deep, open, nearly smooth; calyx open; colour greenish yellow to yellow, washed and splashed with crimson; predominant colour crimson; seeds below medium in size, plump, obtuse; dots few, white, indistinct to distinct; bloom bluish; skin thick, moderately tough; flesh dull white or yellowish, tender, crisp, juicy; core small; quality good; season November to February or later. Resembles Northern Spy considerably in colour, flesh and flavour.

Spiro (*Northern Spy Seedling*).—Fruit medium; form oblate to roundish; cavity deep, medium width, wrinkled; stem short, stout to moderately stout; basin deep,

open, slightly wrinkled; calyx open; colour greenish yellow well washed and splashed with deep crimson; predominant colour deep crimson; seeds medium size, acute; dots few, yellow, distinct; skin thick, moderately tough; flesh yellowish, crisp, tender, juicy; core medium size, open; flavour subacid, sprightly, pleasant; quality good; season November to March. Resembles Northern Spy considerably in flesh and flavour.

Sweetosh (McIntosh Seedling).—Fruit above medium to large; form oblate, conic, regular; cavity open, deep; stem short to medium, stout to moderately stout; basin deep, medium width, smooth; calyx open or closed; colour pale greenish yellow washed and splashed with rather dull crimson; predominant colour rather dull crimson; seeds above medium in size, broad, obtuse and acute; dots indistinct; skin moderately thick, moderately tender; flesh dull white, tender, juicy; core small; flavour sweet, pleasant; quality good; season late September to mid-December. Though rather dull in colour, is sufficiently attractive, and is a good sweet apple.

Wilgar (Northern Spy Seedling).—Fruit above medium to large; form roundish, conical, slightly ribbed; cavity deep, medium width, russeted; stem short, stout; basin deep, open, slightly wrinkled; calyx open; colour yellow washed and splashed with crimson; predominant colour crimson; seeds medium size, acute; dots few, yellow, indistinct; skin moderately thick, tough; flesh yellowish, tender, juicy; core medium, open; flavour subacid, pleasant, not high; quality good; season December to March. Resembles Northern Spy considerably in outward appearance, colour and shape, and in flesh and flavour. Would be quite promising if a little higher in flavour.

CRAB APPLES

Lora (Progress Seedling).—Fruit large for a crab, 2 by 2¼ inches; form roundish conical to oblate conic; cavity narrow, shallow to moderately deep; stem long, slender; basin shallow, open, slightly wrinkled; calyx closed or partly open, persistent; colour pale yellow, splashed and washed with orange red to deep crimson; seeds small for an apple, large for a crab; dots numerous, yellow, distinct; bloom thin, pinkish; skin thin, tender; flesh yellowish with traces of red, crisp, breaking, juicy; core medium; flavour subacid, slightly astringent; quality above medium; season mid to late September. Quite crablike, but of large size for a crab.

Printosh (Prince x McIntosh).—Fruit large for a crab, 1⅞ by 2 inches; form roundish; cavity narrow, medium depth; stem medium length to long, moderately stout; basin open, shallow, but calyx tube is open and deep, nearly smooth; calyx drops; colour pale yellow washed with pinkish red; predominant colour pinkish red; seeds below medium size, acute; dots moderately numerous, pale yellow, indistinct; skin moderately thick, moderately tender; flesh white with traces of red, crisp, breaking, juicy; core medium; flavour subacid, pleasant; quality good. No marked resemblance to McIntosh except in having a good flavour.

Rosilda (Prince x McIntosh).—Fruit small for an apple, but very large for a crab, 2¼ by 2¼ inches; form roundish; cavity shallow, open; stem moderately long, moderately stout; basin open, medium depth, wrinkled; calyx closed or partly open; colour pale yellow, well washed with bright crimson; predominant colour bright crimson; seeds below medium size for an apple, acute; dots moderately numerous, white, distinct; bloom thin, pinkish; skin thin, tender; flesh yellowish tinged with red, firm, crisp, breaking, juicy, perfumed; core above medium; flavour briskly subacid, pleasant; quality good; season early September. A handsome fruit resembling McIntosh somewhat in colour though brighter. Promising as a large crab apple.

TREE SURGERY

During the growing season of 1919 some experimental work in tree surgery was undertaken.

The winter of 1917-18 had done considerable damage to many of the trees in the orchard, which left them in a condition requiring immediate attention.

Wherever possible, an attempt was made to save a tree and prevent any further decay, different mixtures and methods being used for filling the cavities after they had been cleaned out.

In all cases cavities were cleaned out thoroughly by removing all decayed and decaying wood with chisels. After all this material had been cleaned out of the wound, it was then disinfected with corrosive sublimate, one part to five hundred of water, followed by an application of creosote. Care was taken to prevent either the sublimate or the creosote from coming into contact with the living tissue surrounding the wound.

After the disinfection of the cavity, nails were driven in for the purpose of holding the filling. (See Fig. No. 1.)

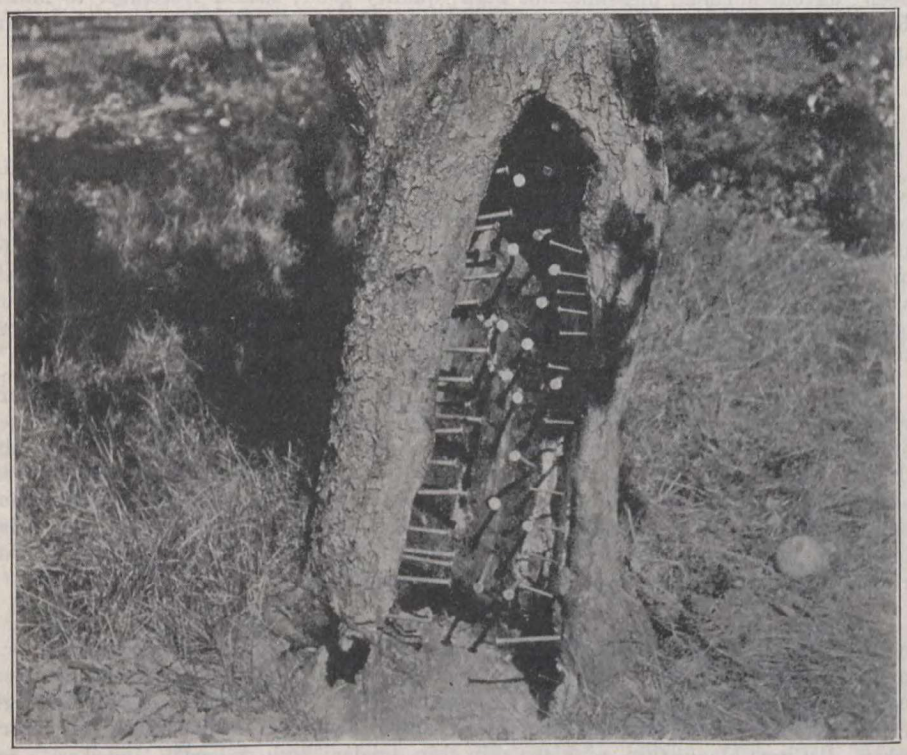

Figure No. 1. Showing large cavity cleaned out and nailed ready for filling.

Two methods of filling wounds were adopted.—The first was what is called the brick method, and is illustrated in Fig. No. II.

Figure No. 11. Showing cavity being filled by brick method.

This method consists of placing the mixture in the wound in layers, and between each layer is placed a sheet of roofing paper. For large cavities, such as illustrated, this is recommended, as it allows for a certain amount of movement when the tree is racked by the wind and tends to prevent cracking of the mixture.

The second method was to simply fill the cavity with the mixture in one solid block.

Different compositions of filling the cavities were used.—For filling the cavities, cement mixed in the proportions as set forth in the following table was used:—

Mixture Used.	Remarks based on notes taken in early part of 1921.
Cement 2 to 1 mixture, no waterproofing.....	Considerable cracking, mixture too rich in cement.
3 to 1 cement, no waterproofing.....	Perfect condition, no cracking.
4 to 1 cement, no waterproofing.....	Perfect condition, no cracking.
2 to 1 cement and plaster mixture.....	Composition crumbling, of no value.
3 to 1 cement and plaster mixture.....	Badly cracked, crumbling.
3 to 1 cement and waterproofing, 1 pt. to 5 gals.	All in first-class shape except one large one done by solid mass method, which should have been bricked.
2 to 1 cement waterproofed by painting after set.	Some cracked. Some in good condition.

RECOMMENDATIONS

From the results of this experiment to date certain recommendations may be made.

The cavities should all be thoroughly cleaned out and all decayed or decaying wood removed. A strong disinfectant, such as corrosive sublimate 1 to 500, or creosote, or both, should then be applied to the cavity, taking care that neither of these solutions come in contact with the living bark surrounding the cavity.

After disinfection, the cavity should be filled with nails as illustrated, the size of the nails to be used depending upon the size of the cavity; generally a 2½-inch nail is best suited. The bark surrounding the cavity should then be cut back to living tissue, in order to give the wound an opportunity of healing over.

The cavity is then ready for filling. From our experience, a 3 to 1 mixture of cement and very fine gravel is the best; that is, three parts of very fine gravel to one of cement mixed with sufficient water to form a grout of such consistency as will just fall off the end of a trowel without running. If the cavity is a long vertical one, the brick method of filling should be used. If just a small or local crotch cavity, the solid mass method will suffice.

After packing the cavity with the mixture, the outer surface should be smoothed and care taken that the filling does not protrude so far beyond the outer circumference of the wood of the tree as to prevent the bark from growing over it when the wound commences to heal. If no attention is paid to this, the growing bark will press against the mass and either split the tree or crack the cement. This is a common cause of poor results in tree surgery.

The final step is to wrap wet sacking around the filling for a few days until the mass is well set, after which it may be removed without danger of the composition drying out too quickly with resultant cracking.

Waterproofing.—Apparently it is not necessary either to mix waterproofing with the cement or to paint it over with a waterproofing after it has set. In fact when waterproofing was mixed with the cement it appeared to lessen its resistance to freezing and thawing.

RESULTS FROM A CLOSE-PLANTED WEALTHY ORCHARD

Following will be found the returns to date from the close-planted Wealthy orchard planted in 1896.

This orchard has shown every year a good net profit per acre, and is a striking example of the profits to be derived from an orchard in this district.

One feature in the management of this orchard should be especially noted; this is the fact that it is grown under the sod mulch system. This is possible largely because the trees are so close (10 feet by 10 feet) that excessive evaporation is impossible owing to the shade cast by the trees themselves.

Although the trees were planted 10 feet by 10 feet, the entire block consisting of 144 trees, there are now only 73 trees left, the remainder either having died from winter injury or having been removed to make room for the other trees.

Special attention is here called to this system for the severe districts, where early-bearing varieties are being used. It is generally conceded that after twenty or twenty-five years in eastern Ontario and Quebec orchards are on the decline, so that when early-bearing sorts are planted the standard distance apart they practically never reach an age where all the land is fully occupied, being lost in later years by the ravages of severe winters.

By this close-planting, sod mulch system, accompanied by removal of trees when necessary, there is no reason why returns fully as profitable as those here recorded should not be obtained.

A word regarding the use of the sod mulch would not be amiss. On land fairly well supplied with moisture this system may be practised if properly handled. For the first year after planting, cultivation and probably intercropping should be practised. Commencing the second season, the whole may be seeded down or the intercropping continued for a year or so longer. If seeded down, the seeding should be done about the latter part of June, and a regular mixture of clover and timothy used. Up to the date of seeding, frequent cultivations, as in ordinary orchard practice, should be given to conserve the spring supply of moisture. During the first two years after seeding, it will probably be necessary to supply some additional mulch until the cuttings from the sod will supply a liberal mulch of their own. Frequent light applications of nitrate of soda in early spring are advisable, and a good manuring once in three years should be given if at all possible.

DETAILED RETURNS FROM CLOSELY PLANTED WEALTHY ORCHARD, FOR 1920.

1,041 gallons of fruit picked.

Sales of fruit.		Estimates per acre.
288 Baskets at 75c	$216 00	
69 Baskets at 25c	17 25	
Total	$233 25	$746 86
Expenses, 1920.		
Mowing, one man, 5 hours at 40c	2 00	
Material for spraying	12 20	
Spraying four times at $1.20	4 80	
Rent of land at $12 per acre	3 96	
357 Baskets at 9 c	32 13	
Picking fruit 56 hours at 40c	22 40	
Packing fruit 45½ hours at 40c	18 20	
Total expenses	$ 95 69	306 39
Net profit for the year	$137 56	440 47
	$233 25	$746 86

RETURNS FROM CLOSELY PLANTED WEALTHY ORCHARD SINCE DATE OF PLANTING

Net profits per acre 1896-1914 (18 years)	$1,719 28
" " 1915	64 23
" " 1916	237 20
" " 1917	97 24
" " 1918	509 95
" " 1919	453 69
" " 1920	440 47
Total net profits per acre 1896-1920 (including initial cost of trees and planting)	3,522 06
Average yearly net profit per acre	$ 140 88

INDIVIDUALITY IN APPLE TREES

THE POSSIBILITY OF THE TRANSMISSION BY BUD HEREDITY OF HIGH-YIELDING ABILITY OF INDIVIDUAL APPLE TREES

Since 1896 a record of the yield of individual trees has been kept at Ottawa. In 1906, scions were taken from the heaviest yielding, the poorest yielding, and the heaviest most regular yielding Wealthy trees. The variation of the three parents was:—

Heaviest yielding, total crop for 8 years	1043 gallons.
Poorest yielding, total crop for 8 years	41 gallons.
Heaviest most regular yielding crop for 8 years	783 gallons.

The scions taken were root grafted on Rose of Stanstead stock, and planted in the same orchard on as uniform soil as was possible to obtain.

The following tables give the results of each individual tree up to the end of 1920. A discussion of the results follows the tables:—

YIELD OF PROGENY FROM POOREST YIELDING TREE IN WEALTHY ORCHARD, No. 4/2.

Yield given in gallons.

Tree	1912	1913	1914	1915	1916	1917	1918	1919	1920	Grand total of each tree
4– 1	.....	0·75	3·0	1·5	8·5	0·5	11·0	0·75	5·5	31·5
4– 2	.....	.....	5·0	0·75	14·0	.....	18·0	2·25	9·0	49·0
4– 3	.....	.....	6·0	4·5	14·0	3·0	13·0	1·5	.....	42·0
4– 5	0·50	0·25	5·0	3·5	11·5	2·25	10·0	9·0	.....	42·0
4– 6	.....	.....	6·0	0·5	10·5	1·5	2·5	3·0	.....	24·0
4– 8	.....	.....	1·5	3·0	8·0	.....	4·5	8·0	.....	25·0
4–10	.....	.....	2·0	3·50	9·0	3·0	6·0	5·5	12·0	41·0
4–11	.....	.....	2·0	.....	2·25	9·0	0·25	14·0	.....	27·5
8	0·50	1·0	30·5	17·25	77·75	19·25	65·25	44·0	26·5	282·0

Average total yield per tree for 9 years $= \frac{282}{8} = 35 \cdot 22$ gallons.

Range from 24 gallons to 49 gallons.

YIELD OF PROGENY FROM HEAVIEST YIELDING TREE IN WEALTHY ORCHARD, No. 4/4.

Yield given in gallons.

Tree	1912	1913	1914	1915	1916	1917	1918	1919	1920	Grand total of each tree
3– 1	0·25	.....	4·50	0·50	17·0	1·0	14·0	4·5	0·5	41·75
3– 2	.....	.....	7·0	1·25	11·0	1·0	16·0	12·5	18·0	66·75
3– 3	.....	.....	4·0	0·50	12·0	1·5	16·0	11·5	16·5	62·00
3– 4	.....	.....	4·0	0·25	7·0	12·0	13·0	25·0	.....	61·25
3– 5	0·50	2·75	8·0	.....	13·0	1·0	25·0	16·0	0·25	66·5
3– 6	.....	1·0	11·0	0·50	21·5	0·25	24·0	18·0	1·0	77·25
3– 7	.....	0·25	5·0	0·50	12·0	.....	4·0	8·5	.....	30·25
3– 8	.....	.....	4·0	3·0	11·0	3·0	14·0	25·0	3·25	63·25
3– 9	.....	.....	4·0	2·5	11·5	2·0	17·5	19·0	0·25	56·75
3–10	.....	.....	5·0	2·0	9·5	1·0	17·5	11·5	23·5	70·0
3–12	.....	2·50	4·0	11·0	20·0	5·0	4·5	21·0	.....	68·0
3–14	.....	.....	6·0	2·0	13·5	.....	11·0	18·0	4·0	54·5
3–16	.....	.....	4·0	5·0	5·25	3·5	1·0	26·0	2·0	46·75
4–12	0·50	3·75	10·0	.....	21·0	.....	12·0	15·5	10·0	72·75
4–13	.....	.....	2·0	3·0	8·5	3·5	2·5	15·0	.....	34·5
4–15	.....	.....	5·0	0·5	16·0	2·0	12·0	26·0	0·5	62·0
2–17	.....	.....	1·5	5·0	0·5	5·5	0·25	25·0	.....	37·75
17	1·25	10·25	88·5	37·5	210·25	42·25	204·25	298·0	79·25	972·0

Average total yield per tree for 9 years $= \frac{974}{17} = 57 \cdot 18$ gallons.

Range from 30·25 gallons to 77·25 gallons.

YIELD OF PROGENY FROM HEAVIEST AND MOST REGULAR BEARING TREE IN WEALTHY ORCHARD (No. 4/5).

Yield given in gallons.

Tree	1912	1913	1914	1915	1916	1917	1918	1919	1920	Grand total of each tree
5– 1	.....	3·25	3·0	1·75	17·25	1·0	7·0	0·75	5·5	39·5
5– 2	0·25	.....	7·0	.....	13·0	1·5	11·0	1·0	7·5	41·25
5– 3	.....	.....	3·0	1·75	9·0	1·0	2·5	1·0	5·0	23·25
5– 4	.....	.....	3·0	0·5	9·5	1·0	6·0	3·5	.....	23·50
5– 5	0·5	2·75	10·0	2·0	9·0	5·5	11·0	7·5	4·5	52·75
5– 6	0·25	5·75	6·0	1·0	17·0	1·0	13·0	15·50	7·0	66·50
5– 7	.....	.....	0·25	.....	10·0	2·0	5·0	7·0	7·0	31·25
5– 8	.....	.....	4·0	6·0	6·0	14·0	0·5	14·5	0·5	45·50
5– 9	.....	.....	8·0	1·0	16·0	2·5	9·5	14·5	2·5	54·00
5–10	.....	.....	5·0	0·25	15·0	1·0	16·5	10·5	14·0	62·25
5–11	.....	2·5	13·0	2·25	14·25	2·0	16·0	10·5	14·5	75·00
5–12	0·5	6·0	10·0	14·0	7·5	21·5	.....	1·75	4·5	65·75
12	1·50	20·25	72·25	30·50	143·50	54·0	98·0	88·0	72·5	580·5

Average total yield per tree for 9 years $= \frac{580 \cdot 5}{12} = 48 \cdot 375$ gallons.

Range from 23·25 gallons to 75·25 gallons.

It will be noticed that the progeny of the poorest yielding tree has given on the average the lowest yields; that the progeny from the heaviest and most regular bearer has given the second highest; and that the progeny from the heaviest total yielder has given about 62 per cent more crop on the average than the progeny from the poorest yielding tree.

Furthermore, it is interesting to note the range of the yields of the individual trees of each lot. For instance, the progeny from the poorest yielding tree runs from 24 gallons to 49 gallons, as compared with 30·25 gallons to 77·25 gallons from the heaviest yielding progeny. Twelve out of a total of seventeen trees from the heaviest yielding parent gave total yields in excess of the highest yielding tree from the poorest yielding parent.

Just what influence the stock may have had is difficult to say for although all the stock used was grown from Rose of Stanstead seed, each stock would be different from it in habit and individuality.

PLUMS

RESULTS WITH PRUNUS NIGRA

The improvement of the native plum of Canada, *Prunus nigra*, has occupied considerable attention and it is gratifying to note that, to date, considerable progress has been made simply by selection within the species Nigra.

The commencement of this work dates back to 1905, when some trees of a select seedling were obtained from Mr. H. P. Carstesen, near Ottawa. Mr. Carstesen has grown a large number of the wild plums and this seedling had been selected for its extreme earliness and good size. On the average it ripens during the first week in August.

From this selected seedling a number of open fertilized seeds were sown with the result that the first generation of seedlings produced a large proportion of trees, which bore fruit equal in size and earliness to the female parent and two trees bearing fruit fully as early as and superior in quality and size to the parent stock. These two have been named Ottawa and Rideau, and a description of these is contained herein.

A second generation of seedlings grown from this first generation is now fruiting and the small percentage of small bitter plums is noticeable. There are also two or three which appear even superior to the best of the first generation.

Although the Nigra plum cannot be called a high class product, it is nevertheless valuable for jelly and preserving and, on account of its extreme earliness, is finding a valuable place in Canadian pomology. The trees of this species have the advantage of fruiting at a very early age and do not quickly attain a great size, rendering it possible to grow them at close distances for a number of years.

DESCRIPTION OF OTTAWA AND RIDEAU

Ottawa.—Fruit size, above medium to large, 1½ inches by 1¾ inches; form, oval; cavity, medium depth and width; stem, short ½-inch, moderately stout; suture, a distinct line slightly depressed; apex, roundish; colour, orange yellow outlaid with brilliant dark red when fully ripe; dots, obscure; bloom, none; skin, moderately thick, moderately tough; flesh, yellow, juicy; flavour, moderately sweet to very mildly sub-acid, not astringent; quality, medium to above; stone, above medium in size, oval, flattened; season, mid-August; value, on account of size and earliness a valuable early plum for marketing in July, and for preserving.

Rideau.—Size 1½ inches and over; form, oval; cavity, medium depth and width; stem, moderately long, ¾-inch, slender; suture, an indistinct line, not depressed; apex, roundish; colour, yellowish orange thinly marked all over with bright pinkish red, when fully ripe nearly all red; bloom, none; skin, thin, tough but fairly crisp for Nigra; flesh, yellow, very juicy; flavour, moderately sweet to subacid, with slight astringency at skin; quality, medium; stone, above medium in size, roundish, flattened, cling; season, early August; valuable as an early native sort.

In addition to the improvement of Prunus nigra by selection, a number of crosses between this species and *Prunus triflora* (the Japanese plums) have been made. It is hoped to retain the hardiness and flavour of some of the Nigra and include the thinner skin, firmer flesh, and better quality of the Triflora in the hybrids.

THE AMERICANA GROUP

Among the Americana plums, attention is called to a seedling of Caro, originated by the Horticultural Division. This is Ekaro and a description follows:—

Ekaro.—Fruit large 1⅞ inches by 1¾ inches, oval somewhat lop-sided; cavity, deep, medium width, abrupt stem, medium length ⅝ inches, moderately stout; suture, indistinct line, slightly depressed; apex, flattened or slightly depressed; colour, yellow washed with deep lively red; predominant colour, deep lively red; bloom, moderate, lilac coloured; dots, numerous, yellow, distinct; skin, thick, moderately tough; flesh, deep yellow, juicy; flavour, sweet, rich; quality, good; stone, large, oval, flattened, cling; season; mid to late September.

A handsome plum of large size, handsome appearance, and of good quality.

HANSEN'S HYBRID PLUMS

A number of the hybrid plums originated by Prof. N. E. Hansen have fruited at the Central Experimental Farm and, as there is considerable interest in these varieties as possible hardy plums for the colder parts of Canada, descriptions follow of those which have been described.

CHERESOTO *(Prunus Besseyi* x *De Soto,* Hansen).—Size medium to below, 1¼ inches by 1⅛ inches; form oval, abruptly pointed; cavity deep, abrupt, moderately open; stem medium length, ¾ inch, slender; suture a distinct line, not depressed; apex abruptly pointed; colour greenish yellow almost or quite covered with dull red; pre-

dominant colour dull red; dots obscure; bloom practically none; skin moderately thick, tender; flesh pale greenish yellow, moderately juicy, soft; flavour sweet and acid, astringent; quality medium; stone small, long, oval, almost free; season late August or early September. Of no special value here; too poor in quality.

EZAPTAN *(Prunus Besseyi* x *Sultan,* Hansen*)*.—Size small, one inch and less; form roundish; stem slender, rather long, one inch; colour purple; skin thin, moderately tough; flesh dark, juicy; flavour briskly subacid; quality above medium; season early September. Much of the character of the best sand cherries.

HANSKA *(Prunus americana* x *P. Simonii,* Hansen*)*.—Size medium, 1⅝ by 1⅝ inches; form oblate to roundish, flattened at ends; cavity open, deep, abrupt; suture a distinct line, depressed; apex depressed; colour deep purplish red; predominant colour deep purplish red; dots numerous, small, yellow, distinct; bloom heavy, bluish; skin moderately thick, moderately tough; flesh greenish yellow, moderately firm, juicy; flavour sweet, pleasant, with a suggestion of grape; quality good; stone medium size, roundish, cling; season evidently early to late September. One of the best in quality of Hansen's hybrid plums.

INKPA *(Prunus americana* x *Prunus Simonii,* Hansen*)*.—Globular, flattened; size medium, 1 1/16 by 1¼ inches; cavity large, wide, fairly deep; suture distinct, depressed; apex slight, depressed; dark plum colour (i.e., dark crimson maroon); dots numerous, very distinct, whitish; bloom slight; skin thick, tough, but not astringent or bitter; flesh buff colour to whitish; stone small, cling; very rich, velvety, pear flavour, sweet and pleasant; quality good. A very distinctive flavour which might be objected to by some people, otherwise a good plum for both dessert and culinary purposes.

KAGA *(Prunus americana* x *Prunus Simonii,* Hansen*)*.—Somewhat heart-shaped, about size of Lombard or larger, 1½ by 1¾ inches; cavity deep, abrupt, medium width; suture a distinct line, very slightly depressed; apex rounded; yellow, entirely overspread with deep crimson; dots numerous, yellow, distinct; bloom bluish; skin thick, tough; flesh greenish yellow, firm, juicy; stone below medium size, roundish, cling; quality above medium to good; sweet, subacid, acid next stone and skin, spicy, pearlike flavour. An attractive looking plum with many Simon plum characteristics. It is highly perfumed. Appears hardier in flower bud than most European plums. Should make a good shipping plum.

ORATA *(Prunus Besseyi* x *Gold,* Hansen*)*.—Size small, 1 by 1¼ by 1 to 1¼ inches; form roundish to oval, flattened about cavity; cavity deep, medium width; suture a distinct line, no depression; apex rounded; colour greenish yellow more or less covered with dark reddish purple; predominant colour reddish purple; dots obscure; bloom thin, bluish; skin moderately thick, tough; flesh moderately firm, juicy, yellowish green; flavour sweet and acid, astringent; quality medium; stone small, roundish, cling; season August. Much of the character of a sand cherry. Not promising.

SANSOTO *(Prunus Besseyi* x *De Soto,* Hansen*)*.—Size medium to below, 1½ by 1½ inches; form roundish to heart-shaped; cavity narrow, abrupt, deep; stem slender, short, ⅛ inch long; suture an indistinct line, no depression; apex rounded; colour greenish yellow nearly covered with dull to dark reddish purple; predominant colour dull reddish purple; dots small, yellow, distinct; bloom thin, bluish; skin thin, moderately tender; flesh soft to moderately firm, juicy, pale yellowish green, sweet and acid; little flavour; quality medium; stone medium size, oval semi-cling; season late August or early September. Not likely to be valuable here. Not attractive enough in appearance or good enough in quality.

SAPA *(Prunus Besseyi* x *Sultan,* Hansen*)*.—Roundish, somewhat heart-shaped, size 1½ by 1 inch; cavity open, deep, abrupt; stem slender, ¾ inch long; suture a distinct

line; apex rounded or very slightly flattened; purple, washed with dark purple; dots numerous, very small, yellow, indistinct; bloom bluish, thin; skin thin, moderately tough; flesh dark purple, very juicy; stone medium size, oval, cling; flavour briskly subacid, sprightly, acid next skin, slightly astringent; quality above medium to good; season, August. Tastes a good deal like the better sand cherries, but is larger. Fruit buds evidently hardier than most Japan varieties.

TOKA *(Prunus americana* x *P. Simonii,* Hansen*).*—Fruit roundish to heart-shaped; medium in size, 1¼ by 1⅜ inches; cavity narrow, medium depth, abrupt; stem medium length, slender; suture an indistinct line, very slightly depressed; apex rounded; colour yellow entirely covered with deep red; dots very small, indistinct; bloom thin, pinkish; skin moderately thick, tough; flesh yellow, juicy, moderately firm; stone medium size, oval, cling; sweet with a peculiar aromatic, pleasant flavour, acid next skin and pit; quality good; season mid-September. A decided and rather unusual flavour. Not large enough to be very promising unless very hardy.

TOKEYA *(Prunus Besseyi* x *Chinese Apricot,* Hansen*).*—Roundish, almost oblate, flattened at ends, size 1 by 1¼ inches; cavity deep, medium width; stem moderately stout, ½ inch long; suture an indistinct line, slightly depressed; apex flattened; dark red dots indistinct; bloom thin, bluish; skin thin, moderately tender; flesh greenish, juicy; stone medium size, roundish, cling; acid, bitter flavour; quality below medium. Hybrid group. Not at all agreeable to eat on account of bitterness.

WANETA *(Apple Plum* x *Terry,* Hansen*).*—Size very large, 2 by 2 inches; form heart-shaped; cavity medium depth and width, slightly flaring; stem medium length, ¾ inch, moderately stout; suture indistinct, not depressed; apex rounded; colour yellow, nearly covered with dark red; predominant colour dark red; dots numerous, small, yellow, distinct; bloom thin, bluish, pink; skin moderately thick, tough; flesh deep yellow; flavour sweet, not very rich; quality good; stone medium size, oval, flattened, cling; season mid to late September. This is the largest Americana hybrid fruited here, but it is not so good in quality as the Emerald (Williams), which is nearly as large.

GRAPES

The following new or not well-known varieties of grapes are recommended for extended trial, having given a satisfactory performance at the Central Farm over a long period.

Pearl of Casaba.—This grape is a native of Hungary and is recommended only for home planting, where an exceptionally high class white early grape is desired. Although not as hardy as the hardiest of our American varieties, if given protection it winters fairly well and is much earlier than any other variety tested here, fruit having been picked from it fully ripe on the 15th day of August, 1919. Bunch, short, medium breadth, loose, oblong, conic, shoulder generally small, sometimes long; berry, above medium in size, yellow in colour with abundant bloom; flesh, pale green, moderately firm, fine texture; skin, thin, slightly astringent, tender; flavour, sweet, aromatic very similar to Muscat Alexandria; quality excellent, a high-class table grape.

Vine is not a heavy producer, appears to be self-fertile but loose bunch when isolated indicates it is a poor pollinizer.

Craig.—This grape is a result of breeding in the Horticultural Division, Central Experimental Farm, and is a hybrid between Florence and Potter.

It is a good sized blue grape, somewhat earlier than Concord, which is an advantage for eastern Ontario and Quebec, as the latter does not ripen in average seasons under their conditions.

Bunch, about 4 inches long by 3 inches wide, cylindrical compact, no shoulder.

Berry, above medium in size, pyriform in shape; colour, black appearing blue through the abundant white bloom which is very persistent; skin, thick but fairly tender; flesh, pale blue green, juicy, tender and melting, fine grain; heavy pigment next skin; quality, above medium.

Mary.—A red grape resembling Lindley, but somewhat earlier; bunch, 4½ inches to 5 inches long; medium breadth, cylindrical, loose, not shouldered; berry, above medium in size, roundish; colour, red, resembling Lindley, with abundant white persistent bloom; skin, thick, tough, slightly astringent; flesh, light green, tender, juicy; flavour, sweet, to aromatic; quality, good; season, early.

A good keeper and a good yielder.

Wilkins.—(Originated by O. F. Wilkins, Bridgeburg, Ont.) A very desirable white, early grape, being a good yielder and ripening much earlier than Niagara. Bunch, medium in size, compact, shouldered; fruit, medium size, round, yellowish green with a white bloom; pulp, melting, juicy, sweet, foxy; skin rather thin; quality, good, a promising white grape on account of earliness, being much earlier than Niagara and should be useful for extending the season of that variety.

Lincoln.—A blue grape originated by M. A. Read, Port Dalhousie, Ont. has proved a better yielder than Concord and ripens much earlier. On account of thick skin should prove a good shipper. Bunch, short to medium, compact, oblong; berry, slightly smaller than Concord, roundish pyriform, dark blue black with abundant bloom; flesh, green, tender, juicy; skin, thick, tough with abundant pigment; flavour, sprightly subacid to sweet, very pleasing; quality, very good.

EUROPEAN OR VINIFERA GRAPES GROWN IN THE OPEN

The European or Vinifera grapes have been very little grown in Canada. The early experience in the Eastern States in attempting to grow them was so discouraging that, doubtless, the old settlers in the province of Ontario did not feel very enthusiastic about trying them and as new, vigorous, and hardy varieties of American origin began to be introduced in the early part of the 19th century, there was little inducement to test them. The European grapes must be covered with soil in winter, but apart from that they are treated much as the American varieties. They are not recommended to be grown commercially but for home use only. The oldest record that we have of the successful cultivation of an European grape vine in Eastern Canada is that of a vine in the garden of a citizen of Perth, Ont., which is said to have been introduced from Italy nearly ninety years ago. This is an early green grape of the Sweetwater group. This variety is now growing at the Central Farm. The first experience with the European or Vinifera grapes at this Farm was in 1900, when cuttings of a variety called "Bonne Madame" were obtained from Mr. D. Matheson, Ottawa, Ont. This variety was obtained by Mr. Matheson from a Roman Catholic institution in Montreal and it was supposed to have come from Italy. It also is of the Sweetwater group. Two vines of this grape were planted in the vineyard at Ottawa in 1902 and the first fruit was produced in 1905. This variety was found to be one of the earliest ripening sorts in the vineyard and has continued to be so.

As it was thought that there might be other Vinifera grapes which would ripen at Ottawa a number of varieties were imported from France and Germany in 1909 and following is a list of these with notes as to whether they would ripen at Ottawa or not:—

Black Alicante.—Does not ripen.

Black Hamburg (Frankenthal).—Does not ripen.

Bonne Madame.—Ripened every year until recently when old vines were destroyed, and new ones not in bearing.

Buckland Sweetwater.—Ripens in some seasons.

Chasselas Doré de Fontainebleau (Weisser Gutedel).—Nearly ripens; ripens in some seasons.

Chasselas Gros Coulard.—Ripens in some seasons.

Chasselas Rose Royale.—Does not ripen.

Chasselas Rouge (Roter Gutedel).—Ripens in some seasons.

Chasselas Vibert.—Nearly ripens.

Chasselas Violet.—Nearly ripens.

Foster White Seedling.—Nearly ripens.

Fruher Blauer Burgunder.—Does not ripen.

Fruher Leipziger.—Ripens in some seasons.

Fruher Roter Malvasier.—Does not ripen.

Gamay de Juillet.—Ripens very early but is very small and not desirable for eating.

Grandiska.—Does not ripen.

Gromier du Cantal.—Does not ripen.

Gros Colman (Dodrelabi).—Does not ripen.

Gros Doré.—Does not ripen.

Lignan Blanc.—

Liebert.—Nearly ripens.

Madeleine Angevine.—

Madeleine Royale.—Ripens in some seasons.

Muscat Noir.—Does not ripen.

Pearl of Csaba.—Ripens very early.

Peuse (Malaga).—Does not ripen.

Portugais Oben.—

Precoce de Malingre.—Ripens in some seasons.

Sauvignon Jaune.—

In addition to the above a number of varieties were imported from France, New York, and California more recently. The best and most promising variety for parts of Canada where the season is as short as at Ottawa is the Pearl of Csaba, a Hungarian variety, obtained from T. V. Munson & Son, Denison, Texas. Not only is this very early, but it is of good quality and one which is strongly recommended for trial. A description of the fruit will be found in the previous chapter on grapes.

CURRANTS

The following descriptions cover a number of black currants originated by the late Dr. Wm. Saunders, former Director of the Experimental Farms. These varieties have been tested out by this Division for many years and in point of yield, quality, and hardiness, have excelled other commercial varieties to a considerable degree. In order to introduce these to the public, they are now being propagated on a large scale and it is hoped that within the next few years a sufficient number to meet all demands may be offered for sale.

A table showing the average yields of all the varieties in the plantation for the last five years is also appended at the end of the descriptions.

Climax (seedling of Black Naples seedling).—Orig. Wm. Saunders, London, Ont.; transferred to Experimental Farm, Ottawa, 1887. Fruit, above medium to large in large bunches; skin, moderately thick, fairly tender; briskly subacid, and of good flavour; quality, good; season, medium to late; bush, a medium to strong grower and very productive. This has proved one of the best of Dr. Saunders' black currants, and on account of its great productiveness and good quality should be tested by all growers of black currants.

Kerry (seedling of Black Naples seedling).—Orig. Wm. Saunders, London, Ont.; transferred to the Experimental Farm, Ottawa, 1887. Fruit, above medium to large; skin, thick but tender; briskly subacid; quality, above medium to good; bush, a strong grower and very productive. This variety and Climax are, perhaps, the most outstanding commercial varieties of Dr. Saunders' black currant seedlings. The Kerry is proving a very valuable variety to those commercial growers who have tried it because of its great productiveness combined with good size.

Magnus (seedling of Black Naples seedling).—Orig. Wm. Saunders, London Ont.; transferred to Experimental Farm, Ottawa, 1887. Fruit, large; skin, rather thick; subacid, good flavour; quality, good; season, medium. A strong grower and very productive. A good variety because of size of fruit, quality and productiveness.

Saunders (seedling of Black Naples seedling).—Orig. Wm. Saunders, London, Ont.; transferred to Experimental Farm, Ottawa, 1887. Fruit, above medium to large; skin, thick; briskly subacid; quality, medium; season, medium. A strong grower and very productive. One of the best commercial varieties but not as good in quality as some others.

Topsy (Dempsey black currant x gooseberry).—Orig. Wm. Saunders, Experimental Farm, Ottawa. Fruit, above medium to large; skin, rather thick; briskly subacid; good flavour; quality, good; season, medium; ripens evenly. This is a hybrid between a black currant and a cross-bred gooseberry (Houghton x Broom Girl). From this cross five plants grew. Of these, four had foliage resembling gooseberry and one, the Topsy, had black currant foliage and fruit and cannot be distinguished from a black currant. Bush is a strong grower and productive.

AVERAGE YIELD PER ACRE FOR FIVE YEARS

	Lb.	Oz.
Saunders	6,703	6
*Kerry	4,525	6
Beauty	4,495	2
Eagle	4,231	15
Magnus	3,971	13
Climax	3,678	6
Topsy	3,481	12
Buddenborg	3,472	11
Eclipse	3,351	11
Black Grape	2,922	2
Schwarze Traube	2,836	2
Clipper	2,776	15
Victoria Black	2,696	14
Merveille de la Gironde	2,559	2
Ontario (833)	2,099	5
Collins Prolific	2,008	9
Goliath Black	1,577	8
Champion	1,542	12
Boskoop Giant	1,334	2
Success	48	6

*NOTE.—Taking the average yield for 15 years, the Kerry outyielded the Saunders by 698 lb. per acre.

GOOSEBERRIES

Two new varieties of gooseberries are being propagated for general introduction to the public, viz., Charles and Mabel, descriptions of which follow, together with a table of average yields showing relative productiveness of these two sorts.

Charles (Houghton x *Roaring Loan).*—Orig. Wm. Saunders, London, Ont. Introduced, Horticultural Division, Central Experimental Farm, Ottawa, Ont. Fruit larger than Downing, roundish to oval, green, tinged with red; smooth; subacid, sprightly, good flavour; good quality; season, medium. Has proven more productive than Downing and Josselyn at Ottawa.

Mabel.—Orig. Wm. Saunders, London, Ont. Introduced, Horticultural Division, Central Experimental Farm, Ottawa, Ont. Fruit, above medium size, averaging larger than Downing or Pearl, roundish to oval, pale green, translucent; sweet but not high flavoured; quality, medium to good; season, medium. Has proven hardy and very productive at Ottawa, having a higher average yield than either Downing or Pearl. The fruit has not mildewed. On account of its greater productiveness this should eventually displace Downing or Pearl.

AVERAGE YIELD 1913-1917 (FIVE YEARS)

Planted 1910	Average yield per acre for five years Lb.	Oz.
1. Mabel	14,810	6
2. Charles	12,429	11
3. Downing	11,712	12
4. Rideau	10,608	13
5. Carrie	10,446	8
6. Josselyn (Red Jacket)	9,338	2
7. Richland	9,063	2
8. Deacon	8,990	4
9. Pearl	8,185	10
10. Lorne	7,645	11

STRAWBERRIES

In addition to the continuation of the regular variety testing in strawberries, experiments with winter protection vs. no protection, and irrigation vs. no irrigation have been conducted.

The results of these tests, together with the results of the variety tests, are contained in the following paragraphs.

IRRIGATION BY THE SKINNER SYSTEM VS. NO IRRIGATION

The soil on which this experiment has been conducted is a very light sand which dries out on top very rapidly becoming in summer exceptionally hot, and thus forming a very fine, dry dust mulch. Beneath the top two inches, however, there is generally plenty of moisture, and the soil is invariably much cooler, so that although the appearance from the surface is that of dry soil it is in reality very retentive of moisture, due no doubt to the fine dry dust mulch which forms naturally so readily.

As will be noted from the results of the experiment, irrigation, so far, has not proved to be an economical proposition on this soil. Where irrigation has been practised there undoubtedly appeared to be more vegetative growth, that is a larger number of plants per square foot, but evidently the irrigated plots had too many plants to produce the best results during the fruiting season.

IRRIGATION VS. NON-IRRIGATION

YIELD PER ACRE 1918

Variety	Irrigated Lb.	Oz.	Not Irrigated Lb.	Oz.
Greenville, Imp	2,240	3	2,333	6
Mariana, Per	1,275	11	622	4
Ophelia, Per	715	8	264	6
Pocomoke, Per	700	..	622	4
Portia, Imp	543	7	77	12
Senator Dunlap, Per	1,897	15	1,275	10
Splendid, Per	622	4	606	4
Total yields	7,995	....	5,801	14

YIELD PER ACRE 1919

Variety	Irrigated Lb.	Oz.	Not Irrigated Lb.	Oz.
Greenville, Imp	3,671	7	4,338	4
Mariana, Per	5,429	6	7,467	6
Ophelia, Per	2,496	12	2,730	5
Portia, Imp	2,987	..	2,240	3
Pocomoke, Per	5,017	..	6,160	9
Senator Dunlap, Per	1,765	11	2,006	14
Splendid, Per	5,180	8	5,973	14
Total yield	26,547	12	31,417	7

YIELD PER ACRE 1920

Variety	Irrigated Lb.	Not Irrigated Lb.
Mariana, Per	11,290	14,658
Bisel, Imp	15,487	10,115
Valeria, Per	11,103	14,028
Pocomoke, Per	8,595	8,960
Greenville, Imp	11,395	11,481
Total yield	57,870	59,242

From the tables it will be noticed that only in 1918 did the total yield from the irrigated plot exceed that from the non-irrigated plot.

VARIETY TESTING

Following is a list of the highest yielding varieties during the period 1916-20, also a list of the highest yielding varieties during the season of 1920.

In addition to the yield for the five-year period there is appended to that table what is termed the standard value for 1920. A word of explanation concerning this should be made. Commencing 1920 twenty well known varieties were selected as standards and these were distributed well through the plots. The yields from these twenty were averaged and this average yield taken to represent 100. All other varieties were then compared with this standard average yield and given a standard value according as they were above or below the average. For instance, Lavinia was slightly below at 96·5 while Olivia was considerably above at 135·7.

As yield is only one factor of many in considering the desirability of a variety, there is in the following pages a list of the varieties that have been found most valuable, together with a description of each sort.

BEST TWENTY-FIVE YIELDING VARIETIES OF STRAWBERRIES FOR THE PERIOD 1916–20.

	Variety	Sex	5-year average	1920 Standard value
			lb. oz.	
1	Lavinia	Per.	6,894 6	96·5
2	Olivia	Per.	6,285 13	135·7
3	New Globe	Per.	6,168 6	125·7
4	Mariana	Per.	5,914 7	95·1
5	Parson Beauty	Per.	5,919 12	145·8
6	Cassandra	Per.	5,728 9	105·2
7	Octavia	Per.	5,388 12	61·5
8	Portia	Imp.	5,046 6	87·5
9	Arnout	Per.	4,095 13	128·5
10	Beder Wood	Per.	4,496 8	116·2
11	Bianca	Per.	4,262 10	111·9
12	Bisel	Imp.	4,055 2	111·7
13	Desdemona	Imp.	4,205 2	112·1
14	Francesca	Per.	4,418 0	75·6
15	Hanbeck Beauty	Per.	4,162 3	71·2
16	Pocomoke	Per.	4,790 11	106·2
17	Sample	Per.	4,115 12	102·6
18	Valeria	Per.	4,866 10	98·5
19	Virgilia	Imp.	4,804 9	85·0
20	Warfield	Imp.	4,922 14	148·9
21	Mead	Per.	3,179 11	119·8
22	Miranda	Per.	3,025 3	130·4
23	Senator Dunlap	Per.	3,829 10	82·1
24	Stevens Late	Per.	3,678 6	71·6
25	Buster	Imp.	3,742 3	116·7

LIST OF TWENTY-FIVE HIGHEST YIELDING VARIETIES, 1920.

	Variety	Sex	Standard value	Yield in pounds per acre
				lb. oz.
1	Hermia	Per.	165·2	13,781 0
2	Grand Prize	Per.	149·8	12,497 9
3	Warfield	Imp.	148·9	12,419 12
4	Parson Beauty	Per.	145·8	12,161 9
5	Olivia	Per.	135·7	11,317 12
6	Crescent	Imp.	134·3	11,201 2
7	Excelsior	Per.	130·7	10·902 14
8	Glen Mary	Per.	130·4	10,877 0
9	Miranda	Per.	130·4	10,877 0
10	Bubach Sdlg. No. 61	Per.	129·9	10,838 3
11	Bubach Sdlg. No. 38	Imp.	128·7	10,734 7
12	Arnout	Per.	128·5	10,721 7
13	Governor Forte	Per.	128·2	10,695 8
14	New Globe	Per.	125·7	10,488 1
15	Bubach Seedling No. 28	Per.	124·3	10,371 7
16	Mead	Per.	119·8	9,995 7
17	Clara	Per.	118·0	9,878 12
18	Premier	Per.	118·0	9,839 12
19	Buster	Imp.	116·7	9,736 2
20	Beder Wood	Per.	116·2	9,690 11
21	Bubach Seedling No. 66	Imp.	115·9	9,671 6
22	Minnesota 1017	Per.	115·2	9,606 8
23	Desdemona	Imp.	112·1	9,425 0
24	Bubach Seedling No. 10	Per.	112·8	9,412 2
25	Bianca	Per.	111·9	9,334 4

EARLY AND LATE VARIETIES

The question is often asked which is the earliest variety and which is the latest variety of strawberry.

Some varieties will throw a few very early fruits but still produce their main crop much later, so that to base earliness on the first ripe fruit is from a commercial viewpoint erroneous. The following table gives the yield of the ten earliest sorts for the first week of the strawberry season dating from the first picking made from the plots. Likewise, lateness is estimated from the quantity of fruit produced during the last week of the season.

STRAWBERRIES, 1920.

YIELD FOR THE FIRST WEEK OF THE SEASON.

	——	Per acre	
		lb.	oz.
1	Excelsior, Per	5,885	11
2	Ewell Early, Per	4,874	9
3	Americus, Per	3,915	3
4	Governor Fort, Per	3,863	5
5	Staples, Per	3,617	8
6	Charles I, Per	3,591	0
7	Beder Wood, Per	3,500	0
8	Maggie, Imp	3,292	13
9	Thompson Earliest, Per	3,241	1
10	Premier, Per	3,150	4

BEST YIELDING LATE VARIETIES.

YIELD FOR THE LAST WEEK OF THE STRAWBERRY SEASON 1920. YIELD FROM 2–15 FEET ROWS.

	——	—		Total yield for whole season	
		lb.	oz.	lb.	oz.
1	Lavinia, Per	7	14	18	
2	Todd Late Champion, Imp	6	8	18	10½
3	Magnificent, Per	6	4	7	8½
4	Uncle Jim, Per	6	1	16	3½
5	Lady Corneille, Per	5	14	21	15
6	Rawastico, Per	5	6	16	10½
7	Kellogg Prize, Imp	4	13	19	14½
8	Warfield, Imp	4	3	29	15
9	F. E. Willard, Per	4	4	17	2½
10	York, Per	4	14	7	10½
11	Glen Mary, Per	4	0	26	3½

WINTER PROTECTION OF STRAWBERRIES

Winter protection by the use of a straw or rush mulch is now a common practice among strawberry growers, but there are those who occasionally doubt the value of winter protection, basing their opinion on the fact that some plantation has come through a winter successfully without protection of any sort.

For the past four years a plot of strawberries has been left uncovered to compare with the same varieties receiving their winter protection.

Until the winter of 1919-20, there was apparently no benefit derived from winter protection, the unprotected plots coming through the winters fully as well as those protected. During the last mentioned winter, however, there was much damage to the plot left unprotected with a resultant decrease in yield. The winter in question

was very cold, with practically no snow until late in December so that plants without mulch were exposed to very severe conditions during the early part of the winter. The yields in the following table from the protected and unprotected plots of 1920, will portray the results of this test in a fuller manner.

ADVANTAGE OF WINTER PROTECTION.

COMPARISON BETWEEN VARIETIES PROTECTED BY STRAW MULCH AND UNPROTECTED.

1920.

Variety	Winter Injury		Yields in lb. per acre	
	Prot.	Unprot.	Prot.	Unprot.
	p.c.	p.c.		
Bisel, Imp.	0	40	15,487	4,363 12
Cassandra, Per.	0	50	9,754	3,675 5
Francesca, Per.	0	50	8,439	1,734 8
Olivia, Per.	0	50	9,676	2,738
Maggie, Imp.	20	70	6,623	1,699
Portia, Imp.	10	50	8,288	3,111 6
Pocomoke, Per.	0	50	8,595	3,228
Greenville, Imp.	20	70	11,395	2,214

It will be noticed that in every instance the protected plots showed less injury and gave a much greater yield than those unprotected.

Although this was only once out of four years, the mulching was more than paid for by the enormous increase in crop during this one season.

VARIETIES RECOMMENDED

Earliest.—Excelsior, (Per.), Charles I, (per.) Beder Wood, (Per.).

Main Crop.—Parson Beauty, (Per.), Glen Mary, (Per.), Arnout, (Per.), Hermia, (Per.).

Late.—Lavinia, (Per.), Portia, (Imp.), Glen Mary, (Per.).

PROMISING NEW VARIETIES OF STRAWBERRIES

Charles I (Per.).—This newer sort is very promising as an early berry of high quality. Size: large. Colour: pinkish scarlet. Flesh: pale salmon, juicy, not very firm, probably not a very good shipper. Quality: good, Plant: very vigorous, good plant maker, originated in Michigan, introduced in 1911.

Hermia (Per.).—This variety is one of the heaviest yielders yet tried. Size: above medium to large. Colour: glossy bright red. Flesh: pale salmon, juicy. Quality: above medium to good, fair shipper. Plant: vigorous, originated at the C.E.F., Ottawa.

Arnout (Perfect to partially imperfect.).—Although this variety is not new it is not largely grown. It is a good yielder of large size, deep rich colour, good quality, firm and of good vigour. A good main crop variety worthy of extended trial.

Portia (Imp.).—This variety originated at the C.E.F., Ottawa, and was introduced this year as a valuable variety on account of its rich colour, vigour, good shipping qualities, high flavour, and excellent canning properties as well as good yielding ability when grown with a good pollenizer such as Parson Beauty or Hermia.

VARIETIES OF FRUITS RECOMMENDED FOR EASTERN AND CENTRAL ONTARIO, SOUTH OF LATITUDE 46°

Following is a list of fruits which, from the experience at Ottawa, are recommended for planting in parts of Ontario where the climate is somewhat similar. There are few late keeping varieties of apples on the market which are suitable for growing in these parts of Ontario. The wood of the trees of late varieties does not, as a rule, ripen thoroughly and the trees are winter-killed, hence varieties of a later season than McIntosh should not be planted on a large scale unless they are known to be very hardy. Pears are not very satisfactory in Eastern and Central Ontario and only succeed in favoured situations. Cherries are not very reliable, the fruit buds as a rule being killed in winter, hence they are not recommended for commercial purposes. The European, Domestica, or so-called "blue" plums are very uncertain in their fruiting and the planting of even the hardiest of them in large numbers is not recommended. The earlier varieties of grapes are the most satisfactory and they should be grown mainly for domestic purposes. Bush fruits and strawberries succeed well.

APPLES

Summer—Yellow Transparent, Crimson Beauty, Duchess of Oldenburg, Langford Beauty, Melba.

Autumn—Wealthy, Dudley, Joyce, Alexander, Pedro, McMahan, Okabena.

Early winter—McIntosh, Fameuse, Wolf River.

Winter—Milwaukee, Bethel, Scott Winter, Mendel. Scarlet Pippin succeeds well near the St. Lawrence river, but is not hardy enough inland.

Additional varieties suggested for home use are:—

Summer—Lowland Raspberry.

Autumn—Peach of Montreal, St. Lawrence.

Winter—Pewaukee, American Golden Russet, Tolman (Sweet).

CRAB APPLES

Commercial and Domestic—Transcendent, Florence, Martha and Hyslop. Whitney is early but is more apple-like than most crabs.

CHERRIES

Domestic only—Orel 25, Vladimir, Minnesota Ostheim, Cerise d'Ostheim.

PEARS

Commercial and Domestic—Flemish Beauty in most favoured parts.

PLUMS

Commercial and Domestic—Americana and *Nigra*, Cheney, Omaha (Hybrid), Waneta (Hybrid), Bixby, Mankato, Wolf, Schley, Brackett, Terry, Hawkeye, and Stoddard.

European or Domestica—Mount Royal, Raynes, Early Red (Russian), Montmorency, Glass, Latchford. These are usually not sufficiently hardy to be reliable enough for commercial purposes.

GRAPES

Black—Early Daisy, Manito, Rogers 17, Worden, Merrimac, Wilder, Peabody.

Red—Moyer, Brighton, Delaware, Lindley, Mary.

White—Winchell (Green Mountain), Wilkins, Diamond.

Early Ripening European Grape—Pearl of Csaba.

BLACKBERRIES

Domestic only—Agawam, Snyder, Eldorado.

CURRANTS

Red—Perfection, Red Cross, Red Grape, London Red, Red Dutch.

White—White Cherry, White Grape.

Black—Kerry, Saunders, Topsy, Ontario, Climax, Boskoop Giant, Victoria Black, Black Champion.

GOOSEBERRIES

Mabel, Pearl, Downing, Josselyn (Red Jacket).

RASPBERRIES

Red—Early, King, Brighton, Count.

Main crop—Herbert and Newman for all districts, and Cuthbert for shipping to a distant market and for the more favoured districts only as it is rather tender.

Late—St. Regis Everbearing.

Yellow—Golden Queen.

Purple—Columbian.

Black Caps—Hilborn, Older, Cumberland, Gregg. Black caps are not very satisfactory.

STRAWBERRIES

Early—Beder Wood, per., Excelsior, per., Splendid, per., Charles 1, per.

Medium early—Greenville, imp., Bisel, imp., Senator Dunlap, per., Williams, per.

Medium to late—Parsons Beauty, per., Pocomoke, per., Arnout, per., Sample, imp., Glen Mary, per.

Late—Portia, imp., Lavinia, per., Wm. Belt, per., is a late variety of very good quality, but not a heavy yielder in some localities.

Fall-bearing—Progressive, Americus.

VEGETABLE CULTURE

The projects being conducted under this subdivision include cultural experiments, individual plant selection, seed production, hybridization, and variety testing with the following crops: Bean, beet, carrot, cabbage, pea, parsnip, onion, corn, tomato, lettuce, and rhubarb, also cultural experiments and variety testing with cauliflower, egg plant, melon, turnip, potato and asparagus.

POTATOES

EXPERIMENT IN TIME OF PLANTING

During the past twenty-two years, experiments have been conducted over different periods at Ottawa to determine the best average time to plant potatoes, and it has been found, as a result of these experiments, that potatoes are being planted by farmers too late for largest yields.

Following are the results for periods of four and five years for the two well-known varieties, Irish Cobbler and Green Mountain, an early and a medium to late variety. It will be seen that the earlier plantings have given the best results on the average, and it would appear from these experiments that May 10 to 15 is the best time to plant potatoes in eastern Ontario, especially for the Irish Cobbler. The seed used in all these experiments was obtained from the Experimental Station, Fredericton, N.B., the same year it was used in the experiment at Ottawa. Sixty-six sets of each variety were planted on each date, the sets being 1 foot apart and the rows 2½ feet apart. Good cultivation was given, and the plots kept well sprayed.

POTATOES—DIFFERENT DATES OF PLANTING.

Record No.	Variety	Year	Date planted	Yield per Acre			
				Marketable	Unmarketable	Rotten	Total yield
				bush. lb.	bush. lb.	bush. lb.	bush. lb.
5096	Irish Cobbler	1915	15–V	424 36	85 14	.....	509 50
5098	" "	1915	29–V	249 42	104 30	.....	354 12
5100	" "	1915	12–VI	173 48	118 48	.....	292 36
5102	" "	1915	26–VI	244 12	90 12	.....	334 24
5104	" "	1915	10–VII	16 30	101 12	.....	117 42
9032	" "	1918	14–V	374 0	57 12	.....	431 12
9035	" "	1918	27–V	323 24	39 36	.....	363 0
9038	" "	1918	10–VI	259 36	70 24	.....	330 0
9041	" "	1918	24–VI	24 12	70 24	.....	94 36
9644	" "	1919	3–V	176 0	66 0	.....	242 0
9645	" "	1919	17–V	176 0	110 0	.....	286 0
9646	" "	1919	31–V	189 12	70 24	.....	259 36
9647	" "	1919	14–VI	105 36	88 0	.....	193 36
9648	" "	1919	28–VI	26 24	39 36	.....	66 0
379	" "	1920	3–V	404 48	33 0	.....	437 48
377	" "	1920	17–V	422 48	26 24	.....	449 12
375	" "	1920	31–V	250 48	55 0	.....	305 48
373	" "	1920	14–VI	193 36	101 12	8 48	303 36
371	" "	1920	28–VI	66 0	96 48	.....	162 48

	bush.	lb.
Average for 4 years, 1st planting	405	12
" " 2nd "	363	6
" " 3rd "	297	0
" " 4th "	231	30
" 3 " 5th "	115	14

POTATOES—DIFFERENT DATES OF PLANTING.

Record No.	Variety	Year	Date planted	Yield per Acre							
				Marketable		Unmarketable		Rotten		Total yield	
				bush.	lb.	bush.	lb.	bush.	lb.	bush.	lb.
5097	Green Mountain	1915	15–V	321	12	88	0	.....		409	12
5099	" " ..	1915	29–V	371	48	70	24	.....		442	12
5101	" " ..	1915	12–VI	352	0	105	36	.....		457	36
5103	" " ..	1915	26–VI	79	12	116	36	.....		195	48
5105	" " ..	1915	10–VII	17	36	82	30	.....		100	6
8210	" " ..	1917	12–V	286	0	66	0	.....		352	0
8213	" " ..	1917	26–V	198	0	96	48	.....		294	48
8216	" " ..	1917	9–VI	83	36	158	24	.....		242	0
8219	" " ..	1917	23–VI	11	0	48	24	.....		59	24
8222	" " ..	1917	7–VII	.....		35	12	.....		35	12
9033	" " ..	1918	14–V	424	36	48	24	.....		473	0
9036	" " ..	1918	27–V	378	24	24	12	.....		402	36
9039	" " ..	1918	10–VI	264	0	57	12	.....		321	12
9042	" " ..	1918	24–VI	30	48	39	36	.....		70	24
9608	" " ..	1919	3–V	198	0	52	48	.....		250	48
9607	" " ..	1919	17–V	211	12	44	0	.....		255	12
9606	" " ..	1919	31–V	246	24	26	24	.....		272	48
9605	" " ..	1919	14–VI	198	0	37	24	.....		235	24
9604	" " ..	1919	28–VI	44	0	44	0	.....		88	0
378	" " ..	1920	3–V	589	36	33	0	.....		622	36
376	" " ..	1920	17–V	580	48	57	12	2	0	640	0
374	" " ..	1920	31–V	567	36	28	36	24	12	620	24
372	" " ..	1920	14–VI	255	12	101	12	46	12	402	36
370	" " ..	1920	28–VI	37	24	79	12	.....		116	36

	bush.	lb.
Average for 5 years 1st planting	421	31
" " 2nd "	406	57
" " 3rd "	382	48
" " 4th "	192	43
" 4 " 5th "	84	58

SOURCE OF SEED

The importance of planting good seed has been impressed upon potato growers by the Horticultural Division for many years, it having been found by long experience that the kind and source of seed used was of more importance, in many cases, than the variety. Seed which looked as good as any that could be obtained was found to produce very poor crops, sometimes not worth harvesting. It was found also that seed stock which gave good crops one year would give greatly reduced yields the following year, and very low yields the next year even though the season were favourable. The cause of this has not yet been thoroughly worked out, but the evidence now points to its being a disease which causes such a rapid decline in yield, but, if a disease, its spread is very rapid and its virulence very great. Results have been published from time to time, but those in recent years have been so marked that it is desirable to publish them, to continue to impress on growers the importance of knowing as much as possible about the potatoes he proposes using for seed before planting them.

Record No.	Variety	Source of Seed	Year	Yield per Acre			Rotten Potatoes among unmarketable	New Seed from Fredericton, Experimental Station. Total Yield per Acre
				Marketable	Unmarketable	Total yield		
				bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.
9058B	Irish Cobbler	Fredericton Experimental Station.	1918	444 24	52 48	497 12	.....	
9651	" "	C.E.F. 9058B	1919	50 36	39 36	90 12	.....	301 24
340	" "	C.E.F. 9651	1920	41 48	24 12	66 0	.....	449 12
8133	Green Mountain	Fredericton Experimental Station.	1917	257 24	83 36	341 0	.....	
9099	" "	8133	1918	154 0	39 36	193 36	.....	473 0
9624	" "	9099	1919	35 12	15 24	50 36	.....	301 36
385	" "	9624	1920	44 0	30 48	74 48	8 48	640 0

It will be seen that in the case of the Irish Cobbler there was a drop from 497 bushels per acre from new seed in 1918 to 66 bushels per acre in 1920 from seed grown at Ottawa for the two previous seasons whereas new seed from Fredericton in 1920 yielded at the rate of 449 bush. 12 lb. per acre. Results are just as striking in the case of the Green Mountain if not more so, as in 1920 new seed of this variety yielded at the rate of 640 bushels per acre and seed grown at Ottawa for the previous two years yielded only 74 bush. 48 lb. per acre.

It is interesting to record that when new seed of Green Mountain potatoes was isolated from other plots in 1918 by planting in a field about 300 yards away and the potatoes from the isolated plot planted in 1919 alongside new seed from Fredericton, the latter only yielded 301 bush. 36 lb. per acre, while isolated seed grown the previous year at Ottawa yielded at the rate of 330 bushels per acre, thus apparently showing that the trouble lay in the field where different varieties and seed stocks were being grown in close proximity. This is now being followed up in order, if possible, to prove whether the loss in vitality is due to disease or not. The lesson to be learned from this experiment by the grower of potatoes is to use seed that came from vigorous growing stock apparently free from disease, and which had not been growing near potatoes that had not made vigorous and healthy growth. In this experiment the number of sets used in each case was 66, planted one foot apart in rows 2½ feet apart, the potatoes receiving good cultivation and thorough spraying.

CORN (FOR TABLE USE)

ORIGIN OF NEW VARIETIES

As corn is one of the most important vegetable crops, much attention has been paid to it in the Horticultural Division, one of the main lines of work being the search for and origination of new varieties of sweet corn that would be earlier and, if possible, better than those already on the market. It had been found by experience on the prairies that the Squaw corn would develop at a lower temperature than the sweet varieties and, as the season for corn is short in the Prairie Provinces, a special effort has been made to obtain sweet varieties which would develop rapidly in that relatively cool climate.

As the following three sorts have been introduced and the Early Malcolm has already become a prominent and much sought for variety, it seems desirable to publish the origins of the three sorts which are, it is believed, the three earliest varieties of sweet corn that can be obtained anywhere.

Pickaninny.—In the year 1916 Thos. A. Peters, Hampton, N.B., sent to the Horticultural Division, some seed of a black sweet corn. In 1918 this was crossed at

Ottawa with the Sweet Squaw, the latter being the seed parent. From this cross the best black strain was selected, and it was named Pickaninny in 1919. Since the cross was made it has been selected each year to improve the size of the ear and at at the same time retain the extreme earliness. This has been found to be the earliest sweet corn ever grown at Ottawa, with the exception of the original variety from Mr. Peters. It is doing very well in different parts of the Prairies. This is a black sweet corn. It has a short ear, the average length being five inches. The average number of rows to the ear is eight.

Early Malcolm.—The Early Malcolm corn was obtained by selection from the Early Malakoff, which variety was introduced from Russia by Prof. Hansen, of South Dakota. The selection was begun in the Horticultural Division at Ottawa in 1909, and by 1913 the variety was so changed that it was decided to name it Early Malcolm. Since that time it has been steadily selected for better ears and earliness. This variety has become very popular, and seed firms both in the United States and Canada are now offering it for sale and are eager to get seed. The average length of ears is six inches and number of rows to the ear twelve.

Sweet Squaw.—Sweet Squaw is a cross between White Squaw and Early Malakoff made here in 1913, and after selections had been made the best was named Sweet Squaw in 1917. This variety has also become very popular in the Prairie Provinces particularly, and it is believed to be a valuable acquisition. The average length of ears is six inches and number of rows to the ear twelve.

EARLY TOMATOES

The greatest profit in growing tomatoes is usually from the earliest ripe fruit, hence the aim of market gardeners is to adopt every known means of obtaining the largest crop of fruit in the early part of the season. It is, therefore, important to know what are the earliest varieties and strains. Many market gardeners now save their own seed, selecting for earliness and smoothness of fruit each year, and those who have made a systematic practice of this may have in their own strain something as good or better than can be obtained anywhere. At the Central Experimental Farm a comparison is made each year of many varieties and strains, and in 1920 there were thirty-seven named ones under test and fourteen other unnamed cross-bred sorts originated at Ottawa. The Alacrity tomato, which gave the largest yield of early fruit in the first week's picking, is an Experimental Farm variety, which has been selected for earliness for twenty years and, while under some conditions the fruit is not as smooth as some other early varieties or strains, it produces a large proportion of its crop in the early part of the season, and is particularly useful where the seasons are short.

TOMATOES, 1920—YIELD FOR FIRST WEEK'S PICKINGS OF EARLIEST VARIETIES.

Record No.	Variety	Origin	No. Plants	Yield from 20 Plants			Total Yield
				23–VII	26–VII	28–VII	
				lb. oz.	lb. oz.	lb. oz.	lb. oz.
702	Alacrity 02–20	C.E.F.	20	16 10	15 7	14 0	46 2
742	Earliana	MacLennan	20	10 6	10 8	15 12	36 10
734	Earlibell	Simmers	20	1 12	13 0	19 8	34 4
764	60 N.D. Earliana	Yeager	20	2 14	5 8	19 8	27 14
732	Burbank Early	C.E.F.	20	20 0	.....	7 8	27 8
737	Langdon Earliana	Summerland	20	.....	7 4	15 8	22 12

CELERY

THE PRODUCTION OF CELERY SEED

During the past six years various experiments have been conducted in the production of vegetable seeds at Ottawa, the results of some of which have been published. As celery seed is expensive and as home grown seed has been found to produce excellent celery, the following information in regard to growing it in Ontario should be of interest and value.

The variety used throughout was Golden Self Blanching. For the years 1916-19, plants were stored outside in the following manner: Trenches twelve inches wide were opened in a well drained place, the celery plants being set upright along each side, and the centre well filled with earth to the tops of the plants or level with the surface of the ground. A light covering of straw was put over the top when necessary until it was time for covering for winter, when a foot of straw and over that fifteen inches of soil was put on. The following table gives some details in regard to this:—

STORING CELERY PLANTS FOR SEED OUTSIDE.

Year	Date Covered for Winter	Amount Pitted	Date Pit Opened	General Condition of Plants	No. of Good Plants	No. of Medium Plants	No. Spoiled
1916	15–XI	291 plants	17–IV–1917	Good	245	.....	46
1917	12–XI	450 "	13–IV–1918	Medium	175	160	115
1918	23–XI	3,978 "	22–IV–1919	Poor	747	.....	3,231
1919	11–XI	1,400 "	21–22–IV–1920	Very poor	.....	.....	All spoiled.

It will be seen that this was not a satisfactory method for storing the plants except in one year out of the four. In the year 1916, plants of Evans Triumph were left in the row where they had been growing, and in one case mulched with straw and an additional ten inches of soil before winter. No plants in a 37-foot row were alive in the spring. 2nd, a 37-foot row covered with soil only—all dead in spring. 3rd, a 37-foot row with no more covering of soil than used to bank celery for bleaching—all dead in the spring.

STORING CELERY PLANTS FOR SEED IN A ROOT-CELLAR

In the autumn of 1919 there were stored 1,500 plants of Golden Self Blanching celery for seed production, the plants being heeled in or planted in the cellar on October 20 and 21. The outer stalks were removed and the plants set upright close together in moist sand and sprayed with Bordeaux mixture. During the winter they were gone over and the rotten plants taken out and the rest re-heeled in. On May 8, 1920, they were taken out for planting, when out of the 1,500 plants, there were left alive 829 plants, of which 711 were in good and 118 in medium condition. Of these, 771 were planted 2 by 2½ feet apart, of which 408 ripened seed, producing 19 pounds 8 ounces of seed, or an average of about three-fourths of an ounce of seed per plant. This seed was threshed out with a flail and cleaned with a small fanning mill. The retail value of this seed in the winter of 1920-21 was from $1.80 to $2 an ounce. At the former price the retail value of this seed was $552.60.

The area occupied by this seed plantation was 3,855 square feet, or less than one-eleventh of an acre. At this rate, the retail value of the celery seed crop per acre would be $6,244.16.

The celery grown in 1920 from the seed produced in 1919 was excellent, and in the fall of 1920 there were 1,300 plants grown from this seed stored in the root-cellar, of which 895 came through the winter alive.

If a sale for this celery seed were assured, it would seem to promise to be a very profitable seed crop.

LETTUCE EXPERIMENT CONDUCTED IN THE GREENHOUSE

Object of the Experiment.—To make a further comparison of head lettuce and to compare the rate of growth with Grand Rapids, and to learn if the varieties of head lettuce, which had been found to be the best in a previous experiment, could be grown at as high a temperature as Grand Rapids.

Photo by Frank T. Shutt.

Head Lettuce in Greenhouse, Central Experimental Farm, Ottawa, Ont.

How the Experiment was Conducted.—The vegetable house was used for the experiment. The soil was the same as had been used for a tomato crop which had recently been taken off, but was well enriched with rotted barnyard manure. The average night temperature was 52 degrees. Two varieties of head lettuce, which had proved the best two in previous experiments, were tried.

Varieties Used Were:

Early Paris (Head Lettuce) Sutton.

Golden Queen (Head Lettuce) Sutton.

Grand Rapids (Loose Leaf) C.E.F.

Date of sowing seed.—November 6, 1919.

Transplanted into flats.—November 19, 1919.

Transplanted into vegetable house.—November 27, 1919.

Distance apart of plants.—6 inches each way.

Number of plants of each variety set out in house:—

Grand Rapids	1,110
Golden Queen	997
Early Paris	997
Total	3,104

The plants were distributed through the house in such a way as to have each variety under as nearly similar conditions as possible.

The first cutting of Grand Rapids was on February 27, 1920, and the last March 8; first cutting of Golden Queen March 4 and last March 16; first cutting of Early Paris March 12 and last March 23.

TOTAL WEIGHT FOR ALL HOUSE

	Lb.	Oz.
Early Paris	410	15½
Golden Queen	193	7½
Grand Rapids	142	3½
	746	10½

TIME SPENT ON VARIOUS OPERATIONS AND COST OF LABOUR.

	Time Hours	Rate cts.	Cost $ cts.
Sowing	1	20	0 20
Procuring soil for flats	12	20	2 40
Transplanting into flats	44	20	8 80
Watering	40	20	8 00
Preparing bed and benches for lettuce	100	20	20 00
Transplanting lettuce into vegetable house	56	20	11 20
Cultivation	19	20	3 80
Harvesting	28	20	5 60

Total time required for all operations—300 hours.
Total cost of all operations—$60.

RESULTS FROM SALE OF LETTUCE

	Per dozen
Price obtained for head lettuce	$1 20
Price obtained for Grand Rapids	0 60

Total receipts: $254.70.
Net profit: $194.70.
Cost of heating could not be accurately estimated.

This was a satisfactory experiment. There were few misses in the plantation and few spoiled heads. The Golden Queen, however, was more or less scalded at tips of leaves. There was practically no scald on Early Paris which is the best head lettuce for greenhouse yet tried. The Golden Queen did not succeed as well as in two previous winters, and evidently requires a lower temperature than that under which it was grown this winter. The soil may have been too low for it at the start in the centre bed. The plants on the east bench were not as vigorous as those on the west bench, which were the earliest and best in the house.

FORCING CUCUMBERS IN GREENHOUSE

Object of the Experiment.—To compare Davis Perfect with Rennie's XXX, those being the two sorts which have given best results in previous experiments. It was also desired to learn what was the yield from a house of cucumbers grown commercially and what the cost and profit.

How the Experiment was Conducted.—The vegetable house was used for the experiment. The soil was prepared by digging in stable manure with rotted sod.

The average temperature during the day was 70 degrees Fahrenheit, and during the night 60 degrees Fahrenheit.

Varieties Used Were:—

Davis Perfect (Wm. Rennie & Co.)
Rennie's XXX (Wm. Rennie & Co.)

Date of sowing.—February 19, 1920.

Transplanted into vegetable house.—March 30, 1920.

Distance apart of rows and plants in bed.—Rows 4 feet apart and plants 2 feet and 3 feet apart.

Plants on the benches were three feet apart.

Number of plants of each variety set out in house:—

Davis Perfect 53
Rennie's XXX 53

The varieties were distributed through the house in such a way as to have each variety under as nearly similar conditions as possible.

Date when fruit was ready for use:—

Davis Perfect, May 10.
Rennie's XXX, May 10.

Date of last picking:—

Davis Perfect, August 6.
Rennie's XXX, August 6.

TOTAL YIELD OF ALL PLANTS OF EACH VARIETY FROM BEGINNING TO END OF CROP.

——	No. of Plants	No. of Pickings	No. of Marketable Fruits	Marketable	Unmarketable	Average Yield per Plant	
						Marketable	Unmarketable
				lb. oz.	lb. oz.	lb.	lb.
Davis Perfect—							
West Bench	12	38	506	351 4	20 6	27·60	1·69
East Bench	14	33	585	438 13	24 14	31·34	1·77
Bed	27	38	1,146	837 12	50 13	31·02	1·88
Total			2,237	1,627 13	96 1		
Rennie's XXX—							
West Bench	14	36	566	436 3	13 4	31·15	0·83
East Bench	12	35	591	431 11	19 3	35·97	1·59
Bed	27	34	1,052	751 7	55 14	27·83	1·03
Total			2,209	1,619 5	88 5		

TOTAL YIELD FROM HOUSE OF BOTH VARIETIES.

——	No. of Fruits	Marketable	Unmarketable
		lb. oz.	lb. oz.
Davis Perfect	2,237	1,627 13	96 1
Rennie's XXX	2,209	1,619 5	88 5
Total	4,446	3,247 2	184 6

TIME SPENT ON VARIOUS OPERATIONS AND COST OF LABOUR.

	Time Hours	Rate cts.	Cost $ cts.
Sowing	5	40	2 00
Preparing bed and benches for cucumbers	13	40	6 20
Transplanting	9	40	3 60
Spraying	15	40	6 00
Pollination	34	40	13 60
Pruning and tying	63	40	25 20
Watering	51	40	20 40
Harvesting and marketing	42	40	16 80
	232		$93 80

RESULTS FROM SALE OF CUCUMBERS

The price obtained averaged about $2.25 per dozen.

Receipts—	
370½ dozen cucumbers at $2.25 per dozen	$833 62
Expenditure—	
232 hours of labour at 40 cents per hour	93 80
Net profit	$739 82

Cost of heating could not be accurately estimated, but it was small.

AVERAGE YIELD PER PLANT OF EACH VARIETY FROM ALL SITUATIONS.

	Lb.	Oz.	Average yield per plant
Davis Perfect—			
27 plants (9 from each situation)	778	5	28.82
Rennie's XXX—			
27 plants (9 from each situation)	881	14	30.81

ORNAMENTAL HORTICULTURE

Ornamental horticulture embraces variety testing and cultural experiments with shade trees and hedges, ornamental shrubs, herbaceous perennials, and all annual flowering plants of ornamental value. During the past season special attention has been paid to crossing the different species and varieties in an endeavour to obtain improved types and forms for the more severe parts of Canada. As the work with other ornamentals than is reported in these pages is brought to reasonable completion it will be reported on in full.

HEDGES

There appears to be a growing interest in hedges in Canada and, if there is, the Experimental Farms should receive credit for much valuable experimental work which has been done in the past thirty years in testing trees and shrubs for hedge purposes in different parts of Canada. At practically all of the Dominion Experimental Farms and Stations there are sample hedges which have attracted much attention from visitors.

The collection of hedges at the Central Experimental Farm, Ottawa, is, so far as the writer is aware, the largest in the world. There are now eighty-four hedges, each fifty feet in length, most of which are growing side by side so that they can be readily compared. In all some one hundred and twenty species of trees and shrubs have been tested.

The plants for each of these hedges were set in a row eighteen inches apart, which has been found a satisfactory method on the whole. It has been found best in starting a hedge to use small plants from one and one-half to three feet in height. The soil for the plants is first dug and levelled or raked and, if thought necessary, well-rotted manure is thoroughly incorporated with it before planting, but no manure is put in the trench which is opened for the plants. Usually it has not been necessary to use any manure at the time of planting, as the soil is fairly good. The trees are planted a little deeper, say from one to two inches, than they had been in the nursery

from which they came. This is to provide for some heaving the first winter and also to make certain that they are not planted too shallow. Early spring planting both for evergreens and deciduous species has been found the best and summer planting of evergreens is not recommended. The soil should be tramped in well about the roots so as to ensure their quick contact with moist soil. After planting the plants should be pruned back to the same height if they are uneven in growth.

The hedges at Ottawa are pruned regularly each year, the usual time for pruning being after most of the growth has been made. For some sorts this is early in June, whereas for others it is late in June or early July. By pruning at this time there is usually a little more growth made which covers the wounds made in pruning and the hedge looks neat until nearly the same time next year. Some kinds require a second pruning late in summer as odd shoots grow up which should be removed to keep the hedge looking neat, and with a few sorts there is a fairly strong second growth.

The shape of hedge which has been found most pleasing to the eye and at the same time ensures the branches remaining alive almost or quite to the ground is one with the broadest part of the hedge at the ground, gradually narrowing towards the top, but the top being rounded instead of being pruned to a sharp point.

While a large number of species have been tried those which are satisfactory for many years are relatively few. The chief defect of most of the hedges is that they become too open at the base, while others require too much pruning.

Tall Deciduous Hedges.—Where a tall hedge is required one of the following might be used with good effect: Siberian Pea Tree, Honey Locust, Josika Lilac, Common Buckthorn. The white, yellow and black birches have also made good hedges at Ottawa and stand pruning well.

Siberian Pea Tree (*Caragana arborescens*).—This is, perhaps, the best of all deciduous hedges for the colder parts of Canada. It is very hardy and a fast grower and its leaves, which come out very early, are of an attractive shade of green. As it makes practically all its growth early in the season one pruning each year is sufficient. This shrub-like tree will reach a height of eighteen feet if desired. The Siberian Pea Tree should be in full sunlight for best results, as if shaded the bottom will become too open. This plant has attractive yellow pea-shaped flowers when not pruned.

Common Buckthorn (*Rhamnus catharticus*)—The Common Buckthorn makes a good tall hedge though the foliage is not so attractive as the Siberian Pea Tree. It is, however, a firmer hedge than the Caragana and where one is desired that will stand rather adverse conditions this is a good one. It stands pruning well. It will grow to any height desired for a hedge.

Honey Locust (*Gleditschia triacanthos*)—Where a hedge is desired that will hold small animals to a great extent the Honey Locust is one of the most satisfactory. It is very thorny and the thorns are long and sharp. It requires more pruning, however, than either of the two previously mentioned hedges and is not hardy enough for the coldest sections, though it has done very well at Ottawa.

Josika Lilac (*Syringa Josikaea*)—Many persons like to have a lilac hedge, mainly as a matter of sentiment, for the common lilac is not a very satisfactory hedge plant, not being stiff enough nor having attractive enough foliage for a hedge which is to be looked at all the season. The foliage often becomes badly mildewed which makes it still less attractive and, when grown as a clipped hedge, there will be no flowers. The Josika Lilac, however, makes a much better hedge plant than the common. The leaves are deep green in colour and glossy, and the bush is firmer than the other. It is one of the most attractive tall hedges at Ottawa.

Tall Evergreen Hedges—The two most satisfactory tall evergreen hedges are the Douglas Fir and Norway Spruce, although the White Pine (*Pinus Strobus*) has made an excellent hedge at Ottawa and is still in good condition though planted in 1890, over thirty years ago. The Arbor-vitæ, or White Cedar, might be included with the tall

hedges, as it will grow as tall as required, but it has been put with those of medium height.

Douglas Fir (*Pseudotsuga taxifolia*)— This has proved to be the best tall evergreen hedge at Ottawa. Planted in 1894 this sample hedge is still in excellent condition, as is also another hedge of it planted before that time, and has living branches to the ground. The foliage is attractive and the hedge looks well.

Norway Spruce (*Picea excelsa*)—This is a very fast growing spruce, but is only fairly satisfactory as a hedge plant where one is looking for a hedge that will stay in good condition for a long time. For the first ten or fifteen years it may do well, but later on the lower branches are likely to die unless it is under very favourable conditions. It is such a strong grower also that it needs much pruning to keep it within bounds. This spruce should be in the open where it will get bright light to do its best. The native White Spruce (*Picea canadensis*) makes a beautiful hedge, but is so often disfigured by the spruce gall worm that it is not recommended for general planting on this account.

Deciduous Hedges of Medium Height—A few satisfactory hedges of medium to tall-growing shrubs have been found among the many that have been tested. Two of the best are the Alder Buckthorn and Wayfaring Tree. The Shrubby or Woody Caragana (*Caragana frutescens*) makes an attractive looking hedge, but is rather soft and sometimes gets out of shape with the weight of snow. It also suckers to some extent. The Tamarack and European Larch have both made good hedges.

Alder Buckthorn (*Rhamnus Frangula*)—This is a more attractive looking hedge than the Common Buckthorn. The leaves are rather small, are glossy and of an attractive shade of green. It stands pruning well and will succeed in partial shade better than some others. While put among hedges of medium height, if allowed to grow, it will reach any height a hedge is likely to be needed, but can be kept down with little trouble. It is not thorny like the Common Buckthorn and on this account is not so desirable where anything is liable to run up against it much.

Wayfaring Tree (*Viburnum Lantana*).—The Wayfaring Tree, or shrub, as it really is, was planted as a hedge in 1890 and after thirty years is still in good condition. While the foliage is rather large to make the most attractive kind of hedge, it is of a lively green colour which offsets that to a large extent. It has done well under pruning and is still clothed with branches to the ground. While the hedge at Ottawa is in bright light, this shrub would probably succeed better in partial shade than some others.

Evergreen Hedges Medium to Low in Height.—The best evergreen hedges of medium height are those made by the various forms of the American Arbor-vitæ, but the ordinary one found growing wild in many places in Eastern Canada is very satisfactory. The Japanese Yew (*Taxus cuspidata*) is promising and the Swiss Stone Pine (*Pinus Cembra*) is still a good hedge after twenty-six years' growth.

American Arbor-vitæ (*Thuya occidentalis*).—This is the best evergreen hedge which can be readily kept at a medium height, or let grow tall as desired. It stands clipping well, will endure shade better than most plants, is only a moderately strong grower, lessening the amount of pruning which would otherwise be necessary, and can readily be kept looking well trimmed for most of the year. It is also very hardy. The hardiest variety of this would seem to be the Siberian Arbor-vitæ (*Thuya occidentalis Wareana*), which, however, has a little coarser look than the ordinary form. Other varieties are dwarfer and they are very suitable where a low-growing evergreen hedge is desired. Among these may be mentioned the Globose Arbor-vitæ (*Thuya occidentalis globosa*) and Compact Arbor-vitæ (*Thuya occidentalis compacta*).

Low-growing Deciduous Hedges.—Three of the best low-growing hardy deciduous hedges are the Japanese Barberry (*Berberis Thunbergii*), the Dwarf Caragana (*Caragana pygmæa*) and the Alpine Currant (*Ribes alpinum*). The only privet that has proved at all suitable for hedge purposes at Ottawa is the Amur Privet (*Ligus-*

trum amurense), but from time to time even this kills to near the ground and the hedge becomes unsightly for a time, hence no privet is recommended for the colder parts of Ontario nor for Quebec.

Japanese Barberry (*Berberis Thunbergii*).—This is the most satisfactory and most popular low-growing hedge. It will reach a height of four feet if desired. It has the good hedge qualities of being of compact habit with small attractive foliage and sufficiently firm to keep its shape well. The leaves become highly coloured in autumn and after they fall the scarlet berries give this hedge a pleasing appearance until it is covered with snow. So far the disease which causes the rust of wheat has not been found on this species, so that it can be planted without fear of its doing harm. There is a dwarf form of this called Box Barberry, which should prove very useful where a very small hedge is desired.

Dwarf Caragana (*Caragana pygmæa*).—Dwarf caragana, because of its great hardiness and attractive flowers, is a desirable shrub, but on account of its small foliage and neat habit it makes a very good low hedge. The colour of the foliage, however, is rather dull, which detracts from it where a bright-looking hedge is desired.

Alpine Currant (*Ribes alpinum*).—The Alpine Currant has not been tested long at Ottawa as a hedge plant, but it has done well elsewhere and it promises to make a good low hedge here. The foliage is comparatively small and is of an attractive shade of green, and the habit of the bush is compact.

PERENNIAL FLOWERS

Iris. The iris has received much attention in the Horticultural Division because of its popularity, its great variety, its hardiness, and its ease of propagation, making it a flower that can be readily grown by anyone having a small area on which to

Photo by Frank T. Shutt.

Iris—Central Experimental Farm, Ottawa, Ont.

grow flowers. In the Arboretum and Botanic Garden at the Central Farm, of which the writer had charge for many years, there has been tested some 250 species and varieties, a descriptive list of these being published in 1908 in the bulletin called

"List of Herbaceous Perennials Tested in the Arboretum and Botanic Garden, Central Experimental Farm, Ottawa, Canada," Bulletin No. 5, Second Series, by W. T .Macoun, Horticulturist and Curator. From this large collection those which seemed to have the greatest horticultural interest were in 1910 added to the collection in the Horticultural Division. To this have been added new varieties from time to time since until now there is in the Horticultural Division one of the choicest collections that can be found anywhere. The varieties in this collection have been carefully compared, and those in the following list have been chosen as being the best, considering the cost of the plants, the prices of some of the newer varieties being at present too high to include them when so many excellent sorts can be obtained at moderate prices.

LIST OF BEST SIXTY LATE MAY AND JUNE FLOWERING BEARDED FLAG IRIS, HORTICULTURAL DIVISION, EXPERIMENTAL FARM, OTTAWA, ONT., 1921, ARRANGED IN THIRTEEN COLOUR GROUPS

1. White predominating on standards and falls.
   Florentina, Mrs. H. Darwin, White Knight, Bridesmaid, Innocenza.
2. White feathered or suffused with bluish-lavender and bluish-purple.
   Ma-Mie, Madame Chereau, Mrs. G. Reuthe (Lord Seymour and Maid Marion are very similar), Fairy.
3. White, or white and purple standards and purple falls.
   Clio, Rhein Nixe, Victorine, Duc de Nemours.
4. Yellow predominating on standards and falls.
   Mrs. Sherwin Wright, Mrs. Neubronner, Flavescens.
5. Pale yellow standards and violet purple falls.
   Princess Victoria Louise, Loreley, Darius, Gracchus.
6. Yellow standards and brownish or maroon falls.
   Iris King, Maori King, Mithras, Honourable.
7. Lavender blue and bluish-purple predominating on standards and falls. All Pallida varieties.
   Albert Victor, Celeste, Juniata, Mary Gray, Tineae Imogen. Dalmatica has a very fine flower but is a shy bloomer.
8. Bluish purple standards and bluish-purple or deep purple falls.
   Oriflamme, Amas (Macrantha), Chester Hunt, Blue Jay, Alcazar.
9. Pale purple standards and purple falls.
   Perfection, Walneri, Salvatori.
10. Purple standards and purple or dark purple falls.
    Kharput, Black Prince, Sappho (Othello is very similar), Parc de Neuilly, Archeveque, Monsignor.
11. Lilac and rose predominating on standards and falls.
    Queen of May, Coquette, Her Majesty.
12. Violet and reddish-purple predominating on standards and falls.
    Caprice, Edouard Michel, Lohengrin, Mandraliscae, Madame Pacquitte.
13. Dusky or dull coppery standards and rich maroon falls.
    Jacquesiana, (Jacquiniana), Prosper Laugier, Arnols, Red Cloud, Nibelungen.

BEST TWELVE VARIETIES

Florentina, Mrs. H. Darwin, Ma-Mie, Perfection, Princess Victoria Louise, Iris King, Albert Victor, Alcazar, Chester Hunt, Kharput, Caprice, Jacquesiana.

BEST TWENTY-FOUR VARIETIES

Florentina, Mrs. H. Darwin, White Knight, Ma-Mie, Madame Chereau, Mrs. G. Reuthe, Rhein Nixe, Mrs. Sherwin Wright, Princess Victoria Louise, Iris King, Albert Victor, Celeste, Pallida Dalmatica, Juniata, Alcazar, Amas (Macrantha), Chester Hunt, Perfection, Kharput, Parc de Neuilly, Black Prince, Caprice, Edouard Michel, Jacquesiana.

Pœonies.—It is bewildering to study the descriptions of the many varieties of pæonies that are listed for sale by nurserymen, all of which have their points of merit. It is very difficult, if not impossible, for the amateur who desires to grow some of the best to learn from the descriptions which are the best. At the Central Experimental Farm, many varieties have been tested during the past thirty years and carefully

Photo by Frank T. Shutt.

Paeonies—Central Experimental Farm, Ottawa, Ont.

compared, which has made it possible to recommend a list of twenty-five which can be relied upon as being some of the choicest sorts available anywhere, the bloom in 1920 being particularly good. Most of those in the following list are relatively inexpensive as the average flower lover, while he may desire quality, cannot afford to pay the high prices asked for some of the newest pæonies.

When selecting the following twenty-five varieties the time of blooming was also taken into consideration in order that early, medium, and late sorts would be included in fair proportion.

BEST TWENTY-FIVE PÆONIES

Pure white.—

Duchesse de Nemours (Calot),

Marie Lemoine.

White, edged or flecked with crimson or carmine; and flesh white:—

Avalanche or Albâtre,
Couronne d'Or,
Festiva maxima,
La Rosiere,
Marie Jacquin,
Monsieur Dupont,
Madame de Verneville.

Pale pink and pale pink fading to white, or edged with white:—

Asa Gray,
Eugène Verdier,
Grandiflora (Richardson's),
Mademoiselle Leonie Calot,
Marguerite Gérard,
Octavie Demay,
Triomphe de l'Exposition de Lille.

Pink:—

Claire Dubois,
Edulis Superba,
Livingstone,
Madame Auguste Dessert,
Madame Geissler,
Modeste Guérin,
Monsieur Jules Elie,
Thérèse.

Red:—

Felix Crousse.

Dark Red:—

Adolphe Rousseau,
Monsieur Martin Cahusac.

Perennial Phlox.—The phlox is one of the most popular hardy flowers and there are many species and varieties which give a succession of bloom from spring until late summer or autumn, but those usually thought of as "Perennial phlox" are those which bloom in summer and are mainly varieties of *Phlox paniculata,* commonly known in the trade as *Phlox decussata.* Of these, there is an early blooming section known as *Suffruticosa,* among which are a few attractive sorts, and there are the varieties of Phlox Arendsi (P. divaricata x P. paniculata), which bloom from late spring until summer, and among which there are some fairly attractive sorts.

Many varieties of phlox have been tested in the Horticultural Division at Ottawa, and the following are considered some of the best.

BEST PERENNIAL PHLOX

Antonin Mercie—Bright violet suffused with white, large white centre.
Consul H. Trost.—Pure red with French purple centre.
Eclaireur.—Bright rosy magenta shading lighter. One of the earliest.
Elizabeth Campbell.—Salmon pink, shading lighter. The best pink.
Etna, or Mounet-Sully.—Bright crimson red with darker centre. Both very good.
Wm. Robinson.—Salmon, large flowers.
Widar, or Lamartine.—Bright violet with large white centre.
Pantheon.—Crimson pink suffused with white about centre.
Pyramide, or Fiancee.—Flowers pure white. Both very good.
Selma.—Lilac rose with conspicuous crimson eye.
Europa.—Pure white with crimson carmine centre.
Miss Lingard.—White with a lilac centre. An early, free blooming suffruticosa variety.
Tapis Blanc.—One of the best whites, dwarf.
Geo. A. Strohlein.—Orange scarlet.
Mme. M. Carvalho.—Mottled white and pink.
Thor.—Carmine, conspicuously lighter about a dark eye.
W. C. Egan.—Pale lilac rose with red eye. Flowers very large.