DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

DIVISION OF HORTICULTURE

REPORT

OF THE DOMINION HORTICULTURIST

W. T. MACOUN

FOR THE YEAR 1927

Chrysanthemums, Central Experimental Farm, Ottawa, 1927. (Photo by Frank T. Shutt.)

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TABLE OF CONTENTS

REPORT OF THE DIVISION OF HORTICULTURE

W. T. MACOUN, DOMINION HORTICULTURIST

This is the forty-first annual report of the Division of Horticulture, and it contains in it the results obtained from some of the experiments, which it is thought will prove of greatest value to Canadians.

The work of the Division of Horticulture is divided into several main parts or subdivisions, namely, pomology or fruit culture; vegetable gardening; ornamental gardening; painting of fruits, vegetables and flowers for records, and the maintenance of a herbarium of horticultural plants; greenhouse experiments; and canning and dehydration. There is also the keeping of the records of the division and the general office work.

The appointment of Mr. H. Hill, B.S.A., M.Sc., as Assistant in Research, has made it possible to attack horticultural problems needing investigation that it was not possible to do before.

Bulletins published during the year have been Bulletin No. 82, New Series, Standard Descriptions of Vegetables—Beets and Carrots, by T. F. Ritchie, B.S.A.; and Bulletin No. 89, New Series, Ornamental Trees, Shrubs and Woody Climbers, by W. T. Macoun, Dominion Horticulturist.

The close co-operation of all members of the staff has made it possible to carry on the work very satisfactorily, and the men in the field have done their part in making the work of the Horticultural Division of value.

As in previous years, the report has been prepared by different members of the staff. That part relating to fruit growing, with the exception of the descriptions of apples, has been prepared by Mr. M. B. Davis, B.S.A., Chief Assistant, and the part on vegetables by Mr. T. F. Ritchie, B.S.A., Assistant in Vegetable Gardening. The Dominion Horticulturist has prepared the rest.

THE SEASON

The seasons vary from year to year, and the character of the weather both during the growing season and when the plants are dormant plays such an important part in experimental work that it seems desirable to record each year some of its features.

Following are some notes on the weather during the year 1927:

The ground was well covered with snow at the end of the year 1926, there being about ten inches on the level. The coldest day of the winter occurred in January, 1927, when it was —29° Fahr. on the 27th, and —23° on the 26th. It was a cold month with temperatures below zero on fourteen days, but rising to above freezing on the last three days.

February was a relatively mild winter month. The lowest temperature was 17° F. below zero on the 5th, and, while it was below zero on eight days, the temperature was above freezing on eight days, the highest temperature being 46° F. above zero on the 24th.

March was a mild month on the whole, the temperature rising above freezing on twenty-three days with little frost on seven other days. Little snow fell during the month, and there was no snow left in the fields on the 29th. The lowest temperature was —2° F. on the 2nd, and the highest 47° F. on the 15th. Eranthus, Snowdrops, and Bulbocodium were in bloom during the last days of the month.

April was a relatively mild month, the temperature rising above freezing on every day. Frost was out of the ground sufficiently to allow digging on April 4, a week earlier than the average for the past thirty years, which is

April 11. There was a period of warm weather from the 15th to 22nd inclusive, when it was 70° F. and over on four days. The highest temperature was 79° F. on the 18th, and the lowest 17° F. on the 8th.

The highest temperature in May was 86° F. on the 22nd. This was the only day the temperature was above 70° F. during the month, it being a rather cool month on the whole with much rain. The last spring frost was recorded on May 1, when the temperature was 28° F.

June was a moderately warm to rather cool month. The highest temperature was 87° F. on the 30th, and it was above 80° F. on five days during the month. There was a plentiful rainfall in June. Bloom of trees and shrubs and herbaceous plants was about ten days later than the average at the end of the month.

While July was not a very warm month, it was quite warm on fourteen days, when the temperature was 80° F. and above. The highest temperature was 84° F. on both July 1 and 2. There was much rain during the month.

August was moderately warm. The highest temperature was 83° F. on the 22nd, and it was 80° F. and above on five days. There was a fair rainfall.

September was also moderately warm. No frost was recorded during the month.

October was a rather cool but fine month. The first autumn frost was recorded on the 9th of only one degree, but there was a killing frost on the 11th, when the temperature dropped to 25° F. The rainfall was light both this month and last.

November was a cool but not a cold month, the temperature rising above freezing on twenty-three days. The lowest temperature was 13° F. on the 20th. The precipitation was heavy during November, there being 7·01 inches rain and 7·5 inches snow. The snow, however, was gone on the 27th.

There was a snowfall of 1·25 inches on December 1, and winter may be said to have set in on December 2, the average date for the past thirty years being November 25. December was only moderately cold, the lowest temperature being —6° F. on the 24th. The only other day when it was below zero was the 25th, when it was —2° F. During the month 13·25 inches of snow fell, but, owing to a thaw during the last three days, there was but a light covering at the end of the year.

POMOLOGY

The season of 1927 was a rather trying one for the fruit growers, although large crops of some fruits were recorded. In the first place the spring was cold and resulted in a low set of plums, due to bad weather during the pollination period. This was followed by a rather wet summer with consequent difficulty in the control of apple scab. In fact it was the worst season in the history of this Farm for the control of that disease. Most small fruits cropped well in this district, being quite up to average in all respects. As the trees appeared to enter the winter in well ripened condition, little winter injury is anticipated.

RESULTS FROM A CLOSELY PLANTED WEALTHY ORCHARD

From time to time, in the annual reports of this division, details have been given of the financial results from a closely planted orchard of the Wealthy apple, set out in 1896. The trees were originally set at 10 by 10 feet and the entire block consisted of some one hundred and forty-four trees. During the course of years many trees have died or have been removed to make room, until now only about half the original number remain, viz., sixty-two.

The orchard has been grown on the sod mulch system and is a pretty good example of the possibilities of that system of orchard practice. The grass, while permitted to grow over the entire area, is kept cut and permitted to lie as a mulch. Thus, while the method adopted is not considered as good practice as

where foreign mulch material may be used to assist in maintaining an adequate mulch beneath the trees, nevertheless, as far as moisture content has been concerned, it has given quite satisfactory results. Obviously such a system of orchard management is liable to leave the trees somewhat deficient in nitrate nitrogen, as very little of this form of nitrogen is to be found under sod. This has been overcome by the use, in the early years, of considerable quantities of manure, but for the last five years chemical fertilizers have been relied upon to provide the deficiencies of plant food. At present each tree receives an application of three and one-half pounds nitrate of soda, one pound acid phosphate and half a pound of muriate of potash, applied in early spring.

While the growing of the trees so close in the early years has resulted in a rather "leggy" looking orchard, the cropping ability of the area has been very satisfactory and the net profits per acre, over a long range of years, has been a practical demonstration of the profit potentialities of an orchard in this district and particularly of one under this system of mangement.

DETAILED RETURNS FROM CLOSELY PLANTED WEALTHY ORCHARD FOR 1927

Expenses, 1927		Estimates per acre
Mowing, 1 man, 6 hours at 34 cents	$ 2 04	
Spraying four times	4 80	
Material for spraying	13 00	
Picking fruit, 67 hours at 34 cents	22 78	
Packing fruit, 54 hours at 34 cents	18 36	
Rent of land	3 96	
518 baskets at 7½ cents	38 85	
Fertilizer and its application	10 00	
Total	$ 113 79	$394·35
Receipts		
518 baskets of apples at 50 cents	$ 259 00	$829·31
Net profit	145 21	464·96

NOTE.—No charge for pruning in 1927, as orchard was not pruned that year.

RETURNS FROM CLOSELY PLANTED WEALTHY ORCHARD SINCE DATE OF PLANTING

Net profit per acre 1896-1920	$3,522 06
" " 1921	411 10
" " 1922	131 28
" " 1923	475 30
" " 1924	102 78
" " 1925	377 83
" " 1926	7 53
" " 1927	464 96
Average yearly net profit per acre	171 64

AVERAGE COSTS PER ACRE

As a very strict account has been kept of all work performed on the above area the figures are rather illuminating as to the cost of maintaining a sod mulch orchard in first-class condition. As the costs in the early days were based on lower wages than now prevail they have little value for present-day conditions, but the last five years give an excellent idea of the working capital required for a full bearing orchard. This five-year average works out to $297.87 per acre per year. This includes cost of harvesting and packing and cost of packages.

AVERAGE YIELDS PER ACRE

The accumulated data also provide an opportunity to estimate the probable yields per acre of Wealthy apples in five-year periods from the date of first yields, which was three years after planting. The accompanying table gives the yield for each year, the five-year totals and averages and the approximate average yearly yield per acre in barrels.

A closer analysis of this table is extremely interesting. In the first place the orchard reached full bearing in 1902, six years after planting. In that year it produced almost as large a yield as at any time in its history, 2,351 gallons,

or about 300 barrels per acre. This is an excellent yield and is all the more impressive if considered in terms of barrels per tree from an orchard planted at regulation distances. At 40 by 40 feet, when planted on the Quincunx plan, and filled one way, we get forty-three trees to the acre. On this basis the three hundred barrel yield is well over six barrels per tree, which would be considered an excellent yield in most fruit districts.

The next point worthy of note is that even in the first five-year period the average annual yield was close to one hundred barrels per acre, while in the second five-year period the maximum yearly average of one hundred and seventy-five barrels was reached.

This maximum yield per acre being reached six years after planting is entirely due to the closeness of the trees. While the yield per tree is low, it is the acreage yield which counts. Trees set standard distances apart would not begin to approach these acreage yields until the fifteenth or sixteenth year, by which time this orchard had been showing maximum acreage yields for ten years.

There was very little variation in average yearly yield during the second, third and fourth five-year periods, in fact the averages for the second and third periods are exactly the same. After the fourth five-year period the yields began to drop and are now approximately one hundred and fifty barrels per year, which is almost exactly the average for the entire twenty-nine years.

Briefly then we note that maximum production per acre was reached in six years after planting, and that the period of maximum production extended from the sixth year to the twenty-first year (1916) before any reduction in crop could be observed, thus giving at least fifteen years of maximum production, which has been followed by eleven years of average production.

YIELD OF WEALTHY ORCHARD FROM TIME OF PLANTING TO 1927

Year	Number of trees growing	Yield in gallons	—
1899	139	255	
1900	139	598	Total yield for five years.... 3,907 gal.
1901	139	380	Average yield per acre..... 781 "
1902	139	2,351	Average yearly acreage yield. 99 bbl.
1903	132	323	
1904	132	2,134	
1905	131	1,247	Total yield for five years.... 6,829 gal.
1906	131	886	Average yield per year..... 1,365 "
1907	122	593	Average yearly acreage yield. 175 bbl.
1908	122	1,969	
1909	108	2,210	
1910	105	939	Total yield for five years.... 6,825 gal.
1911	105	458	Average yield per year..... 1,365 "
1912	103	2,678	Average yearly acreage yield. 175 bbl.
1913	92	540	
1914	92	1,893	
1915	92	690	Total yield for five years.... 6,912 gal.
1916	90	2,240	Average yield per year..... 1,382 "
1917	90	385	Average yearly acreage yield. 175 bbl.
1918	87	1,704	
1919	77	1,258	
1920	74	1,095	Total yield for five years.... 5,871 gal.
1921	73	1,571	Average yield per year..... 1,174 "
1922	72	699	Average yearly acreage yield. 151 bbl.
1923	70	1,248	
1924	68	476	
1925	67	2,193	Total yield for four years.... 4,873 gal.
1926	62	454	Average yield per year..... 1,215 "
1927	62	1,750	Average yearly acreage yield. 154 bbl.

SOME OF THE BEST OF THE VARIETIES OF APPLES ORIGINATED IN THE HORTICULTURAL DIVISION, OTTAWA

Following are descriptions of some of the most promising varieties of apples of the McIntosh and Fameuse type originated in the Horticultural Division, Ottawa. There are many other good varieties, some of which are proving very promising under certain climatic conditions, but the following are the ones which, it is thought, will prove most generally useful. A full list of names given to new varieties of apples, originated in the Division of Horticulture, was published in the annual report for 1926.

DIANA

The Diana apple is an open pollinated seedling of the Langford Beauty, the latter being probably of Fameuse parentage and which originated near Gatineau Point, P.Q. The Diana originated in the Horticultural Division, Central Experimental Farm, Ottawa, Ont. Seed was sown in the autumn of 1898, and the young trees from it were planted in the orchard in 1903. The tree, which was named Diana in 1913, fruited for the first time in 1912, and a description of it was first published in the Annual Report of Experimental Farms for 1913.

Following is a detailed description of the fruit:—

Diana.—Size medium to above medium; roundish regular; cavity medium depth and width; stem medium to long, moderately stout to slender; basin deep, medium width, wrinkled; calyx open or closed; colour yellow well washed and splashed with attractive crimson; predominant colour attractive crimson; seeds medium size, acute; dots few, white, rather indistinct; bloom thin, pinkish; skin moderately thick to thick, moderately tough; flesh white with traces of red, crisp, tender, juicy, melting; core medium size, open; flavour briskly subacid, aromatic; quality good; season late September to mid-December. A handsome apple resembling Langford Beauty somewhat in colour of skin and character of flesh. This promises to be a useful commercial apple. The fruit is very symmetrical and of high colour and the tree is a good cropper. The season is about that of Wealthy.

GERALD

The Gerald apple, which originated in the Horticultural Division, Experimental Farm, Ottawa, is an open pollinated seedling of the Langford Beauty, which is supposed to be a seedling of Fameuse. Seed of Langford Beauty was sown in the autumn of 1898 and the young trees which grew from this seed were planted in the orchard in the spring of 1903. The tree called Gerald fruited first in 1911 and it proved so promising that it was named and a description of it published in the Annual Report of the Experimental Farms for 1912.

Following is a detailed description of the fruit:—

Gerald.—Size medium to above medium; form roundish to oblate, slightly ribbed; cavity medium depth and width; stem medium to short, stout; basin deep, medium width, wrinkled; calyx partly open; colour yellow washed with crimson; predominant colour crimson; dots few, yellow, distinct; bloom thin, bluish; skin moderately thick, moderately tender; seeds above medium size, acuminate to acute; flesh white, crisp, tender, juicy; core medium size, open; flavour subacid, pleasant; quality good; season late November to April.

An attractive looking apple of the Fameuse type, resembling Langford Beauty considerably in outward appearance, flesh and flavour. Promising as a variety to follow McIntosh in season.

HONORA

The Honora apple is an open pollinated seedling of the McIntosh. It originated in the Horticultural Division, Central Experimental Farm, Ottawa, Ont. Seed was sown in the autumn of 1898, and the young trees from it planted in the orchard in 1901. The tree, which was named Honora in 1916, fruited for the first time in 1908, and a description of it was first published in the Annual Report of the Experimental Farms for 1916.

The following is a detailed description of the fruit:—

Honora.—Size medium to large; form roundish to oblate, conic; cavity open, medium depth, russeted; stem short to medium, stout, sometimes clubbed; basin medium depth and width, wrinkled; calyx closed or partly open; colour yellow well washed with crimson; predominant colour crimson; seeds medium size, acuminate; dots obscure; skin moderately thick, moderately tough; flesh white tinged with red, tender, melting, moderately juicy; core medium size, open; flavour mildly subacid or almost sweet, pleasant; season late September to November. Resembles McIntosh very much in colour of skin and somewhat in shape and in character of flesh and in core and also in being highly perfumed. This variety is attractive in appearance.

For those who like a sweet, or almost sweet apple, this is a good one, but, while more attractive looking than McSweet, it has not quite as high a flavour.

HUME

The Hume apple is an open pollinated seedling of McIntosh which originated in the Horticultural Division, Central Experimental Farm, Ottawa. Seed was sown in the autumn of 1903 and germinated the following spring and the young trees were set out in the orchard in 1906. One of these trees began to bear in 1916 and was named Hume the same year, as it appeared to be a very promising autumn variety. It was propagated in the winter of 1916-17. Owing to the original tree having been cut down by mistake in the spring of 1917, fruit was not again seen until the young trees started to bear at the Experimental Station at Saanichton, B.C., and Ste. Anne de la Pocatière, P.Q., in 1926, when the impression of the value of this variety obtained in 1916 was confirmed.

The Hume apple was described first in the Annual Report of the Experimental Farms for 1920-21, page 5.

Following is a detailed description of it:—

Hume (McIntosh Seedling).—Size medium to above medium; form roundish to oblate, slightly ribbed; cavity medium depth and width; stem short to medium, stout; basin medium depth and 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 moderately numerous, pale yellow, distinct; bloom moderate, bluish; skin moderately thick, moderately tender; flesh dull white and yellowish with traces of red, crisp, tender, juicy; core medium; flavour subacid, pleasant, high, McIntosh-like; quality good to very good; season late September to December. A very handsome apple suggestive of McIntosh in colour, flesh, and flavour. Perfume somewhat like McIntosh.

Promising as a possible variety to take the place of Wealthy.

JOYCE

The Joyce apple is an open pollinated seedling of the McIntosh. Seed of the McIntosh was saved in the Horticultural Division of the Central Experimental Farm, Ottawa, Ont., in 1898, and sown there in the autumn of that year.

The seed germinated the following spring and the young trees were set out in rows in the orchard in 1901. One of these trees fruited in 1911 and was so promising that it was named Joyce in 1912.

Propagation was begun in the winter of 1911-12 and many trees have since that time been sent out to experimenters for test. It has fruited in widely separated parts of Canada and in the United States and is so promising that it is expected it will be planted extensively in the near future.

The Joyce is an autumn apple of about the same season as Wealthy and quite equal to McIntosh in quality. The fruit is of good size, attractive in appearance and the tree a good bearer.

Following is a detailed description of the fruit:—

Joyce (McIntosh Seedling).—Medium to large size; oblate to roundish, ribbed; cavity medium depth and width; stem short, moderately stout; basin medium depth and width, wrinkled; calyx closed; colour yellow, washed and splashed with crimson; predominant colour crimson; seeds medium size, acute; dots few, yellow, distinct; skin moderately thick, tender; flesh dull white, tender, melting, juicy; core medium size, open; subacid, pleasant, aromatic flavour; quality good to very good; season September to November. Resembles McIntosh very much in flesh and flavour but much earlier in season.

Described first in Annual Report of Experimental Farms 1912, page 93.

LAWFAM

The Lawfam apple is a cross between Lawver and Fameuse, made in the Horticultural Division, Central Experimental Farm, Ottawa, in 1899, the seed being sown in the autumn of that year. From this seed, the tree, which was afterwards named Lawfam, was planted in the orchard at the Experimental Farm in 1902. It fruited for the first time in 1918 and was named Lawfam in the winter of 1921-22.

It was propagated for the first time in 1922 and since that time it has been sent out to experimenters for test. The first published description of Lawfam will be found in the Annual Report of the Experimental Farms for 1921, page 5.

Following is a detailed description of the fruit:—

Lawfam (Lawver x Fameuse).—Size medium, roundish to oblate conic; cavity open, medium depth, russeted; stem medium to long, moderately stout; basin medium depth and width, nearly smooth; calyx open; colour yellow well washed with deep attractive crimson; predominant colour deep crimson; seeds medium size, acute to acuminate, irregular; dots obscure; skin moderately thick, moderately tender; flesh yellowish, sometimes with traces of red, crisp, tender juicy; core medium to small, open; flavour subacid, pleasant, raspberry-like and also suggestive of Fameuse; quality good; season December to March. Resembles Lawver somewhat in colour of skin. No marked resemblance to Fameuse in outward appearance except that colour of skin is suggestive of a dark coloured Fameuse.

A promising variety for a season a little later than McIntosh.

LINDA

The Linda apple, which originated in the Horticultural Division, Central Experimental Farm, Ottawa, is an open pollinated seedling of the Langford Beauty, the latter being probably a seedling of Fameuse. The seed from which this variety came was sown in the autumn of 1898. The seed germinated the following spring and the young trees were set out in 1902. One of these trees began to bear in 1908 and was named Linda in 1914. It has been propagated since 1910. The first published description of this variety is in the Annual Report of the Experimental Farms for 1915, page 595.

Following is a detailed description of the fruit:—

Linda (Langford Beauty Seedling).—Above medium to large, roundish to oblate, ribbed; cavity medium width to narrow, shallow to medium depth, russeted; stem short to medium, stout; basin open, shallow to medium depth, wrinkled; calyx partly open or open; colour pale yellow washed and splashed with crimson; predominant colour crimson; seeds large, acuminate; dots few, yellow, distinct; bloom thin, bluish; skin moderately thick, moderately tender; flesh dull white, firm, crisp, juicy; core medium size, open; flavour briskly subacid, pleasant, aromatic; quality good; season November to March. Resembles Langford Beauty considerably in outward appearance and in flavour. An attractive looking apple. Will probably keep a month longer than McIntosh. A promising winter apple.

LOBO

The Lobo apple is an open pollinated seedling of the McIntosh. Seed of the McIntosh was saved in the Horticultural Division of the Central Experimental Farm, Ottawa, in 1898, and sown there in the fall of that year. The seed germinated the following spring and the young trees were set out in fruiting rows in the spring of 1901. One of these trees, afterwards called Lobo, fruited in 1906, and, as it continued to be very promising after each year of fruiting, it was named Lobo in 1909.

It was propagated and sent out for further testing, and proved so promising in widely separated parts of Eastern America that it was submitted to the committee of the American Pomological Society on Wilder Medals as a variety to precede McIntosh in season. At the Annual Meeting of this Society in New York in November, 1923, it was awarded the Silver Wilder Medal, the highest award given by the American Pomological Society.

Following is a description of the fruit as grown at Ottawa:—

Lobo (McIntosh seedling).—Above medium size; roundish conical; cavity medium depth, open, sometimes russeted; stem short to medium, stout; basin deep, narrow, almost smooth; calyx open; colour pale yellow, almost white, washed with bright crimson; predominant colour bright crimson; seeds medium; dots moderately numerous, grey, indistinct; bloom little, if any; skin thick, tough; flesh white with traces of red, fine grained, tender, juicy; core medium; subacid, sprightly, pleasant, not high flavour; quality good; season October. Resembles McIntosh considerably in outward appearance, in flesh, and in flavour. (Description first published in Experimental Farms Report for 1910).

This variety is now being widely planted in the state of New Jersey, where it does particularly well, and has also come much into favour in the eastern townships of the province of Quebec.

MCSWEET

The McSweet apple is an open pollinated seedling of the McIntosh which originated in the Horticultural Division, Experimental Farm, Ottawa. Seed was sown in the autumn of 1900 and the young trees from it planted in the orchard in 1903. The tree, which was named McSweet in 1919, fruited for the first time in 1913, and a description of it was first published in the Annual Report of the Experimental Farms for 1920-21.

Following is a detailed description of the fruit:—

McSweet.—Size medium to above medium; form oblate to roundish conic; cavity open, deep; stem short to medium length, moderately stout to stout; basin open, medium depth, nearly smooth; calyx closed; colour pale yellow well washed with deep crimson with darker splashes; predominant colour deep crimson; dots few, indistinct; bloom bluish; skin thick, tough; seeds medium size,

obtuse to acute; core small; flesh dull white, tender, melting, juicy; flavour sweet, pleasant; quality good to very good; season late September to middle of December. Resembles McIntosh considerably in outward appearance and in flesh. A good sweet apple.

MACEARLY

The Macearly apple is an open pollinated seedling of a cross between Lawver and McIntosh. It originated in the Horticultural Division, Experimental Farm, Ottawa. Seed was sown in the autumn of 1908 and the young trees from it planted in the orchard in 1912. The tree which was named Macearly in 1923 fruited for the first time in 1918, and a description of it was first published in the Annual Report of the Experimental Farms for 1924.

Following is a detailed description of the fruit:—

Macearly.—Size medium to below medium; form roundish conic; cavity deep, medium width, russeted; stem medium length and moderately stout to long and slender; basin open, shallow to medium depth, wrinkled; calyx open or closed; colour yellow well washed with crimson; predominant colour crimson; dots few, yellow, distinct; bloom thin bluish; skin thick, moderately tough; seeds above medium, acuminate; core medium size, open; flesh dull white or yellowish, crisp, tender, juicy; flavour subacid, pleasant; quality good; season middle of August to early September. Resembles McIntosh considerably in colour of skin and in flesh. The fruit of this variety should be thinned, otherwise it is liable to be below medium in size, but it is the earliest apple of the McIntosh type fruited at Ottawa.

MACROSS

The Macross apple is an open pollinated seedling of McIntosh which originated in the Horticultural Division, Central Experimental Farm, Ottawa. Seed was sown in the autumn of 1898 and the young trees from it planted in the orchard in the spring of 1904. The tree, which was named Macross in 1926, fruited for the first time in 1911, and a description of it was first published in the Annual Report of the Experimental Farms for 1925.

Following is a detailed description of it:—

Macross.—Size medium to above medium; form roundish to oblong, slightly ribbed; cavity deep, medium width; stem medium to long, moderately stout; basin deep, open, wrinkled; calyx open or closed; yellow, thinly but almost entirely washed and splashed with bright attractive crimson; predominant colour bright, attractive crimson; dots moderately numerous, white, distinct; bloom thin, bluish; skin moderately thick, tender; seeds above medium size, acuminate; core medium; flesh yellowish suffused in places with red, firm, crisp, tender, juicy; flavour briskly subacid, pleasant; quality good; season late August to October. A handsome apple, with little if any resemblance to McIntosh except in colour of skin. About the same season as Melba. Not so good in quality as Melba but should ship better.

MELBA

The Melba apple is an open pollinated seedling of the McIntosh. Seed of the McIntosh was saved in the Horticultural Division of the Central Experimental Farm, Ottawa, Ont., in 1898, and sown there in the fall of that year. The seed germinated the following spring and the young trees were set out in fruiting rows in the spring of 1901. One of these trees, afterwards called Melba, fruited in 1908, and, as it was so exceptionally promising, it was named in 1909.

Propagation was begun in the winter of 1908-09, and trees were sent out to experimenters for test in 1911, and since that time. It has now fruited in many parts of Canada and in a few of the states of the United States, and has proved very promising under many climatic conditions.

It is a summer apple of handsome appearance, in season the same time as the Duchess of Oldenburgh but keeps longer, and is quite as high in quality as the McIntosh. It has a marked perfume which adds to the attractiveness of the variety. The tree is hardy in climates as severe as Ottawa, bears young, and is productive.

The Melba apple was awarded the Silver Wilder Medal in 1927, the highest award given by the American Pomological Society.

Following is a detailed description of the fruit:—

Melba (open pollinated seedling of McIntosh).—Size medium to above medium; form roundish conical, ribbed; cavity open, medium depth; stem medium length, stout; basin medium depth and width, wrinkled; calyx closed; colour pale waxy yellow well washed and splashed with bright carmine and crimson; predominant colour bright carmine; seeds medium to above, broad, acute; bloom moderate, bluish; dots few, pale, indistinct; skin moderately thick, tender; flesh white with traces of red, crisp, tender, juicy; core above medium size, open; flavour sub-acid, sprightly, aromatic, pleasant; quality good to very good; season late August to mid-October. Fruit is highly perfumed. A handsome apple, suggestive of McIntosh in perfume, flesh, and flavour, but not in outward appearance.

Described first in Annual Report of Experimental Farms, 1909, page 111.

PATRICIA

The Patricia apple is an open pollinated seedling of the McIntosh which originated in the Horticultural Division, Central Experimental Farm, Ottawa. Seed was sown in the autumn of 1901 and the young trees from it planted in the orchard in the spring of 1904. The tree which was named Patricia in 1919 fruited for the first time in 1914, and a description of it was first published in the Annual Report of the Experimental Farms for 1920-21.

Following is a detailed description of the fruit:—

Patricia.—Size medium to below medium; form roundish conical; cavity narrow, medium depth, 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; dots obscure; skin moderately thick, tender; seeds medium size, rather light brown, acuminate; core medium in size, open; flesh yellowish with traces of red, tender, melting, juicy; flavour subacid, pleasant; quality good to very good; season October to December. Resembles McIntosh considerably in character of flesh and has a marked perfume. A very handsome apple. This variety is rather small for a commercial apple but is excellent for home use. The fruit should be thinned.

DESCRIPTION OF A VARIETY OF APPLE ORIGINATED IN THE HORTICULTURAL DIVISION AND NAMED DURING THE YEAR 1926-27

One only of the many cross-bred varieties of apples originated in the Horticultural Division was named during the year 1926-27.

Following is a description of it:—

Spiwell (Northern Spy seedling).—Fruit above medium; form oblate to roundish; cavity deep, open; stem short to medium, stout; basin deep, medium width, abrupt, smooth; calyx open or closed; colour yellow washed and splashed with carmine; predominant colour carmine; seeds medium size, acute; dots moderately numerous, pale yellow, distinct; skin moderately thick, tough; flesh dull white, crisp, tender, juicy; core medium to small, open; flavour subacid, pleasant; quality good; season probably November to January or later. Resembles Northern Spy very much in outward appearance and in flavour. Attractive in appearance.

NAMES OF VARIETIES OF APPLES ORIGINATED IN THE HORTICULTURAL DIVISION, CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT., UP TO MARCH 31, 1927, WHICH WERE OMITTED IN THE LIST PRINTED IN THE REPORT FOR 1926

Open pollinated varieties	Female parent	Date of sowing seed	Date of planting tree	Date of first fruiting	Where fruit described
Beda	Langford Beauty	1828	1902	1910	Report 1916, page 617.
Girton	Wealthy	1898	1901	1906	Report 1916, page 617.
Honora	McIntosh	1898	1901	1908	Report 1916, page 617.

VARIETIES OF FRUITS RECOMMENDED FOR EASTERN AND CENTRAL ONTARIO AND PARTS OF THE PROVINCE OF QUEBEC SOUTH OF LATITUDE 46°

The following list of fruits recommended is a revision of the list published in the Annual Report of this Division for the year ending March 31, 1921. Since that date many new varieties have been tested and from among these a few outstanding varieties have been selected for recommendation.

Apples

As newer and better sorts come to the fore some of the older ones can be dropped from the list. On the other hand, for the want of better apples of certain season, some varieties have to still be retained which are not considered as any too desirable.

Summer.—Crimson Beauty, Yellow Transparent and Melba. Duchess for culinary use only.

Autumn.—Wealthy, Joyce and Pedro. McMahan for culinary use only.

Early Winter.—McIntosh, Fameuse, Lobo and Lawfam.

Winter.—Bethel, Scott Winter and American Golden Russet.

Crab Apples

Transcendent, Florence, Martha, Hyslop.

Cherries

For Home Use Only.—Orel 25, Vladimir, Minnesota Ostheim, Cerise d'Ostheim, Montmorency.

Pears

Commercial and Domestic.—Flemish Beauty in most favoured spots, with a few Clapp Favourite for trial.

Plums

Americana and Nigra.—Cheney, Admiral Schley, Terry, DeSoto.

Hybrid Plums.—Kahinta (so much like Waneta with a much better tree that it can replace that variety), Omaha, Emerald, Stella.

European or Domestica.—Mount Royal, Raynes, Montmorency, Glass, Latchford. These are not usually hardy enough for commercial purposes, with the possible exception of Mount Royal.

Grapes

In recommending grapes the early-ripening varieties only are considered which has necessitated the removal of several good varieties from the list. During the last five years very few varieties have ripened, owing to the cooler and shorter seasons we have experienced.

Black.—(Sure ripeners) Early Daisy, Beta and Rockwood. (Varieties that ripen most seasons) Moore Early, Craig and Peabody.

Red.—None of these are sure ripeners; the best are: Mary, Lindley, Moyer and Delaware, with Brighton and Salem as two worth trying on account of their high quality.

White.—(Sure ripeners) Portland, Ontario and Green Mountain.

Blackberries

Domestic only.—Agawan, Snyder, Alfred and Eldorado.

Currants

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

White.—White Cherry, White Grape and Climax White.

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

Gooseberries

Mabel, Silvia, Pearl, Downing, Josselyn, Poorman and Clark.

Raspberries

Red.—(Early) King, Brighton, Count. (Main crop) Newman 23, Herbert, Viking.

Yellow.—Golden Queen.

Purple.—Columbian, Royal Purple.

Black Caps.—Plum Farmer.

APPLE STOCKS

The question of stocks for apple trees has attracted much more attention abroad than in this country. It has long been the custom in England for growers to distinguish between types of stock of different habit, such as dwarf Paradise stocks, semi-dwarf stocks like Doucin, vigorous Paradise stocks, etc. The result has been that these stocks have been propagated vegetatively for years, until now pure clonal lines of several types exist which permit of comparative freedom from the variation found in stocks grown from seed.

In Canada the great majority of propagators have relied on stocks grown from French crab seed. This so-called French crab seed is in reality a heterogeneous mixture of apple seed and need not necessarily be from crabs at all.

Vegetatively propagated stocks have never become popular in this country and it is doubtful if they will become so for many years at least.

The French crab stock referred to above has been found deficient in hardiness for parts of British Columbia, eastern Ontario and Quebec, so that of recent years several of our nurserymen have been using seed from the hardy Russian varieties, native crabs and *Pyrus baccata* hybrids obtained from the Horticultural Division, Central Experimental Farm, Ottawa. The many years of results this Division has had with such stock has demonstrated its superiority from the standpoint of hardiness. This seedling stock from hardy parents, while having demonstrated its constant hardiness, is nevertheless not free from the variations of all seedling stocks as regards vigour, but by selection of the stock before budding and grafting and with careful culling in the nursery row, it has not been difficult to establish a fair degree of uniformity of nursery stock.

Looking forward to the time when there might be a demand on the part of our growers for trees propagated on uniform stock of a pure clonal line, work to originate such a stock was commenced in 1927. While these types of uniform stocks, as used abroad, probably possess all the habits of rooting and vigour required, there is still the question of their hardiness about which we know little, so that it does not appear safe to recommend them as yet for general adoption.

The work commenced in 1927 consisted in layering some two hundred seedlings of Anis, a very hardy Russian variety which produces excellent seedlings for stock purposes. These two hundred were layered by the trench method and in 1928 the layers or shoots lifted. Practically all of the seedlings threw out vegetatively rooted progeny and many were just as prolific in this respect as the Paradise stocks of England. For instance, one Anis seedling gave twenty-one well rooted young shoots, while others of course gave only one or two with very poor roots, and ten to twelve per seedling was about the average.

These were carefully culled over, the shoots from each parent being kept separate, and the poorest parents and their shoots discarded. The result was that five different classes or types were obtained with some seventy-five individual parents and their clonal progeny being retained for further study.

These will be carefully gone over again in 1929 or 1930 and a further culling out will doubtless take place, until several types of desirable clonal stocks for nursery testing will be created.

While the work is yet in its infancy and will take years to bring to completion, mention is made of it here so that growers looking to the future will know that their wants are being anticipated. In the meantime we would caution orchardists against the use of anything but stocks grown from parents of proved hardiness.

AN INVESTIGATION INTO THE HABITS OF THE STRAWBERRY PLANT

During the last four or five years we have been engaged in investigating several types of degeneration diseases found in our strawberry plantations. In the course of this work we were led to examine the root systems of many plants. Without knowledge of the appearance of the root system of a healthy plant throughout its growth we were unable to diagnose between normal ageing of older tissues and definite injury. It was decided, therefore, to study the root system of a normal plant throughout its growth.

Runner Plant one month old, examined November 12.—Root system small but vigorous, healthy, bright white in colour; primaries 8 to 12 in number, 2 to 3 inches long. A few laterals, slender and short, were just beginning to form.

Runner Plant two months old, examined November 12.—Root system strong and vigorous, white and tender. There was no sign of general discoloration or browning. Primaries 18 to 23 in number, 4½ to 5 inches long. Laterals 2 to 3 inches long, having few sub-laterals or fine feeding roots.

Runner Plant two and one-half months old, examined November 12.—Root system strong and vigorous, healthy white in colour, laterals and fine feeding roots well developed, forming a mat or network. No discoloration of root system observable.

Runner Plant three months old, examined November 12.—Root system strong and vigourous, healthy white and tender; no sign of discoloration. Primaries 22 to 31 in number, 6 inches long. Laterals and sub-laterals well developed, forming a mat.

Runner Plant rooted in September, examined April 27.—Root system white and vigorous; no sign of discoloration. Primaries, laterals and sub-laterals well developed, forming a mat. Primaries (24) 5 to 6 inches long.

Runner Plant rooted in August, examined May 20.—Root system well developed. Roots white and healthy; no discoloration. Do not appear to have as extensive a root system as a plant rooted the same time but examined a month earlier. Death of some of the finer feeding roots.

Runner Plant rooted in August, examined July 5.—Plants bearing fruit. All primaries well blackened. Laterals and sub-laterals somewhat discoloured but not blackened. Heart of the primaries white and healthy, cortex could be removed as a skin. No new primaries.

Runner Plant, not cropped, planted in spring, examined October 9.—Runner root yellowish-brown but still alive and vigourous. Browning or discoloration as shown by microscopical examination does not extend beyond the peliferous layer of cells. New primaries with abundant long laterals lighter in colour than the runner root.

STRAWBERRY BUD DIFFERENTIATION

Nutritional conditions within the plant, affected and modified by the nature of the soil solution, constitute one of the chief factors of fruit bud differentiation. An excess of carbohydrates, together with the absence of any limiting factor that interferes with vegetative growth, constitutes favourable nutritional conditions. The supply of available nitrogen is probably the most common limiting element. A knowledge of the time of fruit bud differentiation is of great importance in connection with the possibility of increasing their number by fertilizer applications.

In the reports for 1924, 1925 and 1926 results were presented of our work with the time of application of nitrogenous fertilizers in the strawberry plantation. Our results gave evidence that spring applications as made, though of some slight value in increasing the size of fruit, were unable to increase the number of blossoms, and that the application of fertilizer on September 15 of the first year and August 15 of the first fruiting year gave the best results. In an endeavour to correlate and compare these results with the time of initiation and development of fruit buds, cytological studies were undertaken.

PROCEDURE

For this purpose runners of the variety Pocomoke, which were just becoming attached to the soil by roots, were staked at weekly intervals throughout the summers of 1925, 1926 and 1927. In this way we were able to obtain groups of runners rooted at intervals of one week from the twenty-eighth of June until the tenth of October. Runners from each of these groups were lifted every two weeks, when the group of runners attained an age of two weeks, and prepared for cytological examination. This provided us with material of comparative age, rooted at different times, and a range covering periodic development until fall.

TECHNIQUE

The crowns of the plants were taken and after being very carefully trimmed were placed in medium chromo-acetic acid killing solution for thirty hours. The buds were then washed, dehydrated and embedded in paraffin by the method usually employed in histological study. They were then sectioned on a rotary microtome with a thickness of twelve to fifteen microns. Despite extreme care taken in the handling of the buds, much difficulty was experienced in sectioning, owing to the presence of silicated hairs and bud scales. Safranin was at first employed for staining; later it was found that Erythrosin gave clearer and brighter sections.

PRESENTATION OF RESULTS

Even after the closest examination of numerous slides the initial stage at which morphological differentiation has begun is very difficult to determine. The initiation of differentiation appears to occur as a gradual transition rather

than a sharp and sudden change. In this investigation it has been considered that slight irregularities in the growing point or crown, together with an elongation and flattening of the crown, constitute evidence of the first differentiation of the flower stalk.

SUMMARY

In examining the data we find that the first sign of flower bud differentiation was observed to take place on September 19. This is true for runners rooted both on July 25 and August 22, one month later, and intervening dates. That is, runners of eight weeks of age, up until the middle of September, were unable to commence differentiation of flower buds any sooner than four weeks-old runners. Runners two weeks of age on September 19 showed no signs of differentiation. In a consideration of runners rooted after this date we find that differentiation is evident when runners are but two weeks of age. Runners rooted September 12, 19 and October 10 have begun differentiation on October 10 and 24 respectively. It is also to be noted that runners rooted a week previous to September 19 are not so far developed as runners rooted after this date but collected at the same age. There is apparently a critical seasonal period before which the stimulus for flower bud formation is lacking, independent of the age of the runner. For this variety and locality the date is approximately September 19, as indicated by the results from three years of consecutive work.

Runners rooted on July 25 showed the first signs of differentiation of flower buds on September 19, as evidenced by a pushing up and flattening out of the crown. On October 10 there were three growing points intended to develop into a primary and two secondary flowers. On the primary bud sepal primordia were beginning to push up from the sides. On October 17 the primary bud possessed sepal, petal and stamen primordia and the secondary buds, sepal and petal primordia.

On October 31 the primary bud was very well developed, the receptacle bearing on the surface numerous pistil primordia. Anthers were prominent, lobed with four locules; secondaries with sepal, petal and stamen primordia and a tertiary with sepal and petal primordia.

There is a general development of the floral part from the initiation of differentiation until late fall, with sepal, petal, stamen and pistil primordia appearing in the order named. The primary develops more rapidly than the secondary, the secondary than the tertiary, etc.

The correlation between the results obtained with the time of fertilizer applications in the field and the initial date of fruit bud differentiation is quite marked. Spring applications of fertilizer as made had no effect in increasing the number of fruit buds. This is to be quite understood in the light of our cytological studies, which showed that the initiation of fruit bud differentiation is delayed until approximately September 19. Highest yields were secured with fertilizers applied on September 15 of the first year and August 15 of the first fruiting year, which dates are quite close to the beginning of fruit bud differentiation as determined by our microscopical studies.

The complete data of the above investigation, together with numerous microphotographs, will be published in bulletin form during the coming year.

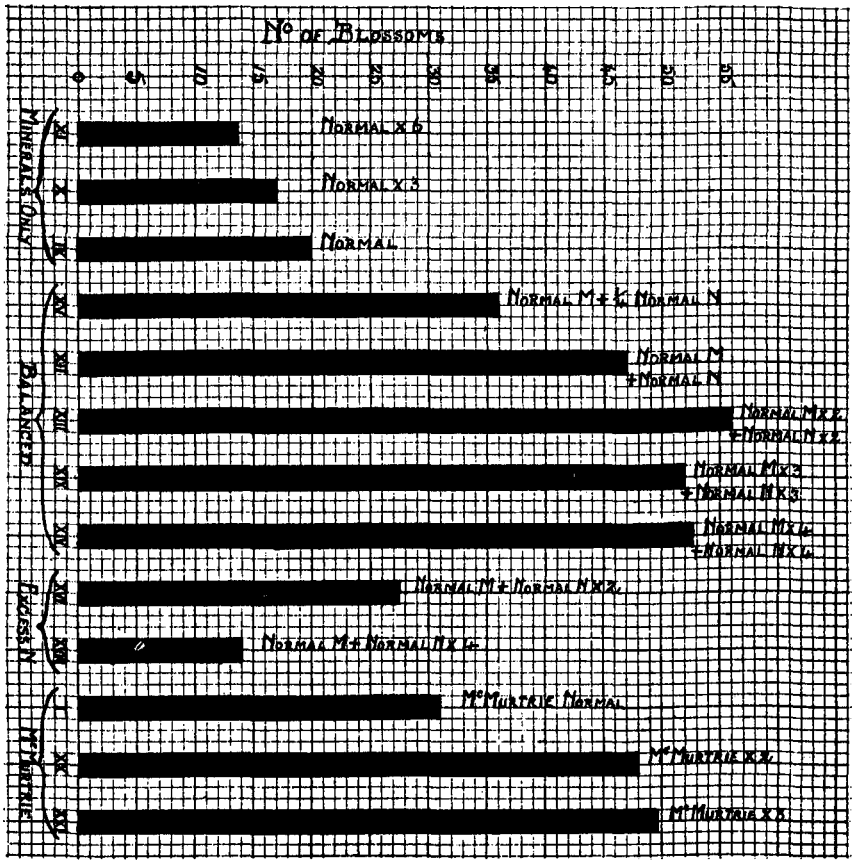
NUTRITIONAL STUDIES WITH STRAWBERRY PLANTS

NITROGEN—MINERAL RATIO

The nutritional requirements of the strawberry plant have been studied in pure sand cultures where the nutrient solutions fed to the plants have been under control. In one series the ratio between nitrogen and minerals was investigated, with the results as set forth in the accompanying graph, which shows the number

of flowers produced by each series under treatment. A brief discussion of the graph will give the results of this experiment without indulging in any details of operation.

It will be noticed that where minerals only were fed the yields were low and became lower as the quantities of minerals increased. As soon as nitrogen was added to the solution yields increased and the increase was greater as the nitrogen was increased up to a certain point. In other words, there exists a requisite balance between nitrogen and the mineral elements to obtain maximum yields.



After this balance has been obtained there is a slight further increase in yields due to the increase of the total solution fed. This increase in quantity of a balanced solution may continue to a certain point without any reduction in yield, but on the other hand there is no increase. (Observe Normal N x 2 + Normal M x 2.) As soon as the nitrogen alone is increased beyond a certain point, without a corresponding increase in the minerals, yield is reduced. (See Normal M + Normal N x 2 and Normal M x 4 + Normal N x 4.)

In other words, an excess of nitrogen may result in as low yields as a total lack of that element, but if a corresponding increase in minerals is given the yields increase. The three columns headed "McMurtrey Formula" show that with this balanced solution yields increased as the total quantity of solution increased, up to the point where three times a normal dose was applied.

SUMMARY

(1) A study was made of the effect of nutrient solutions of different ratios of nitrogen and minerals upon strawberry plants in both pure sand and soil.

(2) The quantitative data showed the danger of excess of nitrogen over minerals, indicating that a ratio of 1 nitrogen to 1 minerals was about as close as the ratio could be brought with safety.

(3) On the other hand, excess of minerals over nitrogen, up to 1 nitrogen to $3\frac{1}{2}$ minerals, did not appear to cause distress.

(4) A ratio of 1 nitrogen to 0·85 minerals appeared optimum.

(5) Total salt concentrations varied from 0·0090 to 0·0700 without materially affecting the results.

(6) None of the solutions showed any interpretive effect upon the set of the blossoms.

The complete data of the above investigation will be published in Scientific Agriculture and separates will be obtained from this division.

NITROGEN, PHOSPHORUS AND POTASH STARVATION OF STRAWBERRY PLANTS

The effect of the starvation of strawberry plants for nitrogen, phosphorus and potash at different periods in their growth has been studied in pure sand cultures. An examination of the results from these different starvation groups revealed (1) that where either nitrogen, phosphorus or potash was lacking throughout the experiment the yield was significantly lower than that of the full nutrient series; (2) that the lack of phosphorus apparently has more effect on set than either lack of nitrogen or potash; (3) that the correction of the nitrogen deficiency, not later than May 2 in this instance, brought the plants back to normal production; (4) that while the correction of the phosphorus and potash starvation by May 2 and June 6 resulted in an increase over the complete lack of these elements, it did not entirely correct the decrement below the maximum; (5) that in the case of the potash group there is some doubt as to whether the spring correction of the potash deficiency actually increased the yield or not; and (6) that excess of nitrogen, phosphorus or potash resulted in decreased yields of about equal magnitude.

The complete data of the above investigation, together with colour plates, is being published in bulletin form.

72972—3½

VEGETABLE GARDENING

The season of 1927 was not ideal for the production of all classes of vegetable crops. The remarks regarding the season in the opening page of this report will give a very clear idea of this, although it was surprising how rapidly the crops matured and what good returns were obtained.

GARDEN CORN—TEST OF VARIETIES

The growing of garden corn has developed so rapidly during the past few years that many of the once popular standard varieties are hardly known at all now. This has been brought about by the keen efforts of the plant breeders and introducers to offer something new and possessing some outstanding sales feature. The white early varieties are very little in demand at the present time, which is largely due to quality associated with Golden Bantam, or any variety that produces yellow ears.

During the past five years there has been a large number of varieties and strains tested for the purpose of ascertaining their value as table or sweet corn. Some of these varieties have been found to possess quality, coupled with earliness or midseason maturity, while some others have been found to require too long a season and were frozen before they reached sufficient maturity to be tested, which, of course, eliminates them from the list of useful varieties for general use in this locality. The averages in the following table are based on the tests from 1922 to 1927.

A variety of sweet corn that will mature for green corn in from sixty-eight to seventy-two days is without doubt worthy of consideration by the growers. There must be, however, associated with the earliness, sufficient quality to make up for any discrepancy in the size of the ears and vigour of the plants. At the present time there is a number of early-maturing garden corns, some of which, when tested, have proved to be nothing more than selected strains of squaw or flint varieties. These, of course, possess poor quality and cannot be considered as a market garden proposition, especially when there are other varieties maturing in the same length of time that are true early-maturing sweet varieties.

Early maturity may be looked at from two angles, first, for those located in districts where the season of growth is short, precluding the use of varieties like Golden Bantam or any variety requiring a longer season to develop, and second, as a first early sort to precede the regular main crop varieties, where there is a market demand for early sweet corn. It is true that there are a lot of varieties listed that fulfil these requirements, but the type of crop produced, which includes the size of ears, quality and colour, renders a lot of them unsuitable. Since the introduction of Golden Bantam there has been an increased demand for yellow corn, so much so that once the yellow varieties are offered on the market, the white sorts are rendered almost unsaleable. Heretofore all the recognized very early sweet corn varieties were white, but of recent years, the work of the plant breeders has resulted in the production of early maturing yellow sweet varieties which have advanced the season of yellow sweet corn very early into the summer, thereby giving an extended season for the yellow type of corn.

In the accompanying table, the various varieties and strains are arranged in order of earliness. Quite a number of the very early sorts are by no means in the sweet corn class, but are included to serve as a basis of comparison where earliness is a factor. However, many of these have been used to a considerable extent in the western provinces, particularly where the regular varieties of sweet corn could not be relied upon to mature with certainty every year.

VARIETIES AND STRAINS OF CORN—ARRANGED IN ORDER OF EARLINESS

Variety	Received from	Average number of days from planting until ready for use.	Average height of plants in inches.	Average height of ears from ground in inches.	Length of ears.	Number of rows per ear.	Average number of ears from 20 hills.	Character
			in.	in.	in.			
White Squaw	Gellatly	67	56	9	6	8	134	Flint white.
Pickaninny	C.E.F.	68	43	9	5	8	80	White with purple fleck turning purple, very sweet, tender.
Kloochman	C.E.F.	70	60	9	5	8	106	Red, sweet.
Assiniboine	Will	70	48	9	5½	8	108	Flint.
Nuetta	Will	71	60	9	5	8	116	Reddish yellow, sweet, very fair quality.
Banting	C.E.F.	72	46	9	5½	8	82	Yellow, sweet, very sweet, tender.
*Northern Success	McKenzie	72	62	10	5	8	67	White, sweet, fairly good.
Gehu	Will	72	65	9	5	8	96	Yellow flint.
Improved Early Dakota	Will	72	62	9	5	8	67	White, sweet, selection of White Cory.
Alpha	Ferry	73	57	12	5½	8–10	85	White, sweet, fairly good.
Alpha	Harris	73	57	18	5½	8–10	38	White, sweet, fairly good.
Gaspe x Golden Bantam	C.E.F.	73	39	6	5	8	87	Yellow, sweet, fairly good, small.
*60 Day Golden	Childs	74	60	6–12	6	10–16	52	Yellow, sweet, good.
Early Dighton (Earliest of All, Red Cob Cory).	Livingston	74	63	8–14	6½	8–12	41	White, red tinge, sweet, poor quality.
Early White Cory	Graham	74	77	8–14	6½	8–10	82	White, sweet, poor quality.
Early Adams	Ferry	74	56	12	6	8–14	63	White dent, poor quality.
Early Market or (60 Day Make Good).	Childs	75	67	12	6	10–16	55	White, sweet, fairly good.
Early Malcolm	C.E.F.	76	60	15	6	12	78	White, sweet, very tender and good.
Golden Bantam	Kentville	76	64	18	6	8–10	135	Golden yellow, sweet, good quality.
Sweet Squaw	C.E.F.	76	75	15	6	12	81	White, sweet, very good.
Early June	Will	76	63	14	5	8	57	White, sweet.
Sunrise	C.E.F.	76	75	18	6	8–10	127	Yellow, sweet, only fair quality.
Early Minnesota	Schell	76	88	15	5½	8	106	White, sweet.
Early Mayflower (Cory Selection).	McDonald	78	68	18	6½	8–12	98	White, sweet, poor.
Golden Bantam	James	79	68	18	6	8	59	Golden yellow, sweet, an excellent strain.
Golden Bantam	Moore	79	67	18	6	8	80	Golden yellow, sweet, an exceedingly good strain.
Golden Bantam	McDonald	79	68	18	6	8–10	42	Golden yellow, a very good strain.
Golden Justice	Bruce	79	70	18	6	8–10	47	Very much like Golden Bantam.
Premo 60 Day	Bolgiano	79	61	18	6	8–12	45	White, sweet, Cory type.
Buttercup	Harris	79	72	18	6	8–10	42	Very much like Golden Bantam.
Malakoff	Vaughan	79	64	18	5½	8–10	89	White, sweet, very good.
Wonder Bantam	Ewing	79	84	18	7½	12–14	84	Golden yellow, fairly good.
Early Cory	Moore	80	57	9–12	5	8–10	60	White, sweet.

VARIETIES AND STRAINS OF CORN—ARRANGED IN ORDER OF EARLINESS—*Continued*

Variety	Received from	Average number of days from planting until ready for use.	Average height of plants in inches.	Average height of ears from ground in inches.	Length of ears.	Number of rows per ear.	Average number of ears from 20 hills.	Character
			in.	in.	in.			
Golden Cream or Golden Country Gentleman.	Dreer	81	70	20	6	10–12	14	Yellow, sweet, late maturing.
Extra Early Cory	McDonald	81	74	18	6½	8–10	108	White, sweet.
De Lues Golden Giant	Mattice	81	83	27	7	10–16	22	Golden yellow, sweet, very good quality.
New Golden Giant	Rennie	82	72	16–24	5½	10–16	25	Golden yellow, sweet, very good quality.
Whipple Early Yellow	Harris	83	83	18	6	12–14	70	Golden yellow, sweet, very good quality.
Gold Nugget	Vick	84	80	8–15	6	8–10	62	Golden yellow, sweet, Bantam like.
Barden Wonder *Bantam	Kelly	84	86	18	7½	12–14	68	Yellow, sweet, long cobs.
*Early	Sutton	84	78	18	6½	8–12	42	White, sweet.
*First of All	Sutton	84	63	6–9	4–6	8–12	37	White, sweet.
Golden Bantam	Graham	85	79	12–20	6	8–12	73	Golden yellow, sweet.
Evergreen Bantam	Graham	86	96	18–32	5	8–14	103	Yellow, sweet.
Seymour Sweet Orange	Burpee	86	78	42	6	8–10	55	Yellow, sweet.
Golden Bantam	Rennie	86	84	18	6½	8–10	84	Golden, sweet.
Pocahontas	McDonald	86	78	12	5	8–12	109	White, sweet, Cory like.
Howling Mob	Burpee	87	75	42	6½	10–16	65	White, sweet, large cobs.
Early Fordhook	Burpee	87	83	36	5½	8–12	103	White, sweet, Cory like.
Sunshine	Yeager	88	64	9–15	5	8–12	64	Yellow, sweet, very good, highly recommended.
Country Queen	Macdonald Ag. Col.	88	75	30	6½	8–12	66	Golden yellow, sweet, tender, good.
Bantam x Black Mexican	Vineland	88	72	30	6	8–12	66	Golden yellow, sweet, similar to Country Queen.
Whipple Early	Harris	89	81	18	7	12–16	60	White, sweet, very good.
Aristocrat	Bruce	90	75	9–24	5½	8–12	46	White, sweet, Cory type.
Vanguard	Stokes	90	75	36	6	8–12	59	White, sweet, Cory like.
Golden Giant	Rennie	93	86	12–27	5½	12–16	68	Golden yellow, sweet, late.
Black Mexican	McDonald	94	82	15–24	6	8–10	104	Purple, sweet, excellent quality, late.
Burbank	Burbank	94	89	9–18	5	10–16	60	Yellow, sweet.
*Metropolitan	Vaughan	95	90	.....	.....	.....	77	White, sweet.
XXX Early	Rennie	95	87	42	6½	8–10	55	Golden yellow, sweet, somewhat like Golden Bantam.
Simmonds Special	Tosh	97	55	48	4½	8	85	White, sweet.
White Sweet	Halliday	97	55	48	4	8	78	White, sweet.
Groff Golden	Groff	98	69	5–18	6	8–14	47	Yellow, sweet, very good, but late. Golden Giant like.
Country Gentleman or Shoe Peg.	Graham	103	86	24–32	6½	Zig-Zag	83	White, sweet, very late.
Stowell Evergreen	Graham	107	86	14–22	6½	14–22	14	White, sweet, very late.
White Evergreen	Burpee	107	90	14–22	6½	14–22	8	White, too late. Frozen.
*Sunnyslope	Stokes	Frozen	81	26	.....	.....	Frozen	Frozen.
*Charlevois	Ferry	"	81	36	.....	.....	"	Frozen.

*Under test one season.

When an early maturing sweet corn is required, gardeners will do well to try either Pickaninny or Banting for the first early sort. The former is white when ready for use, with a slight purple fleck on each kernel, exceedingly tender and sweet. The latter is an attractive yellow, being very tender and sweet, but not as sweet as the former. Reference to the foregoing table will give a very good idea of the place they hold among the very early sorts.

For a succession of yellow sweet corn, the following would seem to be quite logical, Banting, 60 Day Golden, Golden Bantam, Golden Giant. In the majority of localities the first three sorts will be found to give quite as satisfactory results as could be desired, but the latter variety requires a long season for proper development.

PEAS—TEST OF VARIETIES

During the past six years, forty-three varieties of garden peas have been tested for earliness and productiveness. Besides those that are being included in the table, there is a large number that have been under test only a few years and are not included, because of lack of sufficient information. At any rate, those that are included are some of the most important varieties for the market and home garden. In the table the varieties have been arranged in order of earliness with the height of vine growth, and the average yield of ripened seed from a thirty-foot row. The average date of ready for use was arrived at by taking May 5 as the date of sowing.

The averages in the following table are based on the tests from 1922 to 1927.

VARIETIES OF PEAS ARRANGED IN ORDER OF EARLINESS

Variety	Height in inches	Average date ready for use	Average yield of dry seed	Character of the seed	Size of pods
	in.		lb. oz.		
Alaska	30	June 28	2 11	Round	Medium to small.
Extra Early (Pedigree)	30	June 29	2 10	Round	Medium to small.
Extra Early Tom Thumb	12	June 29	2 2	Wrinkled	Small.
Surprise or Eclipse (Gregory)	24	June 30	1 6	Wrinkled	Small.
Sutton Excelsior	24	July 1	2 8	Wrinkled	Medium.
Laxtonian	20	July 2	1 8	Wrinkled	Large.
Little Marvel	18	July 2	1 14	Wrinkled	Small.
Eldorado	25	July 2	1 6	Round	Medium.
Thomas Laxton	36	July 3	2 1	Wrinkled	Medium to large.
Laxton Progress	20	July 3	2 0	Wrinkled	Large, Laxtonian-like.
Manifold	30	July 3	2 7	Wrinkled	Medium.
Richard Seddon	26	July 5	2 6	Wrinkled	Medium.
English Wonder A	18	July 5	3 0	Wrinkled	Medium small.
Blue Peter	14	July 6	2 12	Round	Medium.
Bruce (Invermere)	55	July 6	2 3	Wrinkled	Very large.
Pioneer	15	July 7	1 11	Wrinkled	Medium to large.
Hundredfold	22	July 7	1 2	Wrinkled	Large, Laxtonian-like.
Reading Gem	18	July 8	0 9	Wrinkled	Large.
Laxton Superb	18	July 9	2 2	Semi-wrinkled	Medium to large.
Pilot	35	July 9	3 2	Round	Medium to large.
Sherwood	20	July 9	2 1	Wrinkled	Medium.
Blue Bantam	20	July 10	2 10	Wrinkled	Large, Laxtonian-like.
American Wonder	16	July 10	4 1	Wrinkled	Small.
Gradus	32	July 10	2 12	Wrinkled	Medium to large.
Seedling No. 6 (Invermere)	48	July 11	1 8	Wrinkled	Large.
Dwarf Telephone or Daisy	30	July 11	2 6	Wrinkled	Large.
Kootenay (Invermere)	65	July 13	1 8	Wrinkled	Very large.
Advancer	36	July 13	3 10	Wrinkled	Medium.
Admiral Beatty	55	July 13	1 9	Wrinkled	Large.
Stratagem	30	July 13	2 8	Wrinkled	Large.
Badger	33	July 13	3 8	Wrinkled	Small.

VARIETIES OF PEAS ARRANGED IN ORDER OF EARLINESS—*Concluded*

Variety	Height in inches	Average date ready for use	Average yield of dry seed	Charachte of phe seed	Size of pods
	in.		lb. oz.		
Horal	28	July 13	3 4	Wrinkled	Small.
Lincoln (Invermere)	34	July 15	2 10	Wrinkled	Long, slender, curved.
Danby Stratagem	33	July 15	2 1	Wrinkled	Medium.
Horsford Market Garden	40	July 15	3 7	Wrinkled	Medium.
Champion of England	60	July 15	2 14	Wrinkled	Large.
Telephone	50	July 15	2 13	Wrinkled	Large.
Director (Invermere)	39	July 16	3 5	Wrinkled	Medium.
Quite Content	54	July 17	1 5	Wrinkled	Very large.
Alderman	60	July 18	2 1	Wrinkled	Large.
Melting Sugar	72	July 18	1 7	Smooth and dimpled	Large, broad, flattened.
Glory of Devon	38	July 19	0 13	Wrinkled	Large.
Ne Plus Ultra	60	July 23	1 2	Wrinkled	Medium large.

RHUBARB OR PIE PLANT *(Rheum rhaponticum)*

The testing of the commercial varieties of rhubarb has been conducted for over six years for the purpose of ascertaining the value of each, and also to have a check on the value of varieties of more recent origin. The three standard or well-known varieties used in this test were Linnaeus, Victoria and Early Raspberry.

The variety test plots are located on a rich sandy soil. The ten plants of each variety were set out four by four feet apart, thus giving ample space for the fleshy root-stalks and fibrous roots to spread unhampered. Every autumn just after the ground has frozen up for winter a heavy mulch of well rotted manure is applied to a depth of three or four inches. This manure is dug into the ground in thc spring, supplying humus and plant food.

In so far as the growers of rhubarb are concerned, the names Linnaeus and Victoria are best known and it frequently happens that selected strains of either of these varieties are quite superior to the general average for these sorts. In the table it will be noticed that the variety Ruby outyielded all the others, also being far superior in quality, flavour and colour.

RESULTS WITH DIFFERENT VARIETIES OF RHUBARB

Variety	Received from	Average date ready for use	Total yield for 6 years	Average yield per year	Average yield per plant
			lb. oz.	lb. oz.	lb. oz.
Ruby	O-15	May 18	838 4	139 12	13 15
Linnaeus	Barbier	" 17	620 ..	103 6	10 6
Early Raspberry	"	" 17	415 ..	69 2	6 14
Victoria	"	" 19	406 ..	67 11	6 12
New Zealand	New Zealand	" 19	305 4	50 14	5 2

The yields as computed were obtained from four pullings each year. Leaf stalks of not less than twelve inches in length and over were pulled, thus obtaining a uniform product each season.

DESCRIPTION OF VARIETIES OF RHUBARB

Ruby.—A seedling from a large population of plants grown from the seed of Victoria in the Horticultural Division, Experimental Farm, Ottawa, in 1895.

Classed as Early Red, the plants are medium to large in size but compact, quite erect in habit, moderately strong, producing seed quite freely or much like Victoria. The leaves are of medium size, averaging 19 inches wide by 23 inches long, cordate at the base, tapering to a point with a slightly undulate or wavy margin, dark green, with the surface quite smooth; five ribs arise from the top of the leaf-stalk and show considerable red colouring, with veins that are very small.

Externally the leaf-stalks are a very attractive red extending from the base to almost the top where shading of green shows. The average length is 25 inches, breadth 27/32 of an inch, thickness 19/32 of an inch, these latter measurements being taken three inches from the base. The surface of the skin is very smooth, medium thick, adhering only slightly to the flesh.

Internally the stalks are tinted to deeply reddened; the texture is fine, crisp, tender, brittle, being very juicy but relatively quite mild with a pleasant flavour.

Adaptation.—Market and home garden, also for forcing since the colour is present in all stages whether grown in the light or in a dark cellar.

Third pulling of rhubarb where a barrel was used and first pulling when a barrel was not used.

Linnaeus.—Synonyms: Strawberry, Early Strawberry, Myatt Linnaeus. Classed as very early, but is not much earlier than the others under test. The plant is small to medium in size, quite erect in the early stages, but drooping in the later stages, the crowns are small compactly arranged. In general the plants lack extreme vigour and produce seed stalks very freely even under the best conditions.

The leaves are small to medium averaging 14¾ inches wide by 18 inches long, cordate at the base tapering to a point. The colour is a pale green, with the surface somewhat savoyed. The margin is decidedly waved or undulate, making the leaves appear as if toothed. The mid ribs are five in number of medium size, pale green from which many fine veins branch at right angles.

The leaf-stalks are only medium in length averaging 20¾ inches, by 23/32 of an inch in breadth and 19/32 of an inch thick. The skin colour varies from a pink shading to quite deep red at the base, fading to green about half way up the stalk with occasional red dots scattered over the smooth, thin skin. Being very thin it is difficult to remove from the flesh.

Internally, the flesh is slightly tinted with delicate red at the base showing a very pronounced pale green colour throughout. The texture is fine, brittle being very juicy, sharp acid and good quality.

Adaptation.—For first early in the market garden.

Victoria.—Synonyms: Red Victoria, Myatt Victoria. Classed as a second early sort, but is usually ready for pulling under Ottawa conditions two or three days later than Linnaeus. The plant is of medium size, erect in habit, producing medium sized crowns of fair vigour. Very free in production of seed stalks.

The leaves are of medium size averaging 17½ inches wide by 19¾ inches long, cordate resembling Linnaeus, pale green, smooth in the centre but somewhat savoyed at the undulate margin. Five fleshy ribs tinged with red maintain the spread of the leaf, with many fine veins branching at right angles.

The leaf stalks are of medium size slightly ribbed averaging 24¼ inches long, 27/32 of an inch in breadth, and 20/32 of an inch thick. The latter measurements were taken 2 inches from the base of the leaf stalks.

The skin is quite thick, adheres to the flesh, is red at the base, showing green at the apex, blotched with red, with short soft bristles.

Internally there is a slight amount of red colour that fades to pale green, coupled with medium to coarse texture, sharp acid but a pleasant flavour or tang.

Adaptation.—Market and home garden.

Early Raspberry.—Classed as very early, showing much more rapid growth in the early stages than any of the other varieties under test.

The plant is large, very erect in habit of growth producing large crowns that are very strong and producing seed stalks very moderately.

The leaves are large, cordate at the base but bluntly pointed at the apex, averaging 25 inches by 21 inches long, medium green on the upper surface with a silver grey on the under side, smooth with an undulate margin. Eight fleshy ribs support the large flat spreading leaf with many fine veins branching at right angles.

The leaf stalks are very strong and deeply channeled averaging 26 inches long, 1 5/32 inches in breadth and 24/32 of an inch thick. The skin is pale green in colour dotted slightly with pink or red, the surface being finly ribbed and glabrous, very thin and difficult to remove from the flesh but leaves without tearing the flesh.

Internally, the flesh is pale green with numerous fibres, tough texture, moderately juicy, sharp acid, poor quality and flavour.

Adaptation.—Might be used for truck farming and forcing.

New Zealand.—Classed as a late variety, the plant being a very vigorous grower, very upright in habit, crowns compact large not seeding freely.

The leaves differ from all other varieties in that they are borne quite upright averaging 19¾ wide by 13¾ inches long, pale green, smooth to somewhat savoyed. The margin is very finely undulate, five mid ribs start from the base of the leaf with one secondary rib arising from each of the two extreme outside ribs.

Externally the leaf stalks are glabrous but slightly ribbed, towards the top slight channeling occurs, averaging 25½ inches long, 31/32 of an inch in

breadth by 20/32 of an inch thick. At the base the skin is quite red diffusing in clusters of red dots on green, towards the top. Being very thin and tender it is difficult to remove the skin.

Internally, the flesh is a glistening green, fine, tender, juicy, sharp acid, exceedingly brittle, crisp, snapping at almost any age. The quality and flavour is good but lacks colour.

Adaptation.—Market garden.

Quite a number of varieties and seedlings have been supplied for trial purposes but have not been long enough in the plantation to get enough information concerning their yielding ability. Notes have been taken regarding their behaviour and descriptions of the plants made. These descriptions are herewith given.

Seedling, Lethbridge.—Classed as a late variety. The plant is very large, spreading, strong, producing quite an abundance of seed stalks.

The leaves are quite different from all other varieties in that they are a very pale green with distinct savoy-like blisters, quite soft, cordate at the base, averaging 24½ inches wide by 21¾ inches long, with a distinctly rounded tip. Three strong ribs arise from the top of the leaf stalk with two sub-ribs arising half way between the base and apex of each of the outside ribs. This is very characteristic of all the leaves. The margin is undulate or waved.

Externally, the leaf stalks are very large, slightly ribbed otherwise smooth, with a decided pale red skin colour that extends well towards the top, shading to green. The red is found mostly on the flattened side. The average length is 24 inches, by 1 10/32 of an inch broad, and 3 1/32 thick. The skin is very thin and quite free from the flesh.

Internally, the flesh is quite coarse, pale green but snapping brittle at almost any stage, sharp acid with good flavour. For size this variety is outstanding but being very brittle would be easily damaged by wind.

Adaptation:—Should be valuable for forcing as a winter crop.

Macdonald.—Classed as a medium early, red-skinned variety of considerable merit. The plant is quite large, strong growing, upright, compact, producing very healthy large crowns, producing comparatively few leaf stalks.

The leaves are very soft, cordate at the base, more or less funnel shaped, averaging 14¾ inches wide by 19¼ inches long, with five ribs arising from the top of the leaf-stalk, which show considerable red colouring.

Externally, the leaf stalks are a rich bright carmine red from the base well towards the top. The skin is very smooth, medium thick, leaving the flesh readily. The size averages 24¼ inches long, 2 9/32 of an inch in breadth by 2 4/32 of an inch thick.

Internally, a slight amount of red colouring is usually in the layers of flesh next the skin, the inside being quite white or very pale green, coupled with very fine texture, juicy and mild.

Adaptation.—Well suited for any phase of gardening.

Irish Giant.—Synonyms, none except that it closely resembles the Sutton. Classed as a late or main crop variety. The plant is very large, strong, upright in habit of growth, producing steed stalks quite freely. The leaves are large, flat, broad, smooth, dark green and quite glistening, cordate at the base with undulate margin. Six strong ribs starting from the top of the leaf stalk hold the broad leaf in a sloping position. The leaves average 26 inches wide by 25 inches long.

Externally, the leaf stalks are closely covered with very fine red dots on a pale green skin, disappearing towards the top of the stalk. The surface is covered with short bristles and also slightly ribbed on the round side, with a distinct

channel on the front side. They average 23½ inches long, 1 11/32 inches broad and 1 3/32 inches thick. The skin is thick, coarse, sometimes parting from the flesh easily.

Internally, the colour is green, coarse, fibrous, juicy, sharp acid, fairly good flavour, but coarse, poor quality.

Adaptation.—Forcing.

The Sutton.—Classed as a main crop variety. The plant is very large, strong and upright in habit of growth, producing big crowns and quite free in producing seed stalks. The leaves are large, quite flat, broad, averaging 19 inches wide by 18½ inches long, cordate at the base with undulate margin, with five strong fleshy ribs arising from the top of the leaf stalk with two sub-ribs on each side, developing from the two main outside ribs. The veins are numerous and coarse.

Externally, the leaf stalks are closely covered with fine red dots on a green skin, extending from the base to about half way up the stalk where they diminish, showing an entirely green skin. They are slightly ribbed on the dorsal or round side and quite deeply channeled on the front or ventral side, averaging 17 inches long, 1 10/32 inches in breadth and 1 3/32 inches thick. The skin is moderately thin, leaving the flesh quite easily.

Internally, the colour is pale red with a thin circle of deep red next the skin. This colouring is quite pronounced two or three inches from the base but disappears up the stalk where a deep green colour is found. The texture is coarse, stringy, but quite juicy, sharp acid with a pleasant flavour that has a slight aromatic tang.

Adaptation.—Forcing.

PROPAGATION OF RHUBARB BY SEED

The seed method of propagation is comparatively simple, but does not produce a uniform population of plants, due to the many characters combined through cross pollination. However, if a large enough lot of seedlings are obtained, those exhibiting desirable characters can be selected.

Save seed from one or two desirable plants by allowing the seed stalks to develop from the first of the season. When the seed has turned to a dark brown colour, the seed stalk should be cut off and the seed shaken off onto a clean sheet. When the seed is completely dried, store it away in small cotton bags in a dry airy room.

Seed sowing should be done in the early spring, as soon as soil and weather conditions will permit. The soil used should be a rich sandy loam that is well drained. Space the rows fifteen inches apart, if hand cultivation is to be employed, and transplant in the autumn or early spring. The seed should be sown thick enough to insure having the plants about six inches apart. Another method is to sow the seed in drills four feet apart and thin the plants so as to have them three and a half or four feet apart in the row, for a permanent plantation. When sowing the seed, it should be covered with about three-quarters of an inch of soil, pressing the soil quite firmly to insure an even supply of moisture, as germination will be slow and very uneven if this precaution is not taken. It is much more satisfactory to grow the plants in rows fifteen inches apart and transplant them, since it allows for the choice of plants to be made from a large number of well developed plants that are showing by that time whether they would be suitable for propagation, whereas the latter method does not allow for sufficient selection. After the second year, some leaf stalks may be pulled or, by the end of the third or fourth year, the crowns may be divided for propagation.

PROPAGATION OF RHUBARB BY ROOT DIVISION

The propagation by root division is probably the most satisfactory, since it is possible to build up an entire field, with the progeny of one plant, that will be uniform. This method is, however, comparatively slow since it requires at least three years for a plant to develop sufficiently to be divided into one-eyed root sections, and an equal time from the first division to the time when these can be again divided profitably.

Select clean disease-free plants that possess desirable characters. The entire root should be dug up either in late September or as early in the spring as possible, and by means of a sharp knife cut the roots so as to have one or two eyes or buds on each piece. Plant these in rich sandy loam two by four feet apart, being careful to have the bud only slightly covered with soil. By planting two by four feet in the propagation process, it is possible to utilize the whole of the land to better advantage and, when further division is to be made, every second plant may be lifted and divided, thus leaving the permanent plants four by four feet apart and allowing a portion of the plants to produce profitably. Deep planting has been found to prevent proper development. The practice of digging deep holes and placing manure in the bottom is objectionable since it produces conditions similar to deep planting. When the manure decays the soil and plant settle down, and when cultivation is given the crowns become covered too deeply.

WINTER FORCING OF RHUBARB

The forcing of rhubarb for winter market or for home use during winter has been found to be very profitable since it is in great demand from December until the outdoor crop appears on the market in May.

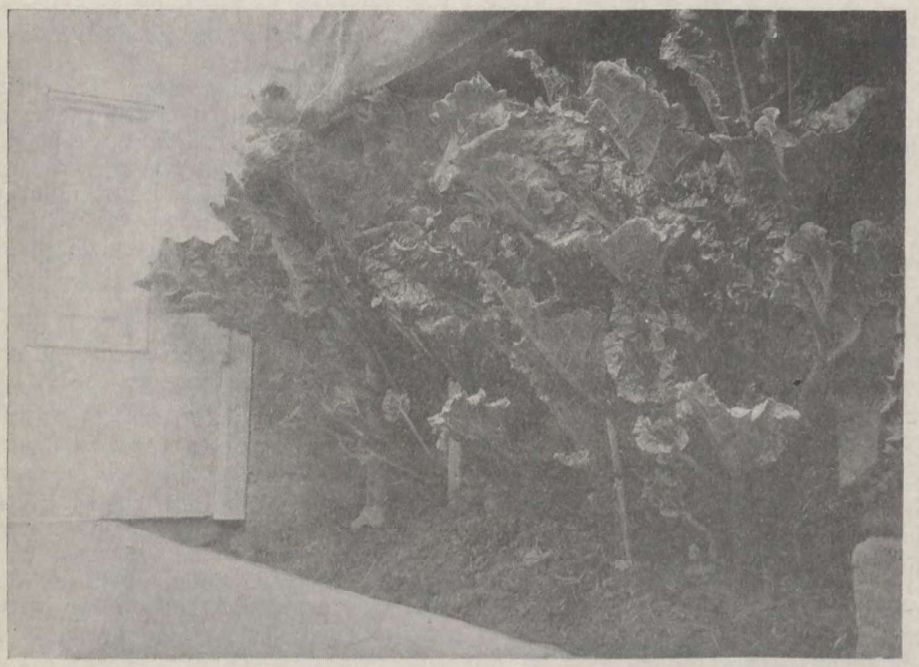
Two-year seedling roots or old crowns may be used. It is important that plants producing large leaf stalks be selected, due to the fact that a much evener product will be obtained than if a small stalked variety like Linnaeus is employed.

The roots should be dug up in the late October or early November before the ground freezes for winter, allowing as much soil to adhere to the roots as possible. Leave them exposed on the surface of the ground until the soil is frozen through. Freezing is important since it has an effect on the rapid forcing of the roots.

A dark, frost proof cellar or cheaply constructed forcing house, heated by stoves, should be provided where the roots can be placed on the ground and covered with moist sand or cinders, or they may be placed under the benches in a greenhouse. When the roots are frozen sufficiently, the first batch may be brought in and started. The temperature should be maintained at from 55° F. to 65° F. It is desirable to maintain the temperature as well between these two extremes as possible. Low temperature tends to produce a highly coloured product with slow growth, while a high temperature tends to force the growth too rapidly, weakening the roots rapidly, and producing poor colour in the leaf stalks.

From time to time water should be applied to the sand or cinders to keep the plants from wilting. Manure or fertilizer is not required because the root stalks have an abundance of food stored up in them that is adequate for the production of the crop if moisture is supplied as required. If the roots are to be planted out to recuperate again, only four or five pullings should be removed. The roots should be put out of doors again and in the early spring replanted. To maintain a constant supply, a second lot of frozen roots should be brought into the forcing house or cellar two weeks after the first lot. These will begin to yield a crop about the time the first lot is ready to be put out. From the time the roots are brought in until the first pulling is taken off will be about four weeks.

A forcing test with four strains of Ruby rhubarb and one lot of seedlings was conducted in the Experimental Farm greenhouses. Five plants of each strain and five roots of the seedling were set in sand, burlap being strung around the sides of the bunches to exclude the light.



Ruby rhubarb—winter forcing.

RESULTS OF FORCING TEST WITH RHUBARB

Strain	Marketable		Unmarketable	
	lb.	oz.	lb.	oz.
Ruby No. 1	43	11	2	5
Ruby No. 3	55	4	2	12
Ruby No. 7	52	..	2	..
Ruby No. 10	57	8	2	10
Seedling	39	4	2	6

The roots were brought in on January 9, and the first pulling was removed on February 5, which was less than four weeks. The fourth pulling was removed on February 29 or 51 days from the time the roots were brought in.

It should be noticed that the Ruby variety produced a very satisfactory return.

BREEDING OF VEGETABLES

SWEET CORN

The breeding and selection of sweet corn is being continued, as this crop offers an immense field for development, chiefly in the production of early maturing, high quality varieties. It is true that there are a lot of early varieties being offered, but the quality and uniformity of these can be improved upon

greatly. So far, the Pickaninny variety is a leader in the early sweet varieties, followed by Banting, and it is hoped that the recent crosses made between these two varieties and with Golden Bantam will yield more material that will produce further high quality varieties.

TOMATOES

There is yet to be found a high quality, uniform, smooth, early tomato to take the place of Earliana. Many efforts have apparently been made, but there is still too much evidence of the characters of Earliana in the progeny of these crosses or selections. The cross made in this Division in 1923 in which Alacrity was crossed with Bonny Best has provided a lot of useful material for segregation. At the present time, the progeny of this cross is breeding true for foliage and form of fruit and is quite early, and yields exceedingly well, but the fruit produced is if anything slightly small but resembles Bonny Best in form. Livingston Globe x Bonny Best is another cross that has produced a valuable red tomato closely resembling Livingston Globe in plant growth and shape of fruit, but the fruits are a rich rosy red, large in size, but earlier in maturing than Livingston Globe. The fruiting habit is very satisfactory. The quality is quite good, firm, with a mild or quite sweet flavour.

Other crosses have been made in the hope of getting improvements of greater value than those just mentioned. In many cases the above mentioned segregants have been used as either male or female parents but the results of these crosses are not available for publication just yet.

PEAS

The breeding of peas is being carried on and some very useful material has been obtained particularly from the cross, Thomas Laxton x English Wonder. This cross has yielded a very sweet, small size type, quite resistant to root-rot as indicated by plot tests under actual growing conditions. The vines grow to a height of one and one-half feet, and are quite branching. This cross is being selected on account of the small sized peas produced which should lend itself well to canning.

Numerous other crosses have been made with peas imported from European countries that possessed earliness, but were smooth. Few of the crosses between these and the wrinkled varieties have produced segregants possessing much sweetness or quality. Those that have shown promise are being utilized for further work.

ONIONS

This crop has been subjected to cross breeding, using Early Flat Red and White Barletta in an effort to obtain an early maturing onion. The segregants from the F 1 seed were harvested this autumn.

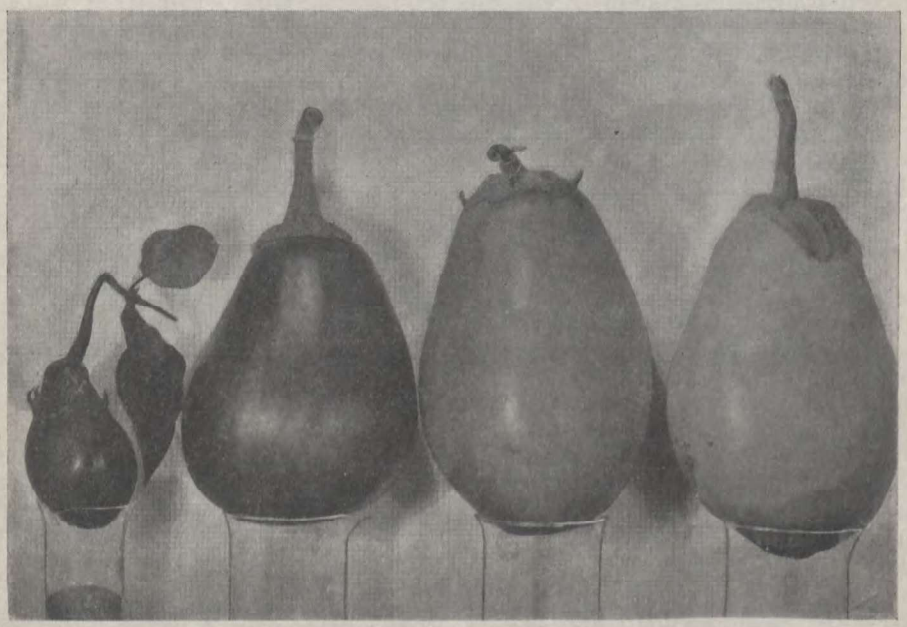
EGGPLANT *(Solanum Melongeria)*

The growing of eggplants has not been considered a profitable undertaking by the growers of the Ottawa district. The chief or principal varieties, such as New York Purple or Black Beauty, require a considerably longer and warmer season of growth than is customary to find here. These facts suggested that, since quite a quantity of this vegetable is brought in from outside sources, there is a possibility of developing a much better sale for this product, if the fruits could be grown locally. To do this in a commercial way, it would be necessary to develop an early maturing, prolific, good quality variety, of fair size. There are, however, a number of very early maturing varieties, but the plants are very small sized, producing numerous small sized fruits, in fact too small to be considered sufficiently attractive.

To obtain an early variety, it was quite obvious that it would be necessary to hybridize, using the earliest maturing variety possible as the pollen parent or male, and employing one of the outstanding strong growing sorts as the female. From repeated tests, it was found that the small fruited Black Nagasaki was by far the earliest maturing variety, having been found to ripen the fruit in the field completely. The fruits produced were small, but in large numbers on these small or dwarf plants. The stems are dark purple, small in size, and scantily covered with small-sized foliage.

The other variety chosen as the fruit bearing or female parent was Black Beauty. This decision was made on account of the vigour of the variety and the size, colour and quality of the fruit produced, and also the size of the plant itself.

In 1926 the first cross Black Beauty x Black Nagasaki was made. The F 1 plants grown in 1927 showed evidence of yielding some very valuable material for selection work, a report on which will be made each season.



Eggplant—Black Beauty X Black Nagasaki. Left to right: 1, Black Nagasaki; 2, Black Beauty; 3, Progeny of cross; 4, Progeny of cross.

POTATOES FROM SEED

During the past six years, a further effort has been made to develop new varieties of potatoes from the seed obtained from the seed-balls borne on the potato vines in the trial plots here. While there were quite a few balls obtained, there never was a large quantity produced any one season. However, the seed thus obtained was found to be quite viable and produced healthy, normal plants. In each batch of seedlings there was a considerable range in the type of top growth and habit of the plants. The yield from the hills varied from a few ounces up to five pounds, fourteen ounces. Some of the tubers were of medium size, indicating that it was possible to get a fair idea the first season if the plants were kept growing continuously or without being checked. The type of tubers varied in form, colour of skin, depth of eyes, texture, quality and colour of the flesh.

Each year a careful selection was made from the most desirable hills, with a view to obtaining a desirable smooth white potato, showing earliness or main crop advantages, but above all, to get a variety showing immunity to leaf roll and mosaic. These chosen tubers were to be used for future propagation, the unit tuber serving as a progeny test, with the tubers divided into four, and treated subsequently each year in a similar manner.

To date it has been found that almost all of the selected seedling stock has shown susceptibility to both leaf roll and mosaic, which would indicate that to obtain the desired end there is an unlimited field to be exploited yet. This project is still in operation.

In the Annual Report of the Dominion Horticulturist for the year 1923, an article will be found dealing with the details of handling the plants.

PAPER MULCH

The use of a paper soil mulch, as is being used in the Hawaiian Islands, in connection with pineapple growing, has been attracting much attention in Canada and the United States, with regard to the value of such materials in connection with vegetable growing. The increased yields per acre claimed to be obtained, coupled with the fact that cultivation between the rows of plants for weed control is eliminated, would indicate that there are possibilities for the use of this material to at least some extent, particularly where the crop is a highly paying one.

To the present there are a few difficulties that have to be solved, which are without doubt a deterrent to the extensive use of waterproof soil mulch paper. First the cost of the material; second that the mulch paper will be durable enough to be of use more than one season; third, that a more satisfactory measure of fastening the paper in position be devised. The first two problems are for the manufacturers to deal with, while the latter is a matter for both the manufacturer and user to work upon.

During the season of 1927, the matter of using a mulch was decided upon, to find if results could be obtained that would warrant a more extensive program with this type of project. Enquiries forthwith brought out the fact that several makes of these materials were on the market. There is the single ply roofing impregnated with asphalt, made in rolls three feet wide and containing 108 square feet, costing $1.65 per roll. A better price than this per roll could be obtained if large quantities were used. There is also Thermogenc, a special single ply asphalt paper made in different widths, but with perforations 4 by 4 inches apart to allow for the entry of moisture, the price of which varies with the width and length of the strips. Alligator hide is another, differing from the former in that it is much thinner and apparently not quite so heavily asphalted or waterproofed. This one, being thinner, is more pliable and may be used more than one season, at least this would seem possible on account of the character of the material. However, the latter two brands only came to notice after the experiment was under way this year, and no statement can be made concerning the cost or performance at this juncture.

An experiment was started in a small way this season, using Bonny Best tomatoes as the crop. The ten plants for each plot were set out in the field 5 by 5 feet apart on June 15. One plot of ten plants was mulched with single-ply roofing, so that the whole space between the plants and two feet all around outside of the plot was covered also with the roofing. Holes were cut in the roofing to allow the plants to grow unhampered.

Another plot was set out in a similar manner, but single-ply burlap was used as the mulch. There was also a check plot corresponding to the above two plots where only a soil mulch was employed.

In the accompanying table will be seen the results obtained from each plot, but while these yields are from only single plots, they represent in round figures some material for future investigation. Bonny Best was the variety used.

Tomatoes mulched with paper, unmulched behind, Central Experimental Farm, Ottawa.

RESULTS FROM USING PAPER MULCHES WITH TOMATOES

Treatment	Grading of fruit		Number of fruits	Yield	
				lb.	oz.
Roofing mulch	Ripe	Marketable	472	140	5
"	"	Marketable split	53	14	11
"	"	Rough	7	2	15
"	Green	Ungraded	648	126	4
Total			1,180	284	3
Burlap mulch	Ripe	Marketable	276	85	6
"	"	Marketable split	73	23	0
"	"	Rough	11	2	7
"	Green	Ungraded	428	79	0
Total			788	189	13
No mulch	Ripe	Marketable	190	54	10
"	"	Unmarketable	49	17	10
"	"	Rough	13	2	12
"	Green	Ungraded	101	22	8
Total			353	97	8

In discussing the results it will be noticed that the roofing mulch plot produced a larger number of fruits and a greater number of pounds than either of the other plots. The plants were exceedingly vigorous and continued quite

green until the first killing frost. From the record of early yield it was found that the crop did not mature any earlier than those on the other plots, but the total yield was extraordinarily large. Weed control was complete, but when the roofing was rolled at the end of the season, it was discovered that it had deteriorated to such an extent to render it useless for another season.

An examination of the soil, after the roofing had been removed, revealed the fact that the whole area was a mass of fine feeder roots which extended to the surface of the ground.

Whatever moisture gained entrance to the soil did so by oozing through at the joints in the roofing or through the holes where the plants came through the mulch.

The burlap treatment was not at all satisfactory, although a better crop was obtained from this than from the check plot. The weeds had penetrated the burlap, rendering the plot rather unsightly, and while the plants were not as vigorous as in the roofing mulch plot, they were decidedly better than those in the check plot.

In the check plot, the smallest yield was obtained, both of ripe and green fruits.

If the extra quantity of fruit obtained from the paper mulch was balanced against the small crop obtained from the check plot, it would seem that there was a paying proposition to be considered after the cost of the mulch material had been deducted. Further tests will be necessary to determine for a certainty the advisability of the use of these materials in an extensive way.

NOVELTY AND PURITY TEST

The testing of the various varieties of vegetables offered as novelties or those that are claimed to be of recent origin and seeking to be introduced under new variety names has been conducted in co-operation with the Seed Branch, Department of Agriculture, Ottawa. The samples of seed were collected by the Seed Inspectors of the Seed Branch and sent to the Horticultural Division for test. This year, quite a number were received and placed in the trial grounds, several of which were found to be quite distinct, while a large proportion were discovered to lack sufficient uniformity to be considered worthy of a license to be sold as a named variety.

In the accompanying tabulation the results of this test will be found.

RESULTS OF NOVELTY AND PURITY TESTS OF VEGETABLES

Vegetable	Variety	Source	Character
Asparagus	Market Favourite	Webb	Not developed sufficiently to report upon this season.
Beans	Burger's Strain	Mr. Hallwright	An extremely early maturing variety, distinct from all other varieties.
Brussels Sprouts	The Webb	Webb	One cabbage and six types and various colours.
Cabbage	The Houser	Stokes	Mixture of types.
	Wong Bok	Stokes	An excellent strain of Chinese cabbage.
	New Holland	Strandholm	Wide range of variation.
	Emperor	Webb	Fairly uniform pointed heads.
	Chou du St. Bernard	G. Martinet	A very good strain of Danish Ballhead (short stem).
	Glory of Poltava	Prof. J. Jegalov	One-third of the plants went to seed, the balance formed loose open heads.
	Surehead Chinese Cabbage.	Yeager	A very fine strain.
Carrot	Berlin Glass	McKenzie	An Amsterdam forcing type.
	New Standard	Webb	A mixture of types.

RESULTS OF NOVELTY AND PURITY TESTS OF VEGETABLES—*Continued*

Vegetable	Variety	Source	Character
Cauliflower	Sample No. 3—73 C.S.G.A.	Seed Branch	A very uniform strain of Snowball type.
	Arlington Special No. 10, Acc. No. 105011.	Arlington Exp. Farm, Virginia, U.S.A.	A very fine uniform strain of Snowball, one of the best grown.
Corn	Burbank	McKenzie	A late Golden Bantam.
	Sunshine	McKenzie	Quite identical to the Originator's strain, distinct, a good variety.
	Pickaninny	Lowden	A true strain.
	Golden Bantam No. 1	71 C.S.G.A.	A true uniform strain of Golden Bantam.
	Golden Bantam No. 2	72 C.S.G.A.	Not desirable, plants variable, kernels flint and wrinkled, not true Golden Bantam.
	Sunshine	Kelly Feed & Seed Co.	A very good strain.
	Black Mexican	Summerland	True to variety, not as early as Pickaninny.
	Lord Early Yellow	Murray	A very even strain of mid-season yellow corn.
	Golden Crosby	Murray	A very even strain of a mid-season to late variety, very true to one type.
	Crosby Evergreen	Murray	This is an excellent strain.
Cucumber	Stay Green	Stokes	A very fine strain of White-Spine. Dark green.
	Windermoor Wonder	Stokes	A remarkably good large, long variety.
	Harris Double Yield Pickling.	Lowden	Chicago pickling type.
Lettuce	Green Icehead	Dunkirk Seed Co	A mixture of five varieties.
Muskmelons	Golden Champlain	Dupuy & Ferguson	Very much like Lake Champlain.
	Prospero	Stokes	Coarse, poor quality, like Page Early.
	Sugar Sweet	Stokes	Coarse, poor quality, like Page Early.
	Emerald Gem F-3 *inbred*	Murray	Very uniform, true to type, early yielding.
	Palmer French F-3 *inbred*.	Murray	A melon of considerable merit, but not popular, distinct.
	Forbes French F-3 *inbred*.	Murray	Fair quality, distinct.
Onions	Yellow Globe Danvers A.	McMeans	Large percentage of long type, undesirable.
	Yellow Globe Danvers B.	McMeans	A very uniform strain conforming to one type.
	Yellow Globe Danvers C.	McMeans	A better strain than A, but not as uniform as B.
	New Masterpiece	Webb	A yellow Prizetaker strain, serious maggot damage.
	Mountain Danvers	Stokes	Yellow Globe Danvers type, serious maggot damage.
	Mountain Red Globe	Stokes	A good strain of Red Globe.
Parsnip	Model Hollow Crown	Stokes	A good strain of Hollow Crown.
	Hollow Crown	Jones	A good strain.
Peas	Neepawa	Hamilton	A variable strain, probably a hybrid.
	Dwarf Telephone	Kelway	Identical to Daisy in height, vigour, foliage and characters of pods.
	The Daisy	Kelway	Identical to Dwarf Telephone.
	Pedigree Extra Early	Stokes	True to variety.
Pepper	World Beater	Stokes	Closely resembling Ruby King.
	Early Giant	Harris	Much like Chinese Giant, but earlier maturing.
	Large Sweet Squash	Harris	Squash or tomato type.
Potato	Seedling from Early Ohio.	Granger	In every respect is similar to Early Ohio and no better.
	Gold Nugget	Olds School of Agric	A golden-skinned, smooth, shallow-eyed Irish Cobbler type, but distinct from Irish Cobbler—white bloom, a very fine variety.
	Gold Nugget	Wheeler	Similar to the above strain.

RESULTS OF NOVELTY AND PURITY TESTS OF VEGETABLES—*Concluded*

Vegetable	Variety	Source	Character
Potato	Mitchell Excelsior	Mitchell	Quite the same as the Gold Nugget in tuber formation, depth of eyes, colour of skin and buds as well as colour of foliage and bloom.
	Arnold	Kay	The same as Green Mountain.
	World Beater	Tool	Resembles Green Mountain.
Radish	Red Turnip, White Tip	Dunkirk Seed Co	One of the best strains of Scarlet Turnip White Tip grown this year.
	Red Giant	Burpee	A variable sample.
Spinach	Princess Juliana	McKenzie	A distinct strain.
	Virginia Savoy	Stokes	Very variable.
	Noble Gaudry	Stokes	Resembles winter or prickly seeded.
	Princess Juliana	Stokes	Distinct, good.
	Prolific	Webb	King of Denmark and Viroflay mixture.
Squash	Des Moines	Stokes	A very fine true strain.
	Blue Hubbard	Stokes	A true strain.
	Early White Bush	Stokes	A true strain of merit.
Tomato	Marglobe	McKenzie	A mixture of Earliana and possibly Marglobe.
	Red River	Lowden	An Earliana type.
	Pepper	Lowden	A pink-skinned late variety, true tomato.
	Open Air	Sutton	A distinct but valuable variety for some sections, fruits tend toward roughness.
	Marvana	Pritchard	A strong growing mid-season variety of merit, very even, distinct.
	Marglobe	Pritchard	A distinct variety of great merit, late maturing but valuable.
	Monarch Prize	Monarch Quality	Too late maturing, poor set of fruit.
	Pen State Earliana	Morrill	A very good strain of Earliana.
	New Conqueror	Webb	A distinct variety, not as valuable as Bonny Best.
	John Baer	Shirley	An excellent strain, very smooth, true.
	Bonny Best	Clarke	An exceptionally uniform strain of Bonny Best, quite early.
	Bonny Best	Campbell	Uniform, true, and early.
	Alacrity	Murray	A strong growing vigorous strain, true to every character, quite early maturing.
	Clark Early	Clark	An early strain of the Bonny Best type, very uniform.
	Wonder	J. Murray	Bonny Best type, not an early strain.

ORNAMENTAL GARDENING

Large collections of the more important kinds of hardy ornamental plants have been brought together in the section of the Horticultural Division devoted to Ornamental Gardening, it being the aim to have the best of the older varieties growing here for comparison with the many newer ones. It is hoped that the following lists, based on these experiments, will prove of service to those establishing new gardens or extending old ones.

NARCISSUS OR DAFFODIL

The narcissus is one of the most popular spring flowers in Canada. Coming into bloom soon after the snow has melted, it seems a very herald of spring, and its graceful form and delicate colouring make it one of the choicest flowers for

garden and woodland and for cutting. The number of named varieties is now very great, and it is puzzling, to one unacquainted with even a few of the best, to know what to plant. At the Central Experimental Farm, a large proportion of the standard moderate-priced varieties have been tested, and great differences have been found in their relative hardiness and rate of increase.

From 1920 to 1922, a certain number of bulbs of each of forty-two varieties were planted to obtain definite information on hardiness, and in each of the years following notes were taken on the record number of blooms from each lot of bulbs, and the record of this is published in the following table.

It would seem, by the table, that in the case of certain varieties, Albatross and Sir Watkin for example, judging by the results of the fifth year only, these varieties were not very hardy, whereas they are two of the hardiest sorts tested. The explanation is that these varieties multiply so rapidly that the bulbs become too crowded after three years for them to develop into blooming bulbs, and shows the need of dividing and replanting certain varieties. Other varieties, on the other hand, are not sufficiently hardy to bloom well after the first and second years, examples of which are Princeps and Golden Spur, which are really too tender for growing outside at Ottawa.

All narcissi are, nowadays, called daffodils, as the different species have been so hybridized and there are so many graduations between those with long trumpets and those with none that the distinction which there used to be by calling those with long trumpets daffodils and those which had but a shallow cup narcissi, as for instance the Poet's Narcissus, is seldom made now, and they are usually all called daffodils.

Following the table will be found notes on some of the hardiest varieties and others of the same groups.

NARCISSUS—TEST OF VARIETIES FOR HARDINESS AND INCREASE

Variety	Class	Year planted	Number of bulbs planted	Number of blooms									Remarks
				1920	1921	1922	1923	1924	1925	1926	1927	1928	
Albatross	Barri	1922	10	.....	.....	.....	17	25	38	1	18	.....	
Conspicuus	Barri	1922	25	.....	.....	.....	20	13	35	31	52	.....	
Constellation	Incomparabilis	1921	12	.....	.....	.....	.....	8	22	29	36	33	Wintered badly 1922 and 1923; had a few flowers in 1923 for the first time.
Cornelia	Yellow Trumpet	1922	10	.....	.....	.....	18	29	30	13	9	.....	
Duke of Bedford	Bicolor Trumpet	1922	10	.....	.....	.....	23	34	47	1	9	.....	
Emperor	Yellow Trumpet	1922	10	.....	.....	.....	17	22	54	29	32	.....	
Empress	Bicolor Trumpet	1922	10	.....	.....	.....	17	26	52	57	43	.....	
Firebrand	Barri	1922	10	.....	.....	.....	7	22	15	7	16	.....	
Flora Wilson	Barri	1922	10	.....	.....	.....	7	21	34	24	12	.....	
Glory of Lisse	Poeticus	1922	20	.....	.....	.....	61	34	16	18	84	.....	
Glory of Sassenheim	Bicolor Trumpet	1922	10	.....	.....	.....	19	30	45	12	2	.....	
Golden Spur	Yellow Trumpet	1920	20	.....	31	21	7	5	3	.....	.....	.....	
Great Warley	Incomparabilis	1922	5	.....	.....	.....	8	13	39	35	43	.....	
Henry Irving	Yellow Trumpet	1922	10	.....	.....	.....	9	5	22	5	16	.....	
Horsfieldi	Bicolor Trumpet	1922	10	.....	.....	.....	14	15	23	8	4	.....	
Incomparabilis plenus	Incomparabilis	1922	10	.....	.....	.....	5	17	3	0	3	.....	
King Edward VII	Poeticus	1922	10	.....	.....	.....	0	12	7	3	2	.....	
Klondyke	Poetaz	1922	10	.....	.....	.....	6	20	13	16	1	.....	
Lord Muncaster	Yellow Trumpet	1922	10	.....	.....	.....	20	36	63	42	23	.....	
Lucifer	Incomparabilis	1922	20	.....	.....	.....	10	13	60	21	68	.....	
Lulworth	Incomparailis	1921	12	.....	.....	0	5	6	25	28	.....	.....	Wintered badly 1922; flowered for the first time 1923.
Mme. de Graaff	White Trumpet	1920	20	.....	28	30	3	2	3	.....	.....	.....	
Madame Plemp	Bicolor Trumpet	1922	10	.....	.....	.....	20	27	52	21	53	.....	
Majestic	Poetaz	1922	10	.....	.....	.....	5	5	26	34	5	.....	
Mohican	Barri	1922	10	.....	.....	.....	6	16	28	29	27	.....	
Olympia	Yellow Trumpet	1922	10	.....	.....	.....	16	26	48	15	40	.....	
Pheasant Eye	Poeticus	1920	20	.....	*	7	0	0	2	0	.....	.....	*Had some flowers 1921, but number not recorded.
Grandiflora	Poeticus	1920	20	.....	22	19	64	45	26	.....	.....	.....	
Ornatus	Poeticus	1920	20	.....	19	22	4	15	8	.....	.....	.....	
Princeps	Yellow Trumpet	1922	10	.....	.....	.....	17	28	6	0	2	.....	
Princess Ida	Bicolor Trumpet	1922	5	.....	.....	.....	9	12	30	33	46	.....	
Red Beacon	Barri	1922	10	.....	.....	.....	14	19	29	2	19	.....	
Seagull	Barri	1920	20	.....	51	55	103	59	90	.....	.....	.....	
Sir Watkin	Incomparabilis	1920	20	.....	37	17	79	14	8	.....	.....	.....	
Tresserve	Bicolor Trumpet	1922	10	.....	.....	.....	13	19	14	3	13	.....	
Van Waverens Giant	Bicolor Trumpet	1922	10	.....	.....	.....	23	22	22	1	3	.....	
Victoria	Bicolor Trumpet	1922	10	.....	.....	.....	29	36	42	5	3	.....	
Weardale Perfection	Bicolor Trumpet	1922	10	.....	.....	.....	17	15	10	1	2	.....	
White Lady	Leedsi	1920	20	.....	42	65	66	75	78	.....	.....	.....	
White Queen	Leedsi	1922	12	.....	.....	.....	10	20	46	62	91	.....	
Will Scarlet	Incomparabilis	1922	10	.....	.....	.....	19	29	37	9	62	.....	
Van Sion	Yellow Trumpet	1922	10	.....	.....	.....	14	6	11	4	4	.....	

Trumpet Varieties

In this group are those varieties which have a long trumpet, and these may be divided into the Yellow Trumpet and the Bicolor Trumpet.

Yellow Trumpet.—Of these, the most satisfactory is undoubtedly Emperor, which, through long years, has proved one of the hardiest and most reliable. Golden Spur, which is so much used for forcing, is not satisfactory outside at Ottawa. The same may be said of Princeps. Of the larger and more expensive Yellow Trumpet varieties, the Lord Muncaster has proven one of the hardiest, and Olympia has held its own also. King Alfred is a popular variety, the hardiness of which is still uncertain.

Bicolor and Nearly White Trumpet.—The variety which has proven most satisfactory in this group is Empress, which is a very attractive sort and a free bloomer. Madame Plemp is also very good. Princess Ida has proved the hardiest of the almost White Bicolor Trumpets. Madame de Graaff has gone down rapidly during the past three years, as judged by the record in this table, but in other situations it has done much better.

Incomparabilis Varieties

The varieties in this group have what might be called half long trumpets or cups, and are among the most attractive Daffodils.

That old variety, Sir Watkin, is very hardy and blooms well for many years when it does not get too thick, but those with the brighter coloured orange red cups are more attractive in the garden, and two of the most satisfactory of these have proved to be Lucifer and Will Scarlet, the former with a whitish perianth and the latter with a yellow one. Great Warley is a charming variety with white perianth and yellow cup.

Barri Varieties

These have still shorter cups. They are among the most graceful varieties, most of them having long stems.

One of the hardiest is Conspicuus with a yellow perianth and a cup edged with orange scarlet. Red Beacon is a fine one with whitish perianth and a very bright orange red cup. Seagull has proved one of the hardiest and freest blooming. It has a white perianth and yellow cup.

Leedsi Varieties

The varieties in this group all have white perianths and the cups are usually of the lighter shades of yellow. Among the most satisfactory are White Queen, which has a white perianth and very pale yellow cup, fading to white; and White Lady, which has a white perianth and pale yellow cup. A good variety, which does not appear in the table but which is under test, is Lord Kitchener.

Poeticus Varieties

These are the Pheasant's Eye or Poet's narcissus. They are very hardy, bloom freely, and multiply rapidly, and, because of their exquisite perfume and great beauty, are among the most popular. The earliest variety, but, perhaps, the least interesting, is Ornatus. Glory of Lisse is the variety which has proven the most satisfactory.

Poetaz Varieties

These are crosses between Poeticus and Tazetta or Polyanthus (of which Paper White is a well known variety.) They are much hardier than Paper

White. The flowers are in clusters, and are charming additions to the list of hardy daffodils. They have not been compared for relative hardiness for a sufficiently long time to determine which are the hardiest, but some of the most satisfactory are Laurens Koster and Majestic.

TALL BEARDED IRIS

The iris continues to be one of the most popular flowers, and there are now many breeders of new varieties of it, the result being that a large number are being introduced each year. The most promising of these are tested at the Central Experimental Farm and compared with the older varieties. From time to time lists are published in the annual report of the varieties considered the best, of those which have been tried, and following is the revised list. The tall bearded iris is the only group included in this list as this is the most generally grown. Most of the varieties are very hardy, and can be grown successfully in every province of Canada. The varieties of this group are of very easy culture, but should not be grown on wet ground. A soil which is usually rather dry in mid-summer suits them best. They bloom most freely in the open where they will get most sunlight, though when they are screened from the sun in the hottest part of the day the individual blooms last longer. They may be planted successfully almost any time when there is no frost in the ground, but the best time is, perhaps, during the month of August as this gives time for them to be well rooted before winter. The tall bearded Iris should be planted quite shallow, the top of the rhizome or thickened root being at, or very near, the surface of the ground when planted.

1. White predominating on standards and falls.—Florentina, White Knight.

2. White feathered or suffused with bluish-lavender and bluish-purple.—Mrs. G. Reuthe, Camelot.

3. White, or white and purple standards and purple falls.—Mary Williamson, Rhein Nixe, Mildred Presby.

Iris at the Central Experimental Farm, Ottawa. (Photo by Frank T. Shutt.)

4. Yellow predominating on standards and falls.—Mrs. Sherwin Wright, Shekinah, Chasseur.

5. Pale yellow standards and violet purple falls.—Princess Victoria Louise.

6. Yellow standards and brownish or maroon falls.—Flammenschwert (Flaming Sword), Iris King, Citronella.

7. Lavender blue and bluish-purple predominating on standards and falls, mainly Pallida varieties.—Ballerine, Lord of June, Morwell, Queen Caterina, Lady Chas. Allom, Juniata.

8. Bluish-purple standards and bluish purple or deep purple falls.—Crusader, Rodney, Magnifica, Lent A. Williamson, Alcazar.

9. Pale purple standards and purple falls.—B. Y. Morrison, Perfection.

10. Purple standards and purple or dark purple falls.—Aurelle, Souvenir de Madame Gaudichau, Parc de Neuilly, Archeveque, Mount Royal, Harmony, Monsignor.

11. Pink, lilac, and rose predominating on standards and falls.—Dream, Mrs. Marion Cran, Susan Bliss, Lady Byng, Delight.

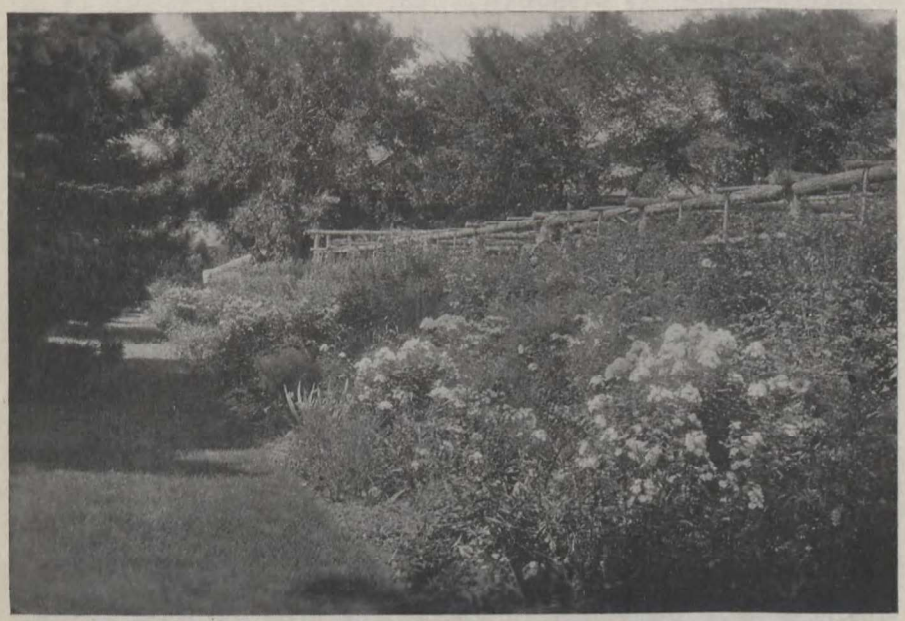
12. Reddish purple predominating on standards and falls.—Asia, Sweet Lavender, Opera.

13. Dusky or dull coppery standards and rich maroon falls.—Ambassadeur, Bruno, Deuil de Valery Mayet.

14. Buff, lilac, and fawn blends predominating on standards and falls.—Afterglow, Isoline, Madame Durand.

PERENNIAL PHLOX

Many varieties of perennial phlox have been tested at the Central Experimental Farm, which among them give a succession of bloom from spring until late summer or autumn. Those usually considered under the name "Perennial



Perennial phlox in the herbaceous border. (Photo by Frank T. Shutt.)

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, the most satisfactory being Miss Lingard. Then there are the varieties of *Phlox arendsi, P. divaricata* x *P. paniculata,* which bloom from late spring until summer, among which there are some fairly attractive sorts, not so generally useful, however, as the later varieties. The summer blooming sorts, only, or the group usually known as perennial phlox, are dealt with here.

The perennial phlox does well in most garden soils, but, to ensure success in dry seasons, it should be planted, if possible, where the soil is not likely to dry out. It succeeds well in partial shade. Its chief enemy is red spider, which is very troublesome in dry weather. This tiny insect works on the underside of the leaves, and the best remedy for it is a thorough washing of that side of the leaves with water. Sulphur is also useful.

Following are some of the best varieties tested in the Horticultural Division:—

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.

Europe.—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.

Viking.—A fine, tall, salmon pink, late variety.

EXPERIMENTS IN THE GREENHOUSES

The main experiments which have been conducted in the greenhouses in the past were continued in 1927. These include the testing of carnation and sweet pea novelties in comparison with older sorts, the forcing of different varieties of Gladioli, the comparison of antirrhinum varieties and methods of culture, and the growing of geraniums, cyclamens, cinerarias, primulas, tulips and daffodils to determine the relative merits of varieties. The large collection of chrysanthemums was maintained, new varieties being compared with old ones, many seedlings originated in the Horticultural Division being under test.

Vegetable experiments were continued along much the same lines as in the previous year, namely, the breeding of cucumbers, head lettuce, and tomatoes especially suited to forcing in greenhouses.

Breeding work with fruits and vegetables for growing outside was also done in the greenhouses, a large number of fruit trees and bushes being forced in pots and bloomed inside, where crossing was done.

NEW CHRYSANTHEMUMS

Only one of the many new chrysanthemums, originated in the Horticultural Division, was named in 1927. This was named after the present Governor General, Lord Willingdon.

Lord Willingdon.—A fine exhibition variety, originated as a sport of J. R. Booth, the latter being a sport of Nag-ir-roc. Flowers large, double, with reflexed petals; colour pale buff. It is of the same form as Nag-ir-roc and J. R. Booth.

SWEET PEA EXPERIMENT IN GREENHOUSE

During the winter of 1925-26, seventy-one different lots of sweet peas, under sixty-three distinct names, were grown in the main greenhouse of the Horticultural Division, results from which were published in the annual report for 1926. During the winter of 1926-27, the best of those tested the previous winter were grown with some others, there being thirty-eight lots under thirty-six different names. The experiment was a successful one, the plants growing

Sweet pea experiment in greenhouse, Central Experimental Farm, Ottawa.
(Photo by Frank T. Shutt.)

and blooming well, and the information obtained, which is given in the following table, should prove useful to those who grow or are proposing to grow this popular flower in winter.

The seed was sown in two and one-half inch plots on October 24, 1926, and the plants set out in the bed on December 8, 1926. The soil was made of rotted sod and manure. Plants were set six inches apart in rows twenty-five inches apart. They were supported with binder twine. The average night temperature was 50° F. The number of plants set out was five hundred and fifty-two, and the area occupied five hundred and seventy-six square feet. The plants were pulled on June 4, 1927, at which time they had reached an average height of about twelve feet, and were still vigorous. The total number of stems cut from all varieties was 59,654 or 104 stems per square foot.

Name of variety and source of seed	Number of plants	Date of first bloom	Date of first cutting	Date of last cutting	Number of cuttings	Average number of flowers per stem, first cutting
Blue Jacket—Burpee	16	27-2-27	4-3-27	4-6-27	46	2
Cheerful—Burpee	12	28-2-27	4-3-27	2-6-27	45	2
Columbia—Burpee	16	28-2-27	9-3-27	4-6-27	41	3
Early Bluebird—Burpee	16	18-2-27	28-2-27	4-6-27	46	2
Early Canary Bird—Burpee	12	19-2-27	28-2-27	27-5-27	43	2
Early Flowering Yarrawa—Burpee	16	1-3-27	9-3-27	4-6-27	40	2
Early Lavender King—Burpee	16	28-2-27	9-3-27	4-6-27	46	2
Early Princess—Burpee	16	20-2-27	28-2-27	4-6-27	43	2
Eldorado—Skidelsky	12	25-2-27	28-2-27	4-6-27	45	1
Fire King—Burpee	16	24-2-27	28-2-27	4-6-27	41	2
Flamingo—Burpee	12	8-3-27	9-3-27	4-5-27	45	2
Fordhook Pink and White—Burpee	16	28-2-27	4-3-27	4-6-27	42	3
Glitters—Burpee	12	24-2-27	28-2-27	2-6-27	42	2
Glorious—Burpee	16	17-2-27	28-2-27	1-6-27	47	2
Grenadier—Burpee	12	28-2-27	4-3-27	4-6-27	46	2
Harmony—Burpee	16	24-2-27	28-2-27	4-6-27	45	2
Hercules—Skidelsky	16	6-3-27	9-3-27	4-6-27	38	2
Illumination—Burpee	12	6-3-27	9-3-27	4-6-27	47	2
Improved Snowstorm—Burpee	12	20-2-27	28-2-27	27-5-27	49	2
Jeanne Mamitsch—Skidelsky	16	7-3-27	9-3-27	4-6-27	41	2
King Tut—Burpee	16	28-2-27	4-3-27	4-6-27	45	2
Loveliness—Burpee	16	30-1-27	12-2-27	4-6-27	47	2
Milkmaid—Burpee	12	26-2-27	4-3-27	4-6-27	50	3
Mrs. Kerr—Skidelsky	12	6-3-27	9-3-27	1-6-27	44	2
Mrs. Kerr—Burpee	12	28-2-27	9-3-27	4-6-27	44	2
Mrs. W. G. Harding—Burpee	16	26-2-27	4-3-27	4-6-27	48	2
Orange—Burpee	12	28-2-27	9-3-27	23-5-27	42	2
Penrose—Burpee	16	24-2-27	28-2-27	4-6-27	46	2
Pink Profusion—Burpee	16	16-2-27	4-3-27	4-6-27	47	2
Quaker Lady—Burpee	16	17-2-27	28-2-27	4-6-27	46	2
Rose Queen—Skidelsky	16	28-2-27	4-3-27	4-6-27	40	2
Rose Queen—Burpee	16	20-2-27	28-2-27	4-6-27	48	3
Snowstorm—Skidelsky	12	24-2-27	28-2-27	19-5-27	43	2
Sunburst Improved—Burpee	16	18-2-27	28-2-27	2-6-27	45	2
Sunlight—Burpee	16	15-2-27	28-2-27	27-5-27	43	2
Torch—Skidelsky	12	3-3-27	9-3-27	4-6-27	45	2
Zvolanek Blue—Skidelsky	16	28-2-27	4-3-27	27-5-27	40	2
Zvolanek Rose—Skidelsky	16	28-2-27	4-3-27	4-6-27	44	2
Average	15	.....	.....	.....	44	2

TEST OF SWEET PEAS

Average number of flowers per stem, all cuttings	Average length of stem at first cutting	Average length of stem, all cuttings	Number of stems cut first two weeks from time earliest variety was cut	Number of stems cut first month from time earliest variety was cut	Total number of stems cut	Average number of stems per plant	Value commercially: xxx 1st in quality, xx 2nd in quality, x 3rd in quality
	in.	in.					
3	12	12	35	162	1,662	104	xxx
3	12	13	50	127	1,161	97	xxx
3	15	15	28	162	1,794	112	xxx
3	12	14	88	200	2,037	127	xxx
2	13	13	62	130	1,118	93	xxx
3	13	14	33	179	1,614	101	xxx
3	14	14	111	294	2,144	134	xxx
3	14	13	76	223	2,125	133	xxx
3	10	13	64	138	1,290	108	xxx
2	12	13	61	171	1,400	88	xxx
3	12	14	44	150	951	79	xxx
3	13	15	38	174	2,142	134	xxx
3	13	14	24	74	1,045	87	xxx
3	12	13	93	209	1,811	113	xxx
3	15	18	74	145	1,128	94	xxx
3	14	13	59	180	2,448	153	xxx
3	13	14	28	163	1,941	121	xxx
3	14	14	55	195	1,479	123	xxx
3	12	14	58	133	1,057	88	xxx
3	14	15	82	300	1,939	121	xxx
3	14	14	88	264	1,542	96	xxx
3	13	14	21	112	1,475	92	xxx
3	16	15	52	135	1,232	103	xxx
3	12	13	55	182	847	71	xxx
3	13	14	58	190	1,253	104	xxx
3	13	14	97	276	2,290	143	xxx
3	14	13	59	148	622	52	xxx
3	12	14	63	186	1,945	122	xxx
3	15	15	87	226	1,526	95	xxx
3	12	14	70	174	2,005	125	xxx
3	14	16	52	173	2,038	127	xxx
3	15	16	72	193	2,397	150	xxx
3	11	14	41	96	882	74	xxx
3	13	14	70	171	1,587	99	xxx
3	12	14	87	168	1,104	69	xxx
3	14	14	50	111	1,435	120	xx
3	11	14	44	131	1,326	83	xxx
3	12	14	48	140	1,862	116	xxx
3	13	14	60	173	1,570	107	

SOME OF THE MOST ATTRACTIVE VARIETIES OF SWEET PEAS

White.—Improved Snowstorm, Milkmaid.
White suffused with mauve pink.—Early Flowering Yarrawa, King Tut.
Cream or pale yellow.—Early Canary Bird.
Pale pink to pink suffused with white.—Sunburst Improved.
Mauve pink suffused with white.—Jeanne Mamitsch, Zvolanek Rose, Hercules, Rose Queen.
White and mauve pink.—Loveliness.
White and rosy pink.—Columbia.
Deep rose.—Penrose, Torch.
Rosy Red.—Fire King, Illumination, Cheerful.
Deep rosy red.—Grenadier.
Rosy red and salmon suffused with white.—Mrs. Calvin Coolidge, Flamingo.
Light mauve-lavender.—Mrs. W. G. Harding, Quaker Lady, Early Princess.
Mauve-lavender.—Harmony, Early Lavender King.
Bluish purple.—Early Bluebird, Zvolanek Blue.
Violet purple and bluish purple.—Blue Jacket.
Rosy purple.—Glorious.

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