DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

DIVISION OF HORTICULTURE

REPORT

OF THE DOMINION HORTICULTURIST

W. T. MACOUN

FOR THE YEAR 1929

New Horticultural Building, Central Experimental Farm, Ottawa.
(Photo by Frank T. Shutt)

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REPORT OF THE DIVISION OF HORTICULTURE

W. T. MACOUN, DOMINION HORTICULTURIST

The Division of Horticulture includes pomology or fruit growing; vegetable gardening; ornamental gardening; the maintenance of a herbarium of horticultural plants and the painting of fruits, vegetables, and flowers for record purposes; also the forcing of horticultural plants under glass; and canning and dehydration. In addition to these are the keeping of the records; the general office work; and much work which has to do with the many horticultural projects at the Experimental Farms and Stations throughout Canada.

Following is the forty-third annual report of the Division of Horticulture, being the thirty-first since the present Dominion Horticulturist was appointed Chief of the Division in 1898.

As usual, this report has been prepared by several members of the staff. Mr. T. F. Ritchie, Assistant in Vegetable Gardening, has prepared the part relating to vegetables. Mr. H. Hill, Assistant in Research, has prepared the articles on Experiments in Fertilizing and mulching trees at Abbotsford, Quebec; Studies in Apple Pollination; and Nutritional Studies with Tomato. The article on Polyantha Pompon Roses was written by Miss Isabella Preston, Specialist in Ornamental Gardening; and the Dominion Horticulturist has prepared the remainder of the report with the assistance of the office staff. The faithful services of all members of the division in the field, laboratories, and offices have made possible the large amount of work that has been accomplished during the year.

The correspondence continues to increase, there being 11,291 letters received and 11,210 despatched in 1929.

Bulletins published during the year were: Bulletin No. 77, New Series, Preserving Fruits and Vegetables in the Home; Bulletin No. 110, New Series, Studies in Strawberry Bud Differentiation; Bulletin No. 113, New Series, Herbaceous Perennials with Lists of Varieties for Special Purposes and Districts; Bulletin No. 114, The Raspberry and Its Cultivation in Canada, with a section on Insects Affecting the Raspberry by the Entomological Branch, and a section on Raspberry Diseases by the Botanical Division; and Pamphlet No. 100, New Series, on Tomato Culture.

The Dominion Horticulturist made his annual visit to the branch Experimental Farms and Stations as usual in 1929 to confer with the superintendents and to see the experimental work in progress. While much time is involved in making these visits, it is felt that it is well spent time. It not only keeps the Dominion Horticulturist in close touch with the work but he is able to bring to the attention of all the branch Stations anything new of value that he has seen at any one or more of them.

In order that the public might be better acquainted with the work that is being done in the Division of Horticulture in breeding new varieties of apples an exhibition of some four hundred of these new sorts was made under the auspices of the Ottawa Horticultural Society in Ottawa on October 17, 18, and 19, which was visited by a large number of persons.

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A collection of some of the most promising of these new apples was shown at the annual exhibition of the New York Fruit Testing Association, Geneva, N.Y., September 19 and 20, 1929, and created many favourable comments. Some of these are doing particularly well in the United States.

Among these new apples are some very promising varieties of the Northern Spy type, and at the Royal Winter Fair held at Toronto in November, a collection of these shown there attracted much attention.

The Melba apple is increasing in popularity in Canada and many trees of this variety are being planted. Other varieties which promise well are Joyce, Hume, Lobo, and Linda.

The Eastern Canada Nurserymen's Association held its annual meeting at the Central Experimental Farm on July 16, 1929, and the members, representing most of the important nurseries in Ontario and Quebec, spent some time in visiting the fruit, vegetable, and ornamental plantations. The members were particularly interested in the new varieties originated here and it is expected that the better acquaintance of them, thus gained, will help to hasten the time when more of these are listed in the nurserymen's catalogues. This is the first time that this association has visited the Experimental Farm, but it is hoped that it will not be long before it comes again.

NEW HORTICULTURAL BUILDING

A new epoch in the history of the Division of Horticulture is marked by the erection of a new horticultural building in 1929. This building was begun in March and completed and occupied in October. The new building has a frontage of 62½ feet and a depth of 37½ feet. It is attractive in appearance, being of brick and stucco and half timbered with a mansard roof. The old building, which was 50 feet by 50 feet, was made part of this new building, which gives a ground area of nearly 5,000 square feet.

On the ground floor of the new building are the offices of the Dominion Horticulturist and some of his assistants, the record rooms, and a large vault for the safekeeping of records. On the first floor are the laboratories, art room, photographic room, library, and offices. There is a large attic which offers further accommodation as the staff gets larger. In the old building which has been renovated is the Home Canning Department, a large lecture hall, foreman's office and workroom, and on the first floor are two large rooms used for selection and record work with fruits and vegetables. There is an excellent and commodious cellar in the new building for the storage of fruits and part of the cellar in the old part will be used for experiments in dehydration and by-products and for cold storage.

CHARACTER OF THE SEASON

As has been the custom since 1898, a brief account of the character of the weather during the year of the annual report is given.

There was little snow on the ground at the beginning of 1929 but during January twenty inches of snow fell and there were about sixteen inches on the level by the end of the month. While January was not an extremely cold month there were only three days when the temperature rose above freezing. The lowest temperature was -26° F. on the 14th, this being the only time when it reached -20° F. It was below zero on twelve days during the month.

The lowest temperature in February was -20° F. on the 20th. It was below zero on thirteen days. Like January, there were only three days when the temperature rose above freezing. There was little precipitation during the month.

The lowest temperature in March was -5° F. on the 8th and 10th, the only times when it was below zero during the month. The temperature rose above freezing on twenty-three days during March, the highest being 49° F. on the 21st. It was a mild month and by the end of it the ground was practically bare.

By April 5 the frost was sufficiently out of the ground to dig, which is six days earlier than the average, which is April 11, for the past thirty-two years. The lowest temperature in April was 10° F. on the 2nd and the highest was 66° F. on the 24th and 28th. The temperature rose above freezing on every day of the month, but it froze on eighteen days.

May was cool up to the 10th, then moderately warm to the 25th when it became warm to very warm. The highest temperature was 86° F. on the 28th, 87° F. on the 29th 88° F. on the 30th, and 80° F. on the 31st. A very warm spell for so early in the season. The last spring frost recorded was on May 20 when the temperature was 30° F.

June was a warm month on the whole. The first week was cool after which it was warm until the end of the month, the warmest spell being from the 16th to 24th It was 80° F. and above on eleven days during the month, the highest temperature being 91° F. on the 18th.

July was a warm month also, the temperature being above 80° F. on sixteen days. The highest temperature was 93° F. on the 27th and it was 92° F. on the 28th. By the 21st rain was badly needed but there was a heavy rainfall on that day. The rainfall for the month was 3.24 inches.

August was moderately warm. It was 80° F. and above on seven days, the highest being 87° F. on the 26th. There were 3.25 inches of rain.

September was also moderately warm on the whole, the first half of the month being warm with the temperature up to 94° F. on the 3rd, the hottest day of the summer, it having been 91° F. on the 2nd. The temperature falling to 28° F. on the 20th caused the freezing of the tenderer plants. There were five nights of frost in succession from the 19th to the 23rd, though the first frost was the heaviest and was earlier than usual for a killing frost. The rainfall in September was scarcely two inches. While crops in surrounding districts suffered badly from lack of rain and moisture during the past summer there was more rain in the vicinity of Ottawa and the injury from drought was not nearly as great as elsewhere.

October was a cool but a fine month. The highest temperature was 71° F. on the 20th and the lowest 24° F. on the 10th, 11th and 29th. Rainfall was 1.88 inches.

November was a cool but not a cold month. The lowest temperature was -4° F. on the 29th but this was the only day the temperature was below zero. It was above freezing on twenty-two days, the highest temperature being 63° F. on the 1st. Winter may be said to have set in on November 19, with frost and a thin covering of snow on the ground. This is seven days earlier than the average date for the past thirty-two years, which is November 26.

While December was not a very cold month the cold was steady, there being only one day when the temperature rose above freezing-point which was the 27th, when it was 39° F. The lowest temperature was -22° F. on the 12th. It was nine times below zero during the month. By the end of the month there were from fifteen to eighteen inches of snow on the level. Late in November and early in December there was little snow on the ground and it was hoped that injury was not caused to herbaceous plants owing to lack of protection at this time.

POMOLOGY

The season was favourable to fruits on the whole. The trees, vines, bushes and strawberry plants wintered well.

The apple crop of 1929 was the largest there has been in the orchard of the Central Experimental Farm and the fruit was clean and well coloured. A large number of new varieties originated here fruited in considerable quantities and gave a good opportunity of determining their merits. There was a very warm spell of weather at blooming time which was evidently favourable to the setting of the fruit.

The crop of pears and plums was also good but grapes, while a fair crop, did not ripen well.

The crops of currants, gooseberries, raspberriees and strawberries were average ones.

There are many projects in pomology in the division, but the results from but a few are given in this report.

SOME OF THE BEST VARIETIES OF APPLES ORIGINATED IN THE DIVISION OF HORTICULTURE, OTTAWA, NOT INCLUDING CERTAIN VARIETIES OF MAINLY McINTOSH AND NORTHERN SPY PARENTAGE REFERRED TO IN THE ANNUAL REPORTS FOR 1927 AND 1928

In the annual report for 1927 descriptions were published of some of the best varieties of apples originated in the Division of Horticulture, mainly of McIntosh parentage and of that type. These varieties are Diana, Gerald, Honora, Hume, Joyce, Lawfam, Linda, Lobo, McSweet, Macearly, Macross, Melba, Patricia. In the annual report for 1928 a list was published of the best varieties having Northern Spy as one parent and mainly of the Northern Spy type. These varieties are Ascot, Bingo, Currie, Elmer, Emilia, Galton, Glenton, Lipton, Nestor, Niobe, Rosalie, Sandow, Sparta, Spiana, Spikee, Spimore, Spiretta, Spiro, Spiwell, Piza and Thurso.

There is now being published an additional descriptive list of the most promising varieties not included in the former lists.

It takes many years before all the good and bad points of a new variety become known and before it is possible to learn, with a fair degree of certainty, when a new variety should be introduced commercially. This is fortunate as there are already too many varieties on the market and new ones should be introduced slowly. At the same time, there is no doubt but that the varieties planted will continue to change as they are shown to be superior to the old. Although a large number of very promising varieties of apples have been originated in the Division of Horticulture the policy has been to not promote the commercial planting of any of them but rather to let them gradually find their level. A few such as Melba, Joyce, and Lobo are now being planted in increasing numbers.

ATLAS

The Atlas apple is an open pollinated seedling of the Winter St. Lawrence. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Winter St. Lawrence was saved and sown in the autumn of 1898. It germinated in the following spring and the young trees were planted in the orchard in 1902. The tree, afterwards named Atlas, fruited for the first time in 1910 and a description of it under that name was first published in the annual report for 1912, page 91.

Following is a description of the fruit:—

Size large to above medium; form roundish, conical, ribbed; cavity deep, medium width to open; stem short to medium length, stout to moderately stout; basin medium width, deep, wrinkled; calyx partly open or closed; colour pale yellow, almost white, splashed and washed with attractive carmine, approaching orange red; predominant colour carmine; seeds medium size, acuminate; dots obscure or indistinct; bloom thin, bluish; skin moderately thick, tender; flesh white with traces of red, rather coarse, tender, moderately juicy; core medium, open; flavour subacid, pleasant; quality good; season October to December.

Tree hardy and productive and the fruit handsome in appearance. The flesh is a little coarse but the quality is good.

BEFOREST

The Beforest apple is an open pollinated seedling of the Forest. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Forest was saved and sown in the autumn of 1908. It germinated in the following spring and the young trees were planted in the orchard in 1911. The tree, afterwards named Beforest, fruited for the first time in 1919 and a description of it under that name was first published in the annual report for 1925, page 6.

Following is a description of the fruit:—

Size medium to large; form roundish to oblate, slightly ribbed; cavity deep, open, russeted; stem medium length to long, moderately stout to stout; basin open, medium depth, wrinkled; calyx partly open; colour yellow washed and splashed with dull to fairly bright crimson, approaching orange red; predominant colour dull crimson; seeds large, obtuse; dots obscure or very small, yellow; skin, moderately thick, tender; flesh yellowish with traces of red, firm, crisp, tender, breaking, melting, moderately juicy to juicy; core medium; flavour subacid, pleasant; quality good; season November to February or later.

Fruit resembles Forest somewhat in colour of skin, in flesh and in flavour. A good dessert apple with very agreeable flesh.

BRUNO

The Bruno apple is an open pollinated seedling of the Scott Winter. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Scott Winter was saved and sown in the autumn of 1898. It germinated in the following spring and the young trees were planted in the orchard in 1901. The tree, afterwards named Bruno, fruited for the first time in 1907 and a description of it under that name was first published in the annual report for 1908, page 101.

Following is a description of the fruit:—

Size above medium to medium; form oblate to roundish; cavity medium depth and width; stem short to medium, moderately stout to slender; basin deep, medium width, wrinkled; calyx closed or open; colour greenish yellow well washed with dark orange red and purplish red; dots few, pale, indistinct; bloom none; skin moderately thick, tender; flesh white, crisp, tender, juicy; core small; flavour subacid, pleasant, not high; quality above medium to good; season November to March.

Resembles Scott Winter somewhat in outward appearance though much larger. Is proving promising as a late keeping apple at the Experimental Station, Ste. Anne de la Pocatière, P.Q.

COXSTONE

The Coxstone is an open pollinated seedling of the Stone. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Stone was saved and sown in the autumn of 1908. It germinated in the following spring and the young trees were planted in the orchard in the spring of 1912. The tree, afterwards named Coxstone, fruited for the first time in 1922 and a description of it under that name was first published in the annual report for 1926, page 6.

Following is a description of the fruit:—

Size above medium to large; form roundish, ribbed; cavity open, medium depth to shallow; stem medium length, stout; basin open, deep, wrinkled; calyx open or partly open; colour yellow washed and splashed with orange red; predominant colour orange red; seeds medium size, obtuse; dots few, small, yellow, indistinct; bloom thin, bluish; skin moderately thick, tender; flesh yellowish, crisp, tender, moderately juicy, rather coarse; core medium; flavour subacid, pleasant; quality good; season probably December to March.

No marked resemblance to Stone except in flavour. Attractive in appearance. A nice dessert apple.

FORPEAR

The Forpear apple is an open pollinated seedling of the Forest. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Forest was saved and sown in the autumn of 1908. It germinated in the following spring and the young trees were planted in the orchard in 1911. The tree, afterwards named Forpear, fruited for the first time in 1920 and a description of it under that name was first published in the annual report for 1925, page 6.

Following is a description of the fruit:—

Size medium to above medium; form roundish, conic, flattened about cavity; cavity deep, open, russeted; stem short, moderately stout; basin open, deep, wrinkled; calyx open or partly open; colour yellow, washed, splashed and streaked with orange red approaching crimson; predominant colour orange red; seeds medium size, broad, acute; dots moderately numerous, white, distinct; skin moderately thick, moderately tender; flesh yellow and white tinged with red, firm, crisp, tender, melting, juicy; core medium size, open; flavour subacid, pleasant, aromatic; quality good to very good; season late October to January.

Resembles Forest somewhat in colour of skin, in flesh, and in flavour. A pleasing combination of flesh and flavour. A good dessert apple.

FORSWEET

The Forsweet apple is a cross between the McIntosh and Forest. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. The cross was made in 1907 and the seed sown in the autumn of that year. It germinated the following spring and the young trees were planted in the orchard in 1910. The tree, afterwards called Forsweet, fruited for the first time in 1921 and a description of it under that name was first published in the annual report for 1926, page 6.

Following is a description of the fruit:—

Size medium to above; form roundish, conical; cavity open, deep; stem medium length, stout; basin deep, medium width, abrupt, wrinkled; calyx open; colour yellow thinly washed and splashed with carmine approaching orange red; predominant colour carmine approaching orange red; seeds medium size, acute;

dots few, white, distinct; skin thick, tough; flesh yellowish, firm, moderately juicy; core small; flavour sweet, good; quality good for a sweet apple; season December probably to March.

A good late-keeping sweet apple. Attractive in appearance, with no marked resemblance to McIntosh, but considerably like Forest in shape and in flavour.

HERALD

The Herald apple is an open pollinated seedling of the Fameuse. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Fameuse was saved and sown in the autumn of 1898. The seed germinated in the following spring and the young trees were planted in the orchard in 1902. The tree, afterwards called Herald, fruited for the first time in 1909 and a description of it under that name was first published in the annual report for 1910, page 135.

Following is a description of the fruit:—

Size medium to below; form roundish to oblate; cavity deep, open; stem short to medium, moderately stout; basin deep, open, wrinkled; calyx closed or partly open, calyx reflexed; colour pale yellow well washed and splashed with attractive crimson; predominant colour crimson; seeds medium size, acuminate; dots obscure; bloom thin, bluish; skin moderately thick, moderately tender; flesh dull white, tinged with red, tender, melting, juicy; core medium; flavour subacid, sprightly, pleasant, Fameuse-like; quality good; season November to January.

Resembles Fameuse somewhat in outward appearance and very much in flavour but has more acidity than Fameuse. Not quite equal to Fameuse in quality, but tree may be hardier.

KEETOSH

The Keetosh apple is a cross between Milwaukee and McIntosh. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. The cross was made in 1904 and the seed was sown in the autumn of that year. It germinated in the following spring and the young trees were planted in the orchard in 1907. The tree, afterwards called Keetosh, fruited for the first time in 1920 and a description of it under that name was first published in the annual report for 1922, page 8.

Following is a description of the fruit:—

Size medium to above medium; form oblate to roundish; cavity deep, medium width; stem medium length, moderately stout; basin medium depth to deep, medium width, wrinkled; calyx open or partly open; colour pale yellow well washed and splashed with deep crimson; predominant colour deep crimson; flesh white with traces of red, tender, breaking, juicy; dots obscure; seeds small, plump, acute; skin moderately thick, tender; core small, open; flavour subacid, pleasant, good; quality good; season October to January.

Resembles McIntosh considerably in colour of skin, flesh, flavour, core and seeds. No marked resemblance to Milwaukee. Attractive in appearance. A good dessert apple.

LAWMAC

The Lawmac apple is a cross between Lawver and McIntosh. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. The cross was made in 1899 and the seed was sown in the autumn of that year. The seed germinated in the following spring and the young trees were planted in the orchard in 1902. The original tree, afterwards called Lawmac, died before fruiting but another tree which had been propagated from it was planted in 1911 and this fruited in 1920 and a description of it under that name was first published in the annual report for 1925, page 6.

Following is a description of the fruit:—

Size above medium to medium; form roundish, slightly ribbed; cavity narrow to medium, medium depth; stem, short to medium, stout; basin shallow to medium depth, medium width to open, wrinkled; calyx open; colour yellow well washed and splashed with crimson; predominant colour crimson; seeds below medium to medium, plump, acute; dots numerous, pale yellow, distinct; skin moderately thick, tender; flesh yellowish, with traces of red, firm, crisp, tender, juicy; core medium size, open; flavour subacid, sprightly, little flavour but pleasant; quality above medium to good; season late December to March or April.

Resembles both McIntosh and Lawver in colour of skin. Attractive in appearance. A very good keeper. Not quite good enough in quality.

LAWTOSH

The Lawtosh apple is a cross between Lawver and McIntosh. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. The cross was made in 1899 and the seed was sown in the autumn of that year. The seed germinated in the following spring and the young trees were planted in 1902. The tree, afterwards called Lawtosh, fruited for the first time in 1913 and a description of it under that name was first published in the annual report for 1925, page 7.

Following is a description of the fruit:—

Size medium to above; form roundish, slightly ribbed; cavity shallow to medium depth, open, russeted; stem medium length to long, moderately stout to stout or slender; basin medium depth to shallow, narrow to medium width, wrinkled; calyx closed or partly open; colour yellow well washed with deep but lively and attractive crimson; predominant colour deep attractive crimson; seeds medium size, plump, obtuse and acute; dots few, yellow, indistinct; skin moderately thick, moderately tender; flesh yellow, very tender, moderately juicy; core small, open; flavour very mildly subacid and sweet, pleasant, good; quality good to very good; season November to January.

A very attractive apple of good quality. May be too lacking in acidity for some tastes.

MACLAW

The Maclaw apple is a cross between McIntosh and Lawver. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. The cross was made in 1899 and the seed was sown in the autumn of that year. It germinated in the following spring and the young trees were planted in the orchard in 1903. The original tree, afterwards called Maclaw, died before fruiting but another tree which had been propagated from it was planted in 1911 and this fruited in 1921 and a description of it under that name was first published in the annual report for 1922, page 8.

Following is a description of the fruit:—

Size medium; form roundish, ribbed; cavity medium depth, medium width to open; stem medium to long, stout; basin open, medium depth to shallow, wrinkled; calyx partly open or closed; colour yellow washed and splashed with crimson; predominant colour crimson; seeds medium size, acute; dots moderately numerous, small, pale yellow, distinct; bloom thin, lilac; skin moderately thick, tender; flesh yellowish, crisp, tender, moderately juicy; core medium size, open or partly open; flavour subacid, pleasant; quality good; season probably late December to March or April.

A blend of McIntosh and Lawver in outward appearance. Attractive in appearance. A good keeper. A good dessert apple. Runs below medium in size at times.

MERLIN

The Merlin apple is an open pollinated seedling of the Shiawassee. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Shiawassee was saved and sown in the autumn of 1899. The seed germinated the following spring and the young trees were planted in the orchard in 1902. The tree, afterwards called Merlin, fruited for the first time in 1911 and a description of it under that name was first published in the annual report for 1920-21, page 5.

Following is a description of the fruit:—

Size medium to above medium; form oblate to roundish; cavity open, medium depth to deep, russeted at base; stem medium length, moderately stout; basin deep, open, wrinkled; calyx closed or partly open; colour pale yellow washed and splashed with crimson; predominant colour crimson; seeds medium size, acute to acuminate; dots few, pale yellow, distinct to indistinct; bloom medium, pinkish; skin thin, tender; flesh white and yellow with traces of red, crisp, breaking, juicy; core medium size, open; flavour subacid, aromatic or spicy; quality good to very good; season October to December.

Resembles Shiawassee considerably in shape, flesh and flavour. A nice dessert apple.

PETREL

The Petrel apple is an open pollinated seedling of the Shiawassee. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Shiawassee was saved and sown in the autumn of 1898. The seed germinated the following spring and the young trees were planted in the orchard in 1901. The tree, afterwards called Petrel, fruited for the first time in 1907 and a description of it was first published in the annual report for 1910, page 136.

Following is a description of the fruit:—

Size above medium; form roundish; cavity medium depth and width; stem short to medium length, stout; basin open, deep, wrinkled; calyx open or partly open; colour pale greenish yellow to pale yellow splashed and washed with carmine; dots few, indistinct; seeds medium size, obtuse; bloom thin, pinkish; skin thin to moderately thick, tender; flesh white, tender, breaking, juicy; core medium; flavour subacid, pleasant; quality good to very good; season September.

Though not very attractive in appearance, this is an excellent dessert apple and is popular where known. It resembles Shiawassee somewhat in flesh.

ROSENA

The Rosena apple is an open pollinated seedling of the Winter Rose. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Winter Rose was saved and sown in the autumn of 1908. The seed germinated in the following spring and the young trees were planted in the orchard in 1912. The tree, afterwards called Rosena, fruited for the first time in 1918 and a description of it under that name was first published in the annual report for 1927, page 17.

Following is a description of the fruit:—

Size medium; form oblate, ribbed but regular; cavity open, medium depth to deep; stem medium length, stout; basin open, medium depth to shallow, wrinkled; calyx open; colour yellow well washed with dark red; predominant colour dark red; seeds medium size to below, irregular, obtuse to acute; dots moderately numerous, small, yellow, distinct; bloom bluish, moderate; skin

thick, moderately tough; flesh yellow with traces of red, crisp, moderately juicy to juicy; core small; flavour subacid, pleasant; quality good; season November probably to March.

Very handsome in appearance. No marked resemblance to Winter Rose. A better keeper than McIntosh though not as good in quality.

ROSLIN

The Roslin apple is an open pollinated seedling originating in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont., from seed of unknown varieties imported from Riga, Russia, in 1889. The young trees were planted in the orchard in 1890. The tree, afterwards called Roslin, fruited for the first time in 1898 and a description of it under that name was published in the annual report for 1926, page 7.

Following is a description of the fruit:—

Size medium to below medium; form roundish, conical, ribbed; cavity open, very shallow, russeted; stem medium length, stout; basin shallow, medium width, wrinkled; calyx closed or partly open; colour very pale yellow, thinly splashed with carmine; predominant colour about 50 per cent of each; seeds large, acute; dots obscure: skin moderately thick, tough; flesh white, tender, juicy; core large, open; flavour subacid, pleasant; quality good; season early August.

This apple is not quite large enough but it is the earliest apple of good quality at Ottawa. Not recommended except for colder districts and for home planting.

RUPERT

The Rupert apple is an open pollinated seedling originating in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont., from seed of unknown varieties imported from Riga, Russia, in 1889. The young trees were planted in the orchard in 1890. The tree, afterwards called Rupert, fruited for the first time in 1897 and a description of it under that name was published in the annual report for 1906, page 109.

Following is a description of the fruit:—

Size above medium; form oblate; cavity medium depth and width, russeted; stem short, stout; basin medium depth and width, wrinkled; calyx closed; colour pale greenish yellow, sometimes with a faint pink blush; dots numerous, green, indistinct; skin thick, tough; flesh white, juicy, tender; core medium; flavour pleasant, briskly subacid, almost acid; quality above medium to good; season early August.

Earlier than Yellow Transparent and better in quality. Flavour suggestive of Early Harvest.

SPILAW

The Spilaw apple is an open pollinated seedling of Lawver. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Lawver was saved and sown in the autumn of 1899. The seed germinated the following spring and the young trees were planted in the orchard in 1902. The tree, afterwards called Spilaw, fruited for the first time in 1912 and a description of it was first published in the annual report for 1925, page 8.

Following is a description of the fruit:—

Size medium. form oblate, conic; cavity deep, open, russeted at base; stem medium to long, moderately stout to slender; basin medium depth, narrow to medium width, abrupt, wrinkled; calyx closed or partly open; colour yellow well washed with crimson; predominant colour crimson; seeds large, dark, obtuse; dots few, yellow, distinct; bloom pinkish; skin moderately

thick, tough; flesh yellowish with traces of red near skin, crisp, tender, juicy; core medium size to small, open; flavour subacid, pleasant; quality good to very good; season probably December to March or later.

Attractive in appearance. No marked resemblance to Lawver except in having large seed. Has a distinct Northern Spy flavour. A nice winter dessert apple.

STONECROP

The Stonecrop apple is an open pollinated seedling of the Stone. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Stone was saved and sown in the autumn of 1908. It germinated the following spring and the young trees were planted in 1912. The tree, afterwards called Stonecrop, fruited for the first time in 1921 and a description of it under that name was first published in the annual report for 1925, page 8.

Following is a description of the fruit:—

Size above medium to medium; form roundish, conical; cavity narrow to medium, shallow, sometimes closed; stem short to medium length, stout to moderately stout; basin open, medium depth to deep, abrupt, wrinkled; calyx open or partly open; colour yellow well washed and splashed with orange red; predominant colour orange red; seeds medium size, acute to acuminate; dots numerous, white or brown, conspicuous; bloom thin, pinkish; skin moderately thick, tender; flesh yellow, firm, buttery, moderately juicy; core medium, open; flavour subacid, spicy, pleasant, high flavour; quality good to very good; season late December to March.

Resembles Stone about cavity, in colour of skin, and in flavour. Not quite juicy enough but has high flavour.

STONEHENGE

The Stonehenge apple is an open pollinated seedling of the Stone. It originated in the Division of Horticulture, Central Experimental Farm, Ottawa, Ont. Seed of the Stone was saved and sown in the autumn of 1908. It germinated the following spring and the young trees were planted in the orchard in 1912. The tree, afterwards called Stonehenge, fruited for the first time in 1921 and a description of it was first published in the annual report for 1925, page 8.

Following is a description of the fruit:—

Size large; form roundish to oblong, conical, regular; cavity deep, medium width to open; stem medium length, moderately stout; basin deep to very deep, open, wrinkled; calyx open; colour yellow well washed with crimson approaching orange red; predominant colour crimson approaching orange red; seeds medium size, acute to acuminate; dots few, pale yellow, indistinct; skin moderately thick, tender; flesh dull white or yellowish, firm, moderately juicy, somewhat buttery; core medium, flavour subacid, pleasant; quality good; season probably late December to March.

No marked resemblance to Stone. Attractive in appearance. A good winter dessert apple.

DESCRIPTIONS OF VARIETIES OF APPLES ORIGINATED IN THE HORTICULTURAL DIVISION PUBLISHED FOR THE FIRST TIME

Edgar (McIntosh x Forest).—Size Medium to above; form oblate to roundish, conic; cavity open, medium depth, russeted near base; stem medium length, stout; basin shallow to medium, medium width, wrinkled; calyx partly open; colour yellow well washed and splashed with attractive crimson; predominant colour crimson; seeds above medium, broad, acute; dots numerous,

white, distinct; skin moderately thick, tough; flesh dull white tinged with red, tender, melting, juicy; core medium; flavour subacid, springhtly, very like McIntosh; quality good; season probably October to January or later.

Attractive in appearance and good to very good in quality. No marked resemblance to Forest but much like McIntosh in flesh and flavour but flatter in shape.

NORSPY (NORTH WEST GREENING x NORTHERN SPY).—Size above medium to large; form oblate to roundish; cavity deep, open; stem medium length, stout; basin deep, medium width, abrupt, wrinkled; calyx open; colour yellow washed and splashed with carmine; predominant colour carmine approaching orange red; seeds medium size, irregular, acute; dots few, white, distinct; bloom thin, pinkish; skin moderately thick, moderately tough; flesh yellowish, firm, moderately juicy to juicy; core small, open; flavour subacid, pleasant; quality good; season probably late December to March or April.

No marked resemblance to either parent though flavour has a suggestion of Northern Spy. A good keeper.

SPICAP (SEEDLING OF NORTHERN SPY).—Size medium to above medium; form oblate to roundish, regular or slightly ribbed; cavity deep, medium width, russeted; stem medium length, slender to moderately stout; basin open, medium depth to deep, nearly smooth; calyx open; colour yellow well washed with crimson; predominant colour crimson; seeds medium size, acuminate; dots moderately numerous, pale yellow, distinct; skin moderately thick, moderately tender. flesh yellowish with traces of red near basin, crisp, tender, juicy; core medium; flavour briskly subacid, pleasant, high; quality good to very good; season probably late December to March.

Resembles Northern Spy considerably in colour of skin, flesh and flavour. A nice dessert apple.

SPIMAN (SEEDLING OF NORTHERN SPY).—Size above medium; form roundish to oblate, ribbed; cavity deep, open, russeted; stem medium to long, moderately stout; basin deep, open, wrinkled; calyx partly open to open; colour pale yellow washed and splashed with crimson approaching orange red; predominant colour crimson; seeds above medium, acute; dots few, yellow, distinct; skin moderately thick, tender; flesh yellowish, crisp, juicy; core medium size, open; flavour subacid, sprightly, pleasant; quality good to very good; season probably December to March.

Very much like Northern Spy in shape, flesh, and flavour. A little dull in colour.

EXPERIMENTS IN FERTILIZING AND MULCHING TREES AT ABBOTSFORD, P.Q.

During the last five years we have been conducting orchard fertilizer experiments with apple trees, involving the relative value of a nitrogen fertilizer alone as compared with nitrogen combined with phosphate, and nitrogen combined with phosphate and potash. A comparison is also being made of the relative value of nitrate of soda and sulphate of ammonia. The sod and the sod mulch systems of cultivation are also being compared. These experiments are being conducted with the co-operation of the Experimental Farm at Lennoxville in the orchard of Arthur Buzzell at Abbotsford, P.Q. The orchard is composed of blocks of the following varieties, the different fertilizer treatments being repeated in each variety:—

Yellow Transparent, five plots.
Fameuse, ten plots.
Winter Arabka, five plots.
Golden Russet, five plots.
Wealthy, five plots.

The Fameuse plots are composed of twelve trees, three trees deep, four wide. In the other varieties the plots contain but nine trees. The Fameuse plots are divided into two series. In one series 80 pounds of straw per tree is spread around the tree from within a foot to a foot and a half from the trunk to as far as the spread of the branches. This mulch is applied every fall, as well as the grass from the centre of the rows, which is cut and thrown under the trees. By this means a heavy mulch is gradually built up. All the other

Horticultural field laboratory, Abbotsford, P.Q.

plots are in sod; the grass is kept cut but no further mulch is added. The trees are mature twenty-five-year-old trees on a fairly uniform gravelly type of soil. The condition of one or two plots is somewhat modified by the close proximity of forest trees. At the beginning of the experiment all trees were rather lacking in thrift and vigour. The following are a list of the five different fertilizer treatments per tree for each variety:—

1. Nitrate of soda, 6 pounds.
2. Nitrate of soda, 6 pounds; superphosphate, 5 pounds.
3. Nitrate of soda, 6 pounds; phosphate, 5 pounds; muriate of potash, 1 pound.
4. Sulphate of ammonia, 4 pounds.
5. Check plot—no fertilizer.

The fertilizer is applied early in the spring, being spread from a point within one foot of the trunk to about one foot beyond the spread of the branches.

NITROGEN ALONE VERSUS NITROGEN COMBINED WITH PHOSPHORUS AND POTASH

In table I is presented the average tree yield per year in bushels for each variety under the different fertilizer treatments. It will be noticed that nitrate and phosphate or nitrate, phosphate and potash combined give higher yields

per tree in each of the varieties, Yellow Transparent, Russet, and Wealthy, than do nitrate or sulphate alone. The beneficial results obtained from the application of phosphate or potash is much more marked in the variety Wealthy. The tendency of this variety toward a biennial bearing habit presupposes the need of a delicate nutritional balance in order to produce moderate annual crops. In the variety Wealthy the increased yield obtained by the application of potassic and phosphoric fertilizers appears significant. In the varieties Fameuse and Arabka the effect of phosphoric and potassic fertilizers is rather contradictory. In the Fameuse mulch series the addition of superphosphate greatly increased yield, whereas the complete fertilizer plot yield is somewhat below that of the check. With the exception of the variety Fameuse the yields from the check plots were below those of any of the fertilizer plots. Wealthy showed a marked response in increased yield from the application of any of the fertilizers used.

Average girth increase per tree for the five-year period is given in table II. The check plots in each variety are again low. In the average girth increase for all varieties nitrogen with phosphorus and nitrogen with phosphorus and potash gave the largest girth increase. In general, trees receiving potash and phosphorus appeared to be more vigorous; there was also a greater grass growth in these plots. Up to date, however, results are not sufficiently clear-cut to warrant definite conclusions. In this orchard there is a tendency to favour the application of phosphatic and potassic fertilizers along with the nitrogen, although this does not hold for all varieties used. The variety Wealthy shows a more decided and definite response than any of the other varieties.

TABLE I.—YIELD RECORD OF THE BUZZELL ORCHARD, 1925-29

Variety	Plot	Number of trees	Average plot yield per year	Average tree yield per year
			bush.	bush.
Fameuse	Mulch sulphate	11	97·65	8·87
	" nitrate	11	54·6	4·96*
	" N & P	11	121·87	11·01
	" N P & K	11	75·95	6·90
	" check	12	95·075	7·92
	Non mulch sulphate	12	85·25	7·10
	" nitrate	11	66·03	6·00
	" N & P	9	61·525	6·83
	" N P & K	12	83·75	6·97
	" check	12	85·85	7·15
Wealthy	Sulphate	9	54·929	6·10
	Nitrate	9	47·933	5·32
	N & P	8	54·545	6·81
	N P & K	9	73·187	8·13
	Check	8	31·210	3·90
Russet	Nitrate	8	25·187	3·148
	N & P	9	29·15	3·23
	N P & K	9	29·595	3·288
	Check	9	17·137	1·904
Yellow Transparent	Sulphate	7	34·0	4·85
	Nitrate	5	28·7	5·74
	N & P	6	39·37	6·56
	N P & K	6	38·7	6·40
	Check	6	30·37	5·06
Winter Arabka	Sulphate	9	53·0	5·88
	Nitrate	9	61·9	6·87
	N & P	9	56·25	6·25
	N P & K	9	47·30	5·25
	Check	9	50·00	5·55

*This plot is a very poor one, with five of the nine trees possessing only 50 per cent of a normal bearing area. This would account for the low yield.

TABLE II.—BUZZELL ORCHARD—AVERAGE GIRTH INCREASE PER TREE, 1925–29

Variety	Check	Nitrate	Sulphate	N & P	N P & K
	in.	in.	in.	in.	in.
Wealthy	3·179	4·510	5·096	4·590	5·03
Winter Arabka	3·835	4·848	4·260	5·278	5·00
Golden Russet	3·582	4·611	.....	4·820	5·598
Yellow Transparent	4·771	5·430	4·755	5·296	6·275
Fameuse, non-mulch	3·833	5·172	4·949	4·942	4·885
Fameuse, mulch	4·355	4·296	4·978	4·100	5·139
Total	23·555	28·867	24·038	29·026	31·927
Average	3·925	4·811	4·807	4·837	5·321

NITRATE OF SODA VERSUS SULPHATE OF AMMONIA—AVERAGE YIELD PER TREE FOR ALL VARIETIES

Treatment	1925	1926	1927	1928	1929	Average
	bush.	bush.	bush.	bush.	bush.	bush.
Nitrate of soda	5·25	11·97	1·04	10·3	2·25	6·16
Sulphate of ammonia	4·70	11·97	1·15	10·8	2·30	6·18

The average yield per tree for five years is practically identical for the two fertilizers. The average girth increases as found in table II are also similar. In this orchard sulphate of ammonia appears to be a suitable fertilizer.

A COMPARISON OF THE SOD AND THE SOD MULCH SYSTEMS OF CULTIVATION

These two methods of cultivation are being compared with mature trees of the variety Fameuse, five fertilizer plots of twelve trees each being used in each method.

AVERAGE YIELD PER TREE

Treatment	1925	1926	1927	1928	1929	Average
	bush.	bush.	bush.	bush.	bush.	bush.
Sod	2·29	15·02	1·48	13·5	1·75	6·80
Sod mulch	9·10	8·52	5·64	8·37	8·53	8·03

The most outstanding effect of the mulch treatment appears to be the establishment of a moderate annual crop in contradistinction to the distinctly biennial habit of the sod plots. The average yield for a five-year period is in favour of the mulch, although if the yield for 1930 were available the average would probably be about the same. The annual crop on the mulch plots may be considered to be close to an optimum crop in order to secure good size and quality and leave the tree in a good state of thrift. In general, the trees on the mulch appear to possess greater vigour and better condition than the trees on the sod area. The check plot on the sod area is distinctly inferior to the check plot on the mulch.

Each year a bushel of tree-run fruit from each plot was sorted into three grades, according to size. Below is given the average per cent in each grade:—

Treatment	I	II	III
	%	%	%
Check mulched	41·3	41·5	17·2
Check sod	15·5	60·9	25·2
Nitrate mulched	56·6	36·2	7·2
Nitrate sod	5·0	39·9	55·1
Sulphate mulched	35·3	39·2	25·5
Sulphate sod	30·1	52·3	17·6
Complete mulched	37·6	37·6	24·6
Complete sod	28·8	43·4	27·7

In all cases the mulched plots have the highest percentage of fruit grading No. 1 for size and, in general, the highest percentage grading No. 3 for size are found in the sod plots. The difference between the two check plots in the percentage of grade I is very marked. The nitrate sod plot is very low in grade I fruit, while the nitrate mulch plot has very good size.

The fruit was also graded for colour in the following order:—

1. Check sod.
2. Check mulched.
3. Sulphate sod.
4. Nitrate mulched.
5. Complete mulched.
6. Sulphate mulched.
7. Complete sod.

More definite and consistent response may be expected as the treatment is continued. It is proposed to continue these tests for an additional five-year period, during which period progress reports will be made as knowledge of significant facts warrants. Additional tests have been initiated in a young orchard, comparing the value of various synthetic fertilizers, spring as compared with fall applications of fertilizer and the comparative value of nitrate of soda and sulphate of ammonia.

STUDIES IN APPLE POLLINATION

The problem of ensuring adequate pollination is one of the considerations to be taken into account when planning new plantings. Although some of our varieties have been proven to be partially self-fruitful, as a general rule additional pollinators are required to be sure of a commercial crop. Even mixed planting does not always ensure an adequate set, since all varieties may not prove suitable pollenizers one with the other. This may be due to one or several reasons, difference in the time of blooming, insufficient supply of free pollen, pollen of low germinability and the incompatibility of one variety of pollen to complete fertilization of another.

From time to time various phases of the pollination question have been studied at Ottawa. From these studies we have gained a general, if incomplete, knowledge of the compatibility and value as pollinators of some of our standard varieties. From work done in 1923 and 1924 we gather that Wealthy, with a large amount of free pollen, is a satisfactory pollinator for Duchess, Fameuse, Pedro, and McIntosh; that Fameuse has a small amount of free pollen and that as a pollinator it ranks considerably below Duchess; that Duchess is a satisfactory pollinator for Wealthy. In regard to self-fertility studies we find that Pedro, Melba, and McIntosh are reported as completely sterile in 1922, but in 1923 Melba and McIntosh are reported as having a fairly high degree of self-fertility. That our conclusions have not been more definite and our results more consistent may be due to the fact that we have been unable to deal with the problem in comprehensive fullness and that the duration of our study has been short.

It is for the purpose of gathering further necessary information in regard to the pollination value of the standard varieties and also of the more newly introduced varieties, such as Melba, Joyce, Pedro, Lobo, Lawfam, etc., that we have undertaken a pollination study at Abbotsford with the intention of continuing the study for a period of five years. It is intended to work with the following varieties: McIntosh, Fameuse, Wealthy, Duchess, Melba, Lobo, and Russet, as well as Joyce, Pedro, Lawfam, etc., if found available.

In order to carry on this work we had need of a small laboratory, which the Quebec Department kindly provided for our use.

Cause of sterility may be due to one or several reasons: (1) Difference in the time of blooming, pollen not being available when the pistil is receptive; (2) insufficient supply of free pollen, e.g., Fameuse; (3) pollen of low germinability and low rate of pollen tube growth; and (4) the incompatibility of one variety of pollen to produce complete fertilization of another variety. These factors, together with those of general weather conditions, presence of insect pollenizers and general thrift of trees used, must be considered singly and together.

We will first consider factor 1—a comparison of the blooming dates of the different varieties and the period during which the pistil is receptive. In co-operation with some of the growers, blooming dates were secured for the different varieties from Abbotsford, Rougemont, Chateauguay, St. Hilaire, and

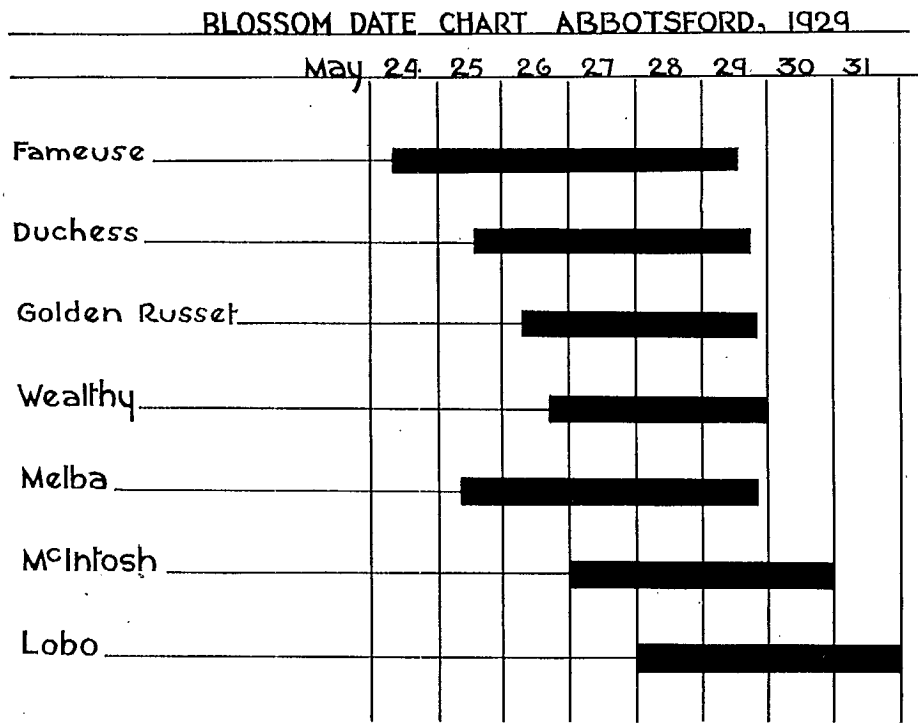
Hand pollination of apples.

Hemmingford. It will be seen from the prepared chart that in the Buzzell orchard at Abbotsford the entire centre bloom of the Fameuse was open a day and a half to two days before those of any other variety. Although commencing to bloom earlier than any other variety, the progress to full bloom was relatively slow as compared with some of the other varieties. In this variety a few central bloom were open on the 24th, 75 per cent of the central bloom were open on the 25th, and liberating pollen very early on the 26th. Full bloom was not recorded until the 28th, with the petals beginning to fall on the 30th. The most effective period of Fameuse as a pollinator would probably be from the 26th to 29th inclusive.

Fameuse was closely followed by Melba. A few central bloom were open on the 25th; all central bloom on the 26th; pollen was being liberated on the 28th, with full bloom recorded the morning of the 29th. Petals began to fall on the 30th. Effective as a pollinator from the 28th to 30th.

Duchess had practically the same blooming dates as Melba, reaching full bloom slightly more quickly. Effective as a pollinator from 27th to 30th. Russet followed Duchess with centre bloom all open on the 27th and liberating pollen, with laterals beginning to open. Full bloom recorded on the 28th. Effective as a pollinator from the 28th to 30th.

The blooming dates for Wealthy were practically identical with those of Golden Russet. McIntosh variety was very slow in coming into bloom; about 30 per cent of the central bloom was open on the 27th, fully three days after Fameuse. On the 28th the bloom on the McIntosh came very rapidly and full bloom was recorded on the 29th. Available as a pollinator 28th to 30th.



Blossom date chart, Abbotsford, 1929.

The one tree of Lobo on which we have record at Chateauguay did not commence to bloom until the 28th and did not reach full bloom until the 31st. Effective as a pollinator from 28th to 31st.

At Rougemont bloom began to open on the following varieties in the order named: Fameuse, Duchess, Melba, Russet, Wealthy, McIntosh, and Lobo, there being an interval of three days between the first and the last to commence blossoming. The first four varieties named came into full bloom practically the same time, followed closely by Wealthy. At Chateauguay the blooming dates varied slightly—Duchess began to open their bloom first, followed closely by Fameuse, Melba, Wealthy, and McIntosh. Lobo did not commence to open bloom until the previous four were in full bloom.

Although there was an interval from one to three days between the opening of the central bloom of the different varieties, sufficient overlapping occurred in most cases to prevent this from being a negative influence. The tempera-

ture was such that, irrespective of the commencement of bloom, full bloom was reached at the same time. Bloom had commenced to open in the Fameuse fully three days before any other of the varieties commenced to liberate pollen, so it is possible that a considerable percentage of the central bloom of this variety would lack pollination. This season the blooming dates of Fameuse and McIntosh appear to be too widely separated for them to be good reciprocal pol-

FEMALE

MALE: VARIETIES	FAMEUSE % SET	FAMEUSE % HARVEST	McINTOSH % SET	McINTOSH % HARVEST	MELBA % SET	MELBA % HARVEST	DUCHESS % SET	DUCHESS % HARVEST	WEALTHY % SET	WEALTHY % HARVEST	RUSSET % SET	RUSSET % HARVEST
DUCHESS	22·7	17·3	4·0	2·6	13·5	9·8	7·5	0	13·8	4·6	18·2	6·6
WEALTHY	14·7	5·9	6·4	4·2	20·0	11·4	11·6	6·2	8·0	3·2	17·0	3·4
RUSSET	16·9	7·8	4·3	3·4	12·1	7·8	20·8	13·3	4·1	1·9	6·9	2·4
FAMEUSE	0·0	0·0	10·4	7·1	12·4	7·8	13·7	9·4	14·9	7·45	14·1	1·9
McINTOSH	18·1	5·7	3·8	1·6	9·8	6·2	31·2	22·5	13·0	2·8	18·2	5·4
MELBA	21·5	8·2	13·0	2·6								
LOBO			11·5	7·0					15·8	7·0		
ASTRACHAN					29·6	19·5						
SELFED	0·0	0·0			3·2	0·0	0·4	0·0				
OPEN POLLINATION	19·6	10·7	9·0	5·4	17·1	9·1	16·1	6·7	13·7	6·2	13·0	5·4
BAGS UNOPENED	0·0	0·0	0·0	0·0			1·1	0·0	0·0	0·0	0·0	0·0

Results from hand pollination of apples at time of set count and harvest.

lenizers. This indication is further strengthened when we consider the small amount of free pollen liberated by Fameuse. The indications are that Lobo comes into bloom too late to act as an effective pollenizer for any variety, with the exception of McIntosh.

Owing to the rush of work we found ourselves unable to take adequate notes on the date and duration of pistil receptivity, but hope to be able to do this the coming season.

POLLEN PRODUCTION

Very marked differences occurred in the amount of free pollen liberated by different varieties. Duchess was especially good in this regard, liberating dense clouds of free pollen when a bag was removed from a cluster. Russet and Melba were also good pollen producers, as was also Wealthy. McIntosh and Fameuse were somewhat wanting in this respect, Fameuse especially having a marked paucity.

Apple pollen, showing high germination.

CROSS-COMPATIBILITY TESTS

The ability of the viable pollen of one variety to fertilize the flower of another when applied to the receptive pistil under suitable conditions.

For this purpose clusters were bagged before opening to prevent open pollination. Unopened flowers of the various varieties were gathered, carried into the laboratory and the pollen ripened by gentle heat. The germinability of the pollen was tested and observed under the microscope. Pollen not showing suitable germination was discarded. When the pistils were observed to be receptive the pollen was applied with a brush, the bag replaced and a tag attached to the cluster, bearing the number of blossoms fertilized, the date and the name of the varieties concerned in the cross. After the petals had fallen and all danger from pollination had passed the bags were torn open. A record of the set and the number of fruit harvested was taken.

From these results there does not appear to be a lack of compatibility between any of the varieties used.

On Fameuse a very good set was obtained by all the varieties, with Duchess and Melba being slightly the best. Per cent set from open pollination gave a slightly lower average set than the average hybridization set.

Using McIntosh as a female, very poor set was obtained with Duchess, Wealthy, and Russet. Satisfactory set was obtained with Fameuse, Lobo, and Melba. Owing to the fact that the pollen used for the hybridization of McIntosh was somewhat old and of not proven germination these results must not be accepted until checked. The per cent set from open pollination is much less than recorded from any other variety.

All varieties produced a fairly good set on Melba, with McIntosh being somewhat the lowest. Count from open pollination was much higher than that recorded from any one variety.

Very good set was obtained with Duchess, employing any of the varieties as males.

Fair set was obtained on Wealthy, with the exception of Russet.

SELF-FERTILITY TESTS

In order that our self-fertility tests should be as thorough as possible, three different methods were employed.

1. Clusters were bagged before opening, to prevent open pollination, and then left to pollinate themselves. Under such conditions there is no absolute assurance that the pollen has actually reached the pistil, so that negative results are not conclusive. When bags were unopened all varieties under this method appeared totally self-sterile.

2. Clusters were bagged as before, but pollinated at various intervals by brushing the pollen across with a brush or the finger. This method has the objection that in apples the pistil may be ready for pollination previous to the liberation of the pollen. Employing this method, Fameuse was again totally self-sterile, Duchess practically so, while Melba gave a small per cent set.

3. Clusters bagged as before, but pollinated upon receptivity with pollen from the same variety, ripened in the laboratory.

Fameuse was again absolutely self-sterile, McIntosh gave a small per cent set, but not high enough for a commercial set. Duchess gave a per cent set equal to about 50 per cent of the open pollination set. None of the fruit set in this case persisted until harvest. Wealthy gave a fairly satisfactory set, as also did Russet, but in neither case did the set approach the set of the open pollination count.

This is intended merely as a general description of the work being undertaken and to give an idea of the knowledge sought for. It is intended to check this work for three or four years and to correlate more of the factors involved, which we were unable to do this past season.

NUTRITIONAL STUDIES WITH TOMATO

Our nutritional work with strawberries has provided us with a conception of the necessity of balance between the different plant food elements in plant nutrition. We have also gained knowlege of a diagnostic value concerning the effect of various deficiencies, notably nitrogen, phosphorus, and potash. It was thought that we might gain further symptomatic knowledge concerning deficiencies and the inter-relations of the different elements in promoting growth and yield.

Johnson and Hoagland, working with tomato plants, have reported that the leaves on low-potassium plants exhibited dark brown spotting; that the optimum potassium concentration was found to be five parts per million.

Janssen and Bartholemew, working with the same plant, found that when potassium starvation occurs in the plant there is a retardation in growth rate, the leaves take on a dark green colour and become wrinkled, the stems are streaked with a brownish-purple colour, the lower leaves wither in large numbers; that a large amount of potassium ion is taken up in the early stages of growth, which may be moved from one region of the plant to the other as needed; that nitrogen and potassium seem to have an inverse relationship; and that wherever a high percentage of potassium is found in the plants a low percentage of nitrogen is likely to occur.

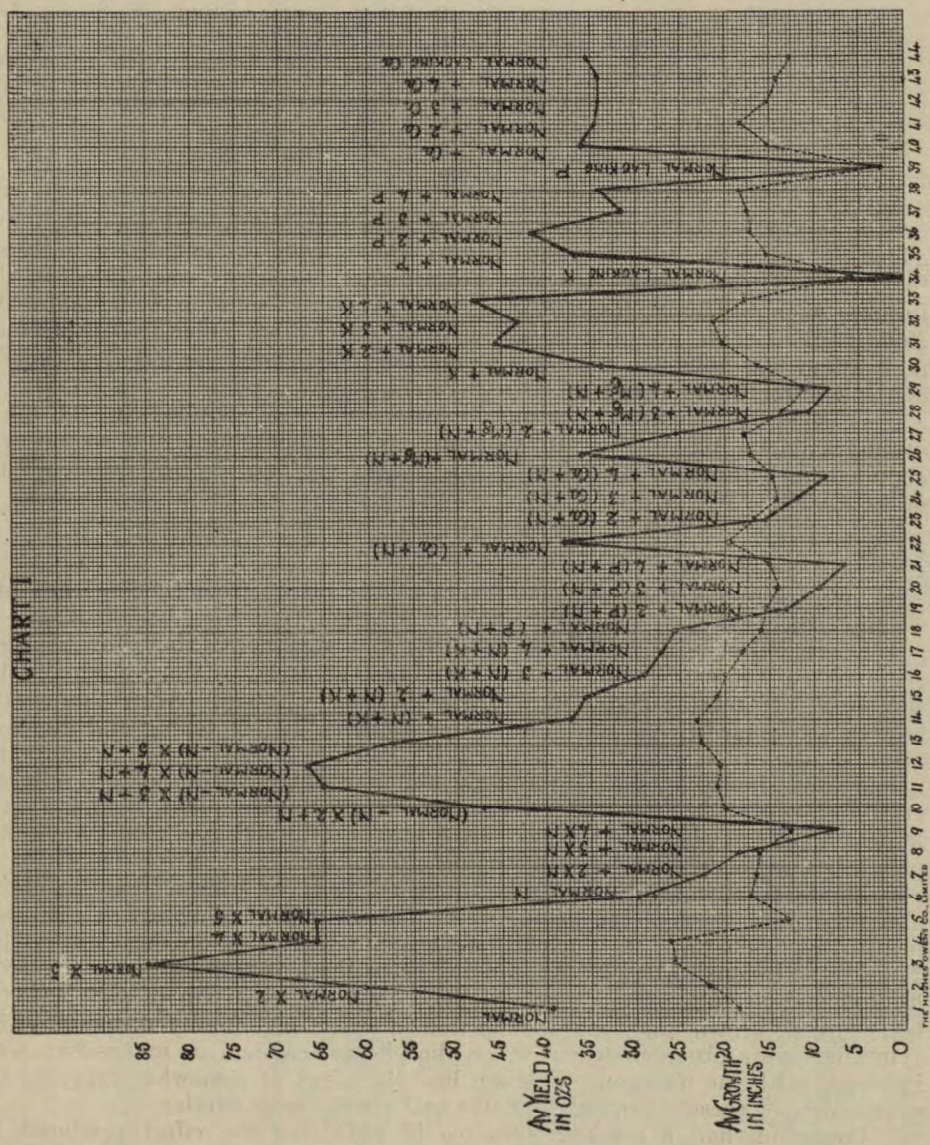
METHODS

Bonny Best tomato plants were used in this work. The seed was sown in soil in pots and pricked out into 2½-inch pots after three weeks' growth. When three to four inches high they were lifted, the soil washed off and transplanted into 5-inch pots in ground sandstone, practically devoid of any nutritional elements. Five plants were included in a series. After the experiment had been under way for some time they were repotted in 7-inch pots.

Following are the different nutrient solutions employed:—

I Normal solution.
II Normal solution x 2.
III Normal solution x 3.
IV Normal solution x 4.
V Normal solution x 5.
VI Normal solution + nitrogen.
VII Normal solution + 2 x nitrogen.
VIII Normal solution + 3 x nitrogen.
IX Normal solution + 4 x nitrogen.
X (Normal solution — nitrogen) x 2 + nitrogen.
XI (Normal solution — nitrogen) x 3 + nitrogen.
XII (Normal solution — nitrogen) x 4 + nitrogen.
XIII (Normal solution — nitrogen) x 5 + nitrogen.
XIV Normal solution + (nitrogen + potassium).
XV Normal solution + 2 (nitrogen + potassium).
XVI Normal solution + 3 (nitrogen + potassium).
XVII Normal solution + 4 (nitrogen + potassium).
XVIII Normal solution + phosphorus + nitrogen.
XIX Normal solution + 2 (phosphorus + nitrogen).
XX Normal solution + 3 (phosphorus + nitrogen).
XXI Normal solution + 4 (phosphorus + nitrogen).
XXII Normal solution + calcium + nitrogen.
XXIII Normal solution + 2 (calcium + nitrogen).
XXIV Normal solution + 3 (calcium + nitrogen).
XXV Normal solution + 4 (calcium + nitrogen).
XXVI Normal solution + magnesium + nitrogen.
XXVII Normal solution + 2 (magnesium + nitrogen).
XXVIII Normal solution + 3 (magnesium + nitrogen).
XXIX Normal solution + 4 (magnesium + nitrogen).
XXX Normal solution + potassium.
XXXI Normal solution + 2 potassium.
XXXII Normal solution + 3 potassium.
XXXIII Normal solution + 4 potassium.
XXXIV Normal solution lacking potassium.
XXXV Normal solution + phosphorus.
XXXVI Normal solution + 2 phosphorus.
XXXVII Normal solution + 3 phosphorus.

XXXVIII Normal solution + 4 phosphorus.
XXXIX Normal solution lacking phosphorus.
XL Normal solution + calcium.
XLI Normal solution + 2 calcium.
XLII Normal solution + 3 calcium.
XLIII Normal solution + 4 calcium.
XLIV Normal solution lacking calcium.



Stock Solutions

$MgSO_4$ $7H_2O$—50 g. in 2,000 cc. water.
KH_2PO_4—40 g. in 2,000 cc. water.
KCl—15 g. in 2,500 cc. water.
$CaCl_2$—115 g. in 6,000 cc. water.
NH_4NO_3—360 g. in 1,000 cc. water.
KNO_3—15 g. in 1,000 cc. water.
$MgNO_3$—10 g. in 1,000 cc. watere.

Amount of Stock Solution made up to 5,000 cc. to make a Normal Solution

$MgSO_4$ $7H_2O$—14·5 cc. containing 0·070 g. of magnesium.
KH_2PO_4—14·5 cc. containing 0·249 g. of potassium.
KCl—3·5 cc. containing 0·487 g. of calcium.
$CaCl_2$—14·5 containing 1·204 g. of nitrogen.
NH_4NO_3—29·0 cc. containing 0·093 g. of sulphur.
0·130 g. of phosphorus.
0·936 g. of chlorine.

In solutions requiring excess of certain elements additional potassium was added in the form of potassium nitrate, the nitrate content being adjusted to agree with the normal solution. Additional phosphorus was added in the form of monocalcium phosphate, the calcium in the solution being adjusted. Additional calcium was added in the form of calcium chloride. Additional magnesium was added in the form of magnesium nitrate, the nitrogen content of the solution being adjusted.

In solutions lacking potassium, phosphorus was supplied in the form of monocalcium phosphate. In solutions lacking phosphorus, potassium was supplied in the form of potassium nitrate. Every second day 150 cc. to 200 cc. of solution was fed to each pot.

QUALITATIVE DATA

Notes were taken on the appearance of the plants from time to time and a summary of these is given.

Dealing first with the normal solutions, it was noted that, for the first six weeks of the experiment, plants receiving four and five times normal solution were the most vigorous and made the most growth. After this period growth was retarded, mottling of the upper leaves and blotching and discoloration of the stems occurred. From this time on greater growth and better vigour was shown by plants receiving two and three times normal solution. It would appear from our observations that the tomato plant is able to use large amounts of plant food in the earlier stages of growth and that its requirements become somewhat less toward the fruiting period.

Plants receiving solutions containing nitrogen in excess first exhibited abnormal dark green foliage along with poor growth and vigour. Later dark brown lesion-like patches appeared on the main stems and on the leaf petioles. Finally the lesions turned black; in many cases the leaf petioles became entirely girdled and necrotic, the lesions extended into the main rib of the leaf, the leaf turned brown and the leaf petiole drooped and finally dropped. Like symptoms were observed when either phosphorus, calcium or magnesium were increased with the nitrogen. Calcium had the effect of somewhat delaying the appearance of these symptoms, but the end results were similar.

Potassium had a marked influence in nullifying the effect produced by excess nitrogen. The plants lacked vigour, were abnormally dark green in colour and showed a slight amount of stem lesions, but the extreme discolor-

ation and necrotic condition of the stem and petioles, followed by the drop of leaves, did not occur. Apparently the nitrogen-potassium relationship in the solution has a marked effect on the ability of the plant to absorb or make use of nitrogen.

Series in which all elements were in excess, with the exception of nitrogen, were fairly vigorous and healthy, somewhat light green in colour with rather slender type of growth.

Series receiving excess potassium were fairly strong and vigorous, of good colour but slender in growth, with the leaves spaced somewhat far apart.

Series receiving excess phosphorus were somewhat lacking in vigour, rather pale green in colour.

Excess or lack of calcium appeared to have but little effect.

Lack of potash was evidenced by almost absolute lack of growth purpling of the under surface of the leaves, with the upper surface muddy green. The older leaves faded to a brown purplish-green, with purple veins and the leaves curled downward toward the stem.

Lack of phosphorus produced somewhat the same symptoms but the leaves became more transparent, the chlorophyll disappeared.

GROWTH AND YIELD RECORDS

Series	Height of stem	Weight of fruit	Series	Height of stem	Weight of fruit
	in.	oz.		in.	oz.
1	18·7	39·4	23	16·6	15·3
2	21·9	61·4	24	14·1	12·2
3	26·7	84·9	25	14·6	8·6
4	26·4	66·0	26	17·1	36·3
5	13·0	66·1	27	17·8	25·3
6	17·5	29·3	28	13·6	10·7
7	16·8	22·5	29	11·2	8·9
8	16·8	18·5	30	16·1	34·4
9	11·8	7·9	31	20·1	45·7
10	20·0	47·0	32	21·0	43·4
11	21·0	65·0	33	18·0	48·4
12	20·5	65·4	34	5·4	
13	22·7	56·9	35	15·5	36·9
14	23·4	37·5	36	17·1	41·7
15	21·0	35·9	37	17·5	30·2
16	19·8	29·4	38	18·3	34·6
17	18·4	27·1	39	4·3	2·3
18	16·0	25·7	40	15·3	36·4
19	15·5	13·2	41	18·3	34·9
20	14·3	9·6	42	15·3	34·6
21	15·0	6·7	43	14·0	34·2
22	19·6	37·6	44	12·8	35·1

In an examination of the growth and yield records, as recorded in the above table and in chart I, it will be observed that the maximum production is obtained in series III, receiving three times normal solution. Further increase in concentration causes a decrease in growth and yield, but still remaining above that of the normal solution.

Increase of nitrogen brings about a very large decrease in growth and yield. This is true whether the nitrogen alone is increased or whether it is increased together with either phosphorus, calcium, magnesium or potassium.

It will be noticed that the lowest points in yield and growth occur in series 8, 9, 20, 21, 24, 25, 28 and 29, receiving excess quantities of nitrogen. When potassium and nitrogen are increased together the decrease in growth and yield is much less than when nitrogen alone is increased.

Increasing all the elements, with the exception of nitrogen, brings about considerable increase in yield and growth, as compared with the normal solution, but does not equal that produced by three times normal solution.

Where phosphorous or potassium are not supplied, growth and yield are reduced to a minimum. The low points in yield correspond with the low points in growth.

SUMMARY

(1) A study was made of the relationship of calcium, phosphorus, potassium or magnesium to nitrogen on the growth and yield of the tomato plant in pure sand; also the effect of phosphorus and potash starvation.

(2) A normal solution having a total salt concentration of 0.0525 produced the best growth and yield response.

(3) Excess nitrogen brought about a large decrease in growth and yield, the plants were stunted in growth and lesions occurred on the stem and leaf petioles. In many cases the leaf petioles became necrotic, the lesions extended into the main rib of the leaf, the petioles drooped and finally dropped off.

(4) Potassium had a marked influence in lessening the effect produced by excess nitrogen.

(5) Lack of potash was evidenced by almost absolute lack of growth, purpling of the under surface of the leaves, with the upper surface muddy green. The older leaves faded to a brown purplish-green, with purple veins, and the leaves curled downward to the stem.

(6) Lack of phosphorus produced symptoms very similar to those produced by potash starvation. There was not quite so much purpling of the leaves, the chlorophyll disappeared and the leaves became transparent-like.

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VEGETABLE GARDENING

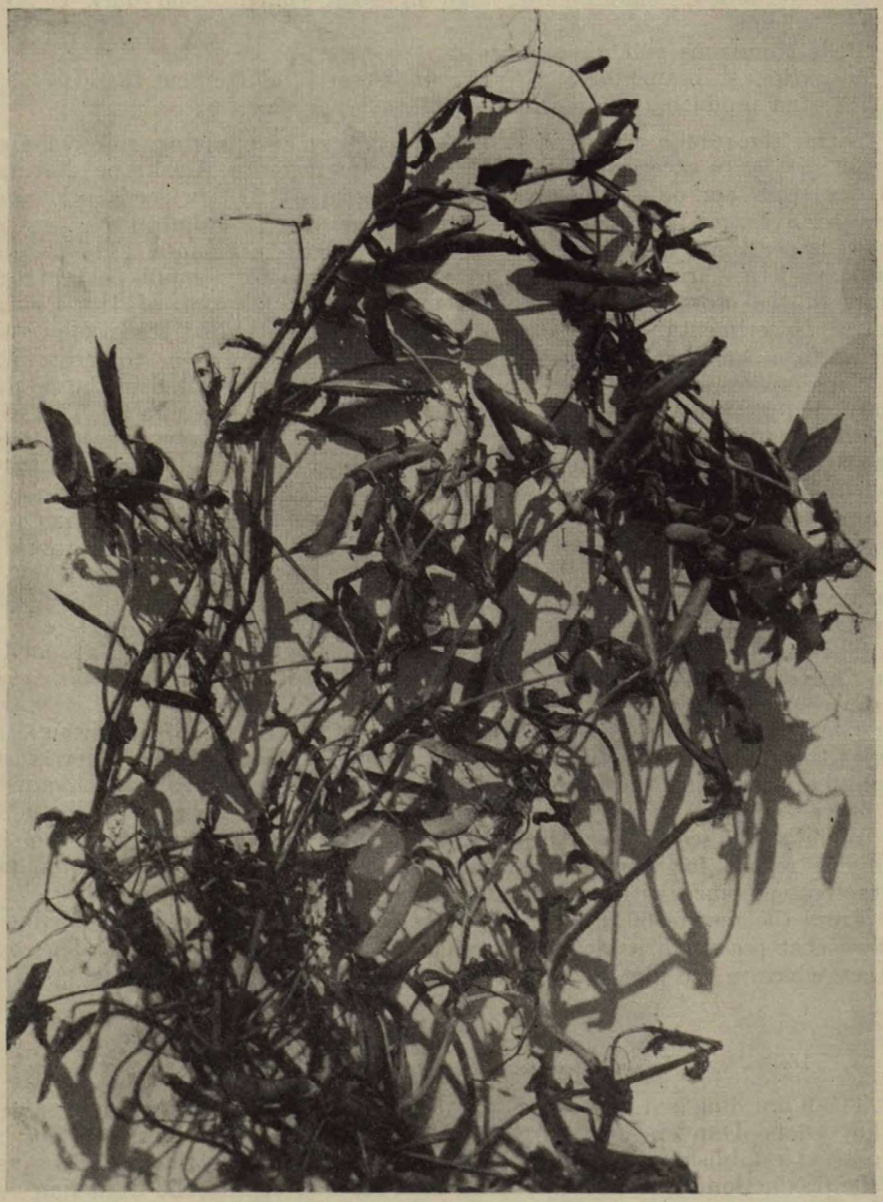
SEASONAL REMARKS

The season of 1929 opened with great promise for a favourable early spring. The first seeding of onions out-of-doors was done April 24, but the weather became wet and cool for a few days, then becoming very spring-like again when seeding was resumed. In May, frost occurred between the 19th and 20th, which was severe enough to damage early field planted cabbage and cauliflower; and during the first and last weeks of June cool conditions prevailed that checked the growth of the tender crops considerably. The nights were quite cool with warm bright days. From July 8 to 27 a severe spell of dry weather occurred, which was broken by a heavy rain storm, and on August 10 another heavy rainstorm occurred which was followed by a severe drought until the end of the month and on into September. The first killing frost was recorded September 19, when a series of frosts occurred until the 24th of the month, when warm weather returned but accompanied with some rainstorms.

In the opening pages of this report the meteorological records are given in detail.

PEA BREEDING

The pea crop is one of considerable importance to the canning industry of Canada, and the time is fast coming when our own small sized, home grown peas, canned in Canadian canneries will be in a position to compete with the foreign product that is so highly prized. During the past few seasons breeding work has been under way, with the aim in mind to produce a variety of peas that will come close to the number one size, even when the peas are fully matured. As, no doubt, the consumer knows, that the small sized peas are very



Pea breeding—A portion of a 30-inch hybrid pea vine. This is one of the vines of the cross Winged Sweet x Pois de Roston. It has proved very productive.

immature, possessing very little food value, therefore, the amount of peas of the number one grade cannot be very large from a crop of Thomas Laxton, Horsford Market Garden or Green Admiral, since the fully matured seed of these varieties is relatively large. Where Alaska or any of the smooth varieties are used, they naturally are peas of poor quality and possess a low sugar content, which results in a canned product of inferior quality.

Pea breeding was commenced with the object to produce a variety that would conform to the following specifications:—

Seed-Wrinkled, small in size, high in sugar content, and dark green in colour.

Pods-Numerous and of fair size.

Vine-Robust, branching and free from disease ranging about three feet high and producing a large number of pods per vine.

So far the results of this work have been very encouraging, since many of hybrid sorts have exeeeded the expectation. For instance, Alaska peas average 163 dry seeds per ounce, Thomas Laxton averages 125 dry seeds per ounce, Advaneer averages 153 dry seeds per ounee, Green Seeded Admiral averages 200 dry seeds per ounee and Horal averages 205 dry seeds per ounce. The two last named varieties are really the nearest to a satisfactory small pea, but the results of the crosses that have been made in the Division of Horticulture, Central Experimental Farm, exeeed any of the above dry seed counts and weights to a considerable extent.

Such crosses as White Sweet x Pois de Roston have resulted in the production of segregations, the seed of which ran 497 dry seeds per ounce. The seeds are well wrinkled and in the green state are found to be very sweet. These segregations are intermediate in height and from the field test proved to be much hardier than any of the wrinkled varieties grown alongside. The pods are produced mostly in pairs or twins, thus producing a large number of pods per vine.

Thomas Laxton x English Wonder cross has resulted in the produetion of a heavy yielding dwarf type that produeed seed of smaller size than either parents.

The vines range about 19 inches high and have been found to produee as many as twenty-six pods per vine that were filled with very tender, dark green sugary peas.

These two crosses cited are representative of the results of numerous other crosses that have been made with other varieties. Many of the other crosses having been made for the purpose of combining some factor with the factors of the other variety.

While small seeded varieties have been uppermost in mind, yet there has been due regard for any segregation possessing large pods or desirable vine characters combined with good quality and yield.

From the results of the progeny tests this past season it is reasonable to believe that the small seeded heavy yielding hybrids will give a good account of themselves in the plot tests next season.

ONIONS

IMPROVEMENT OF COMMERCIAL STOCK

The inbreeding and improving of two commercial varieties of onions, namely, Yellow Globe Danvers and Large Red Wethersfield, was undertaken for the purpose of establishing pure line strains of these two sorts, that could be used for the produetion of seed stoek eligible for registration with the Canadian Seed Growers' Association. The stock that is now in process of multiplication has been found to be very uniform and promises to be of value to seed growers.

BREEDING NEW VARIETIES

By crossing such varieties as White Barletta with varieties like Cranston Excelsior, Sweet Spanish, Early Flat Red, Red Wethersfield and Denia it is hoped to obtain early maturing varieties possessing good quality and keeping qualities coupled with disease resistance.

During the past season seed of a large number of cross-bred onions was sown and in the autumn a great many splendid onions were harvested some of which gave promise of fulfilling at least one, and in other cases more, of the purposes for which they were crossed.

ONION ROOT MAGGOT CONTROL

Several methods of control have been tried during past years most of which proved very inadequate.

One method that was tried was the sodium arsenite solution, commonly known as poisoned bait. It consisted of a solution of sodium arsenite sweetened with molasses, and placed in shallow pans, with the pans spaced about sixteen feet apart each way in the field. It is very important to have the pans with the poisoned solution in place when the first flies emerge to commence egg laying, since the idea is to poison the flies as rapidly as possible before egg laying commenced.

The solution is made up as follows: ½ ounce arsenite of soda dissolved in one gallon of water to which is added one pint of molasses.

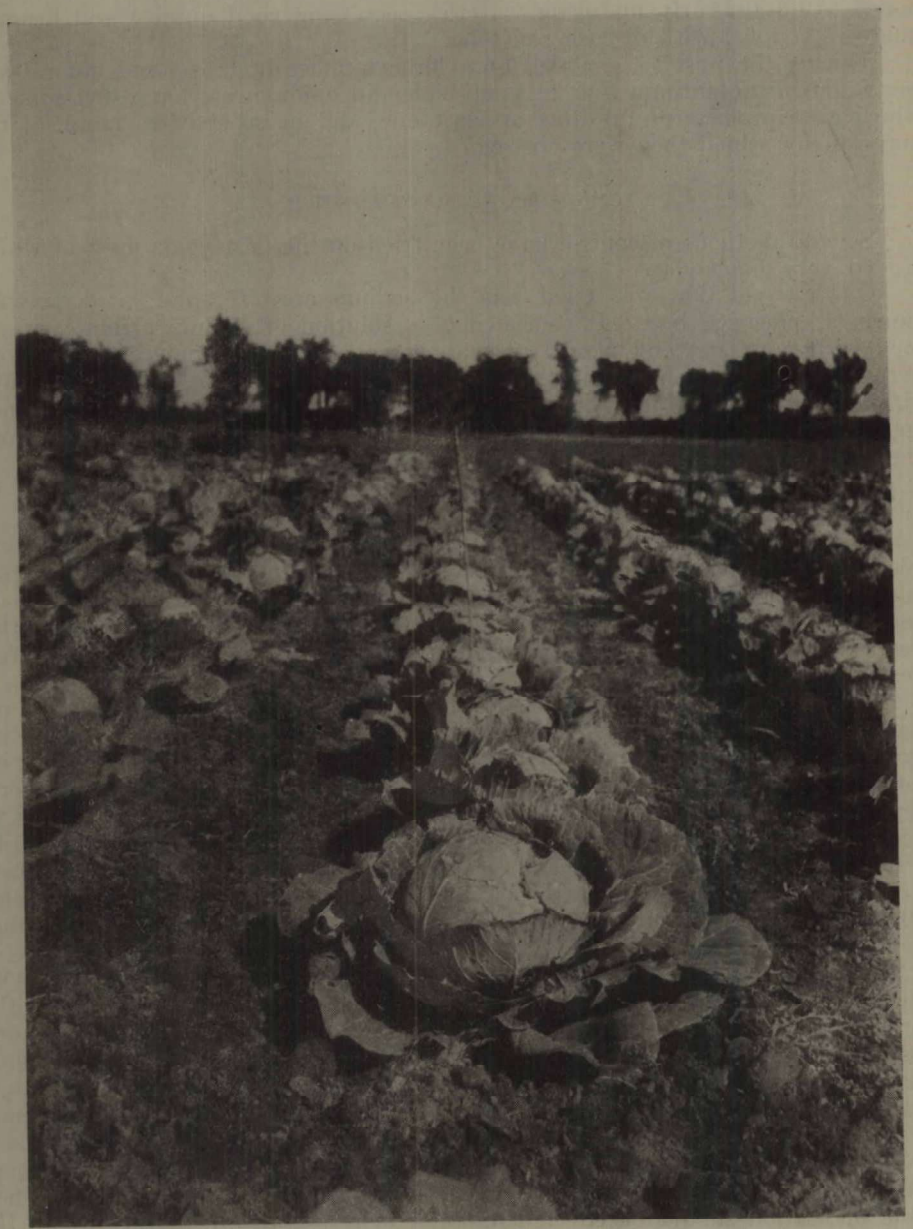
It was found that while there may have been some benefit from this poisoned bait yet there was always too heavy a loss, particularly during those seasons when onion root maggot was really bad. For the grower of a small amount of onions this type of protection might be found helpful since the preparation and application of the remedy is relatively easy, but for the large area it was found inadequate.

Trap crops is another method that has been tried which gave only fair results. This method consisted of placing boxes with screen wire bottoms at regular intervals in the onion plantation. Then old onions that had been in storage over winter and were well sprouted were placed in these boxes, where they took root in the soil through the screen wire. These old onions acted as a decoy to the flies, where they laid their eggs. When the old onions were full of the maggots they were taken up and destroyed by burning. Then another lot of old onion were placed in the boxes. This method was not found entirely satisfactory, but certainly helped to attract the flies away from the young onion seedlings.

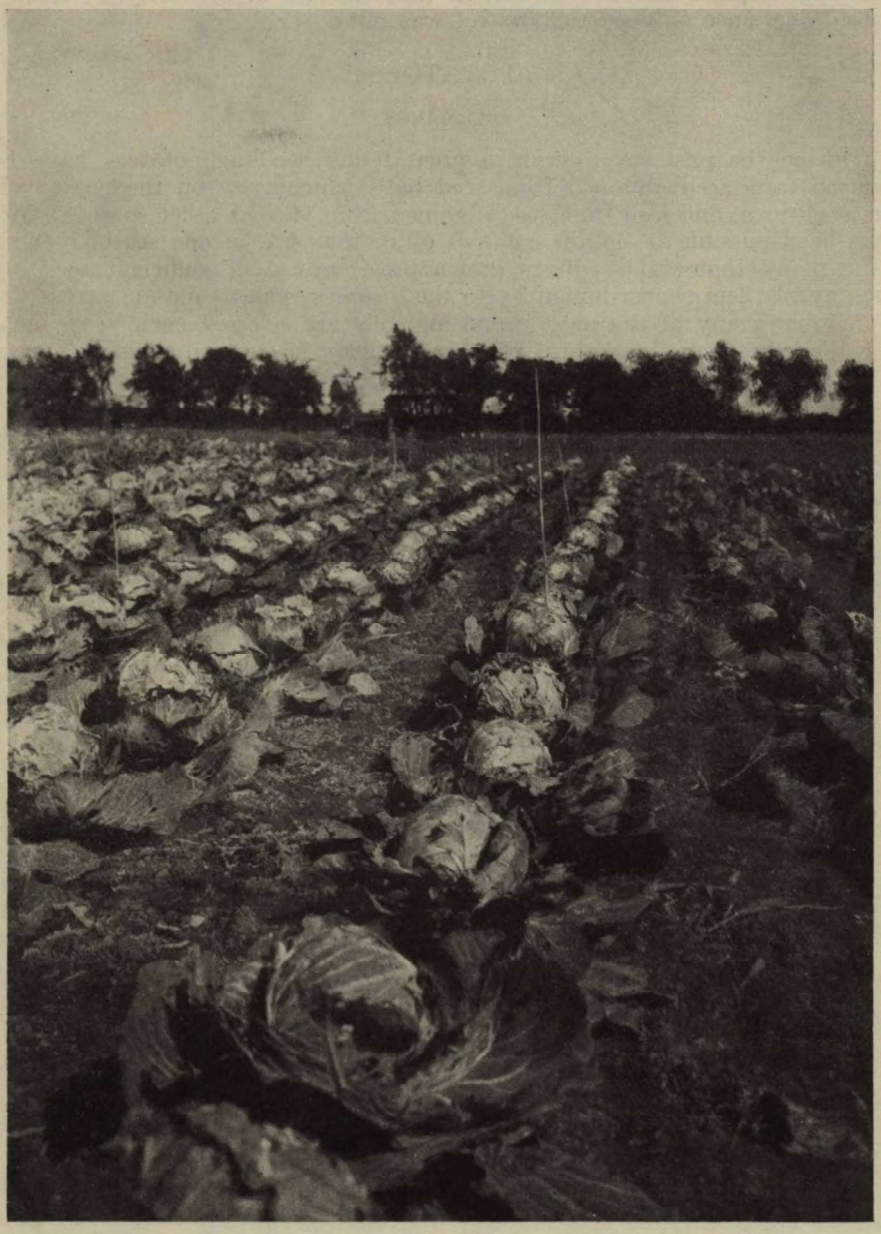
Bordeaux oil emulsion is probably the most effective method of onion root maggot control tried yet. This consists of emulsifying crank case oil with Bordeaux mixture. The two per cent oil Bordeaux emulsion has been found most effective. One gallon of good crank case oil emulsified with an equal amount of Bordeaux mixture, by passing the solution through a force pump and small nozzle can be made up to 50 gallons of spray by adding the emulsion to 48 gallons of Bordeaux mixture.

To apply this solution high pressure should be employed, anywhere from 150 to 250 pounds per square inch is recommended, using fine nozzles. The whole plantation should be covered and not merely sprayed on the rows. It requires at least 115 gallons at each application to properly spray an acre, and from four to six applications put on at intervals of ten days apart. The first spray should be applied when the onions are about one inch high.

Bordeaux oil emulsion has been found very effective during two seasons out of three. The one season that it did not seem as effective was probably due to insufficient pressure on the nozzles.



Cabbage breeding—in-bred Golden Acre cabbage. This strain is short stemmed with broad saucer-shape leaves, with the heads set low in the leaves. The leaves are quite deep green with well defined vines.



Cabbage breeding—in-bred Golden Acre cabbage. This strain is longer shanked than the one on the previous page, with the heads well above the leaves. The heads are more rounded. The leaves are quite light green in colour with coarse vines.

This method may seem cumbersome, but once a grower learns how to prepare the materials it is an easy matter to apply the spray.

Mercuric chloride has been tried with varying results, in the control of onion root maggot and it would seem that the use of so costly a remedy is unprofitable since only partial control was obtained.

POTATOES

SEEDLINGS

During the past seven years a great many seedling potatoes have been produced from seed obtained from seed balls which grew on the potato vines here at Ottawa, and also from seed obtained from various other sources. While it has been possible to obtain potatoes of normal size in one season yet none of the many thousand seedlings grown have proved of sufficient merit, nor have any of them shown immunity to the diseases such as mosaic and leafroll.

A great many of the most promising hills are selected each year, but by the end of the second and third year the progeny has shown signs of breaking down due to disease.

SPROUTING VS. DORMANT SEED

During the past two seasons a fairly extensive test was made with Irish Cobbler potatoes to find by what means earliness and yield could be influenced. This experiment was outlined to test three types of seed, namely, tubers that had been placed stem end down in flats and then filled in with sand which was watered at intervals as required to keep the sand moist. Tubers arranged in flats in a manner similar to the previous method, but without any sand around the tubers. The flats were then placed in a room where the temperature was around 65°F. and the bright light excluded. In this test, tubers of medium to small size were used, that is, tubers that would be about one and a half to two inches in diameter. They were started to sprout fifty-four days previous to planting, but could have been started some days later and been sufficiently developed by planting-out time. The tubers were placed by hand in the drills, fourteen inches apart with the drills two and a half feet apart.

The tubers sprouted in the sand and kept moist were found to be very firm with well developed, sturdy buds between one and two inches long, with well developed roots. The tubers that were sprouted without sand around them were severely shrivelled and while the buds were well developed there was a total absence of roots. The dormant tubers were taken direct from the storage cellar and placed in the drills. None of these tubers were showing any buds.

RESULTS FROM ONE HUNDRED AND THIRTY-SIX HILLS

—	Date started to sprout	Date of planting	Bloom	Ready for use	Graded yield		
					No. 1	No. 2	No. 3
					lb. oz.	lb. oz.	lb. oz.
Irish Cobbler in flats with sand....	Mar. 29	May 22	June 19	July 14	227 8	32 4	16 0
" " without sand	" 29	" 22	July 6	" 22	111 8	26 8	13 0
" dormant.....	.....	" 22	" 10	" 30	128 0	38 4	16 4

The returns both seasons were decidedly in favour of the tubers sprouted in moistened sand, and while returns from the tubers sprouted in flats without sand were earlier by eight days yet the dormant tubers out-yielded them, which would indicate that if sprouting is to be employed the tubers should be kept in moist sand during the process of sprouting so as to obtain the best returns from such a venture.

MULCH PAPER

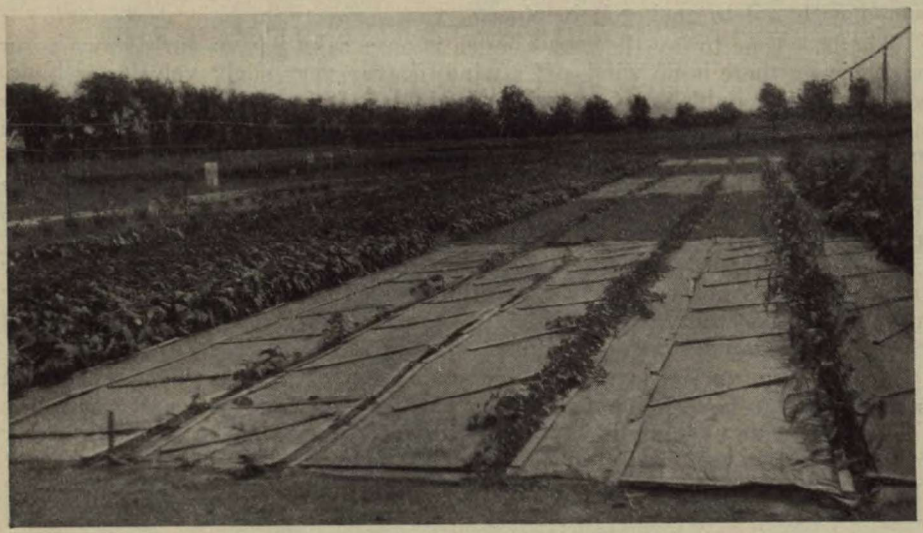
The use of paper mulch in connection with growing vegetable crops has been attracting nation wide interest during the past two seasons. Great claims have been made regarding the value of this material, in that it tended to raise the temperature of the soil, maintaining soil moisture, controlling weeds and hastening as well as increasing the returns from garden crops.

Gator Hide type A, which is a black paper of thin texture, but tough and waterproof, is known as the annual type of mulch, while the type B is thicker and intended to last longer. The former material comes in rolls of 900 lineal feet and can be got in two widths, eighteen and thirty-six inches wide. Several firms are now handling mulch paper in Canada.

The test conducted in the Division of Horticulture, Central Experimental Farm, during the season of 1929 was in reality a preliminary test to find out how the mulch paper could be used as there was not any information available that would serve as a guide concerning its use. A series of duplicate plots were laid out on a fairly uniform piece of light, sandy loam soil. The plots were thirty feet long and arranged to follow in sequence mulch paper plot, check plot, mulch paper plot and check plot. Sixteen kinds of vegetable crops were used the results of which will be found in the tables to follow.

The mode of procedure was to prepare the land as usual for regular garden operations. The manure was applied to the land, ploughed in and the harrow used. To insure an even surface upon which to lay the paper the ground was carefully raked and rolled with a light roller so as to provide an even base for the paper to rest upon.

Fastening the paper in place was accomplished by first digging a shallow trench at the end of the plot, wide enough to take in the eighteen inch or thirty-six inch strip of paper, then the end of the paper was buried in this trench. As the paper was unrolled, three foot laths were placed end to end along both edges and secured in place by means of staples made of No. 12 gauge galvanized wire in the form of an inverted capital "L". The leg of the "L" being about eight inches long. At intervals of four feet apart, down the middle of the strips of paper laths were placed diagonally and fastened with staples to prevent



Mulch paper—beans, cucumbers, melons and corn, early in the season.

heavy winds from pulling the paper from the edge fastenings. In fact the paper was blown away from the fasteners in several of the plots and had to be replaced, this happened before the cross laths were put in place.

Another method of fastening that was found quite satisfactory was to use number 12 gauge galvanized wire in the form of long staples that extended from edge to edge of the paper and having an eight inch lug at each end to push into the ground. Of course it was found that violent winds would lift the paper and pull the staples out of the ground so that this means of fastening, while it looked secure, failed too, under extreme circumstances.

Burying the edges of the paper with soil was found very effective but this method is mainly adaptable in the case of crops being transplanted through holes in the paper.

It was found, however, that a great deal of the trouble was overcome as soon as the plants spread enough to be on the mulch.

The method of placing the paper on the ground was quite simple. This was accomplished by having a tongue or handle made of light wood, with a cross piece in the form of a capital "T" and braced with pieces of flat iron which extended beyond the ends of the cross piece sufficiently, so when bent would reach across the roll of paper. A hole through each of these pieces of flat iron permitted a long rod to be passed through the roll. Thus hitched the roll of paper could be pulled down the field evenly.

For sowing seed directly in the ground a strip of paper was put down and fastened and a drill opened along the edge in which the seed was sown, then covered with soil. Then the next strip of paper was put down allowing about one inch of space for the seeds to germinate unhampered.

When plants are to be set or transplanted the method followed was to plant along the edge of a strip of paper, then place another strip on the opposite side, thus covering the entire surface of the ground on both sides of the row of plants. There are other ways of transplanting such as cutting holes in the paper through which the plants are set in place, and in the case of tomato plants in a garden they may be put in place and by making slits in the paper from the edge to the centre of the strip, the paper can be pulled into place so that the plants will stand in the centre of the strip of paper. The edges of the paper can then be covered with soil to anchor it in place.

The best time to lay the paper mulch is on a calm day or early morning or evening when there is no wind. If a wind of even very slight velocity is blowing the paper is liable to be carried out of place before the fastenings can be applied. Where paper is put down with the aid of plenty of help or with a special laying device some of this difficulty will of course be avoided.

From the point of durability it was found that the type "A" Gator Hide had disintegrated quite early in the season, especially where the lath fastenings came in contact with it. When the crops were harvested it was found that none of the paper could be salvaged for use another year. No doubt a heavier type of paper such as the type "B" Gator Hide would last longer, withstand heavy winds better, but would add considerably to the already high cost of mulching an acre with this material.

Owing to inexperience in handling mulch paper and the lack of definite instructions as to how this material should be put down it was found impossible to get an accurate estimate of the cost. Several changes had to be made in our methods before it was finally put down with much speed and satisfactorily. At any rate it can be said that the cost of laying and materials for fastening may be considered as very high.

BEANS

Two varieties were used, Round Pod Kidney Wax and Stringless Green Pod. Fifteen feet of row in the the mulch plots and check plots were harvested as green snap pods while the remaining fifteen feet was left to ripen for seed. The rows were planted along the edge of three-foot wide paper and spaced the same in the check plots with the plants four inches apart in the row.

BEANS—RESULTS OF MULCH PAPER TEST

——	Date sown	Date of germination	Date of bloom	Height of plants in inches		Ready for use	Snap pods	Ripe seed
				3 weeks after germination	When ready for use		lb. oz.	lb. oz.
Mulch—Round Pod Kidney Wax.....	May. 29	June 5	July 7	10	18	July 22	30 14	3 9
Check—Round Pod Kidney Wax.....	" 29	" 6	" 8	9	17	" 22	23 14	2 3
Mulch—Stringless Green Pod.....	May 29	June 5	July 6	12	19	July 20	31 9	5 13
Check—Stringless Green Pod.....	" 29	" 6	" 6	11	17	" 21	25 10	5 12

Mulch paper beans, cucumbers, melons and corn, late in the season. The greatest difference can be noticed in the growth of the melons and cucumbers on the mulch paper.

It will be noticed that the plants grown on the mulch paper plots had a slight advantage over the check plots, which applied to quicker germination, height of plants and the yield of green or snap pods. The amount of ripe seed was slightly more in favour of the mulch paper plot with Round Pod Kidney Wax, but there was only one ounce of difference in the yield of ripe seed in the Stringless Green Pod plots.

CABBAGE

The variety Copenhagen market was used as it was thought that an early maturing round headed variety would be of greater value. The rows were thirty-six inches apart with the plants spaced eighteen inches apart in the rows.

CABBAGE—RESULTS OF MULCH PAPER TEST

—	Date of sowing	Date of planting	Ready for use	Number of heads	Yield
					lb. oz.
Mulch—Copenhagen Market	Mar. 22	May 14	July 3	19	56 9
Check " "	" 22	" 14	" 6	19	58 5

The difference in earliness was not sufficient to warrant the cost of mulching.

BEET

Detroit Dark Red was used. Half of each plot was pulled as young beets when the roots were of marketable size. The balance of the plot being left to mature as a full season crop. The rows were thirty-six inches apart, and the plants were thinned to two inches apart in the rows.

BEET—RESULTS OF PAPER MULCH TEST

—	Date of sowing	Date of germination	Ready for use	Number of roots ready	Number of roots pulled in autumn	Weight of late roots
						lb. oz.
Mulch—Detroit Dark Red	May 13	May 25	July 30	59	65	125 0
Check " "	" 13	" 25	" 30	86	62	124 0

This kind of vegetable did not respond favourably to the use of mulch paper.

CAULIFLOWER

One variety was used, the plants were set along the edge of the paper spaced eighteen inches apart in the row. The heads were considered ready for use when they were six inches in diameter. Thirty-six inch wide paper was used between the rows with the plants eighteen inches apart.

CAULIFLOWER—RESULTS OF PAPER MULCH TEST

—	Date of sowing	Date of planting	Ready for use	Total yield			
				Marketable		Unmarketable	
				Number	—	Number	—
					lb. oz.		lb. oz.
Mulch—Snowball	Mar. 22	May 14	June 24	15	21 11	3	1 5
Check "	" 22	" 14	" 24	12	11 7	6	4 7

Cauliflower was a very good crop this season; the cool moist weather after planting favoured it very much. It will be noticed in the above table that there was a slight difference in favour of mulch paper, but this difference is

only slight and could not be considered as significant enough to make strong recommendations. Root maggots were equally as bad in the mulched and unmulched plots, but were kept from doing serious damage by the use of corrosive sublimate.

CARROT

One variety was used, the one chosen has been considered a standard commercial sort by the best growers. Half of each plot was pulled when the roots

Mulch paper—onions, lettuce and carrots. This picture was taken on August 10, and it will be noticed that the paper had disintegrated where the laths were placed.

were one inch in diameter for bunched carrots. The remainder of the plot was left to mature for late fall harvest. The rows were spaced three feet apart with the plants thinned to two inches.

CARROT—RESULTS OF MULCH PAPER TEST

—	Date of sowing	Date of germination	Ready for use	Number of roots 1 inch	Yield
					lb. oz.
Mulch—Chantenay	May 13	May 26	July 16	61	41 0
Check "	" 13	" 26	" 18	81	31 8

At the outset it should be made clear that the stand was very uneven due to poor germination of the seed and loss of plants later due to carrot rust fly. It is therefore unfair to draw definite conclusions. So far as appearance of the plots was concerned, the growth of the plants was very much the same in the check and mulch plots.

CELERY

One variety of the self blanching type was used. The rows were thirty-six inches apart with the plants six inches apart in the row. The blanching was done by placing twelve-inch boards at each side of the rows.

CELERY—RESULTS OF PAPER MULCH TEST

—	Date of sowing	Date of planting	Height of plants four weeks after planting	Weight of six plants
			in.	lb. oz.
Mulch—Golden Plume	April 9	June 24	5	9 4
Check "	" 9	" 24	5	8 4

This crop did not show any advantage of great account in favour of mulch paper. At the conclusion of the season of growth the plots both check and mulched were the same height and had produced crops that were quite analogous.

CORN

In choosing a variety for a test of this kind it was thought that a well known standard mid-season variety would serve the purpose best. The seed was planted in drills thirty-six inches apart, with a plant every eight inches apart in the row.

CORN—RESULTS OF MULCH PAPER TEST

—	Date of sowing	Date of germination	Average height	Number of ears	
				Marketable	Un-marketable
			in.		
Mulch—Golden Bantam	May 29	June 5	24·9	76	10
Check "	" 29	" 6	19·8	69	6

In reviewing this test it will be noticed that the germination was a day ahead in favour of mulch which would indicate that there was apparently more

favourable conditions under mulching than in the check plots. The difference although noticeable in the height of the corn as indicated in the table did not apparently mean so very much in marketable ears.

CUCUMBER

The variety used is a strain of White Spine. The thirty-six inch paper was used on each side of the row, with a space of one inch wide between the strips of paper through which the plants were set. The plants were spaced one foot apart in the row.

CUCUMBER—RESULTS OF MULCH PAPER TEST

—	Date of sowing	Date of germination	Average length of vines when three weeks old in field	Date first fruit ready six inches long	Total yield			
					Marketable		Unmarketable	
			inches		No.	lb. oz.	No.	lb. oz.
Mulch—Perfection	May 29	June 5	24·194	July 24–27	390	388 7	83	6 8
Check "	May 29	June 6	22·66	" 27–29	291	231 12	48	4 4

Under mulched conditions the plants made very uniform quick growth. At the end of three weeks it will be noticed in the table that the average length of the vines was greater and this difference was maintained until the end of the season. There was also a substantial difference in yield in favour of mulch paper, with from two or three days gain in earliness.

Another feature that commends paper mulch was the total absence of weeds, in the main part of the rows. The only weeds present were those that grew between the plants in the rows.

EGG PLANT

The growing of egg plants as a field crop under Ottawa conditions is not looked upon as a commercial success. The seasons on the average are not warm enough nor long enough to insure a good crop each year. The past season was not a satisfactory one for this crop but it was found that the plants grown on mulch paper grew better than those in the check plots, however, there was not a crop of marketable fruits produced.

LETTUCE

A heading type of lettuce was used. The rows were nineteen inches apart with the plants eight inches apart in the rows along the edge of the paper.

LETTUCE—RESULTS OF MULCH PAPER TEST

—	Date of sowing	Date of germination	Ready for use	Weight of six heads
				lb. oz.
Mulch—Iceberg	May 13	May 22	July 4 to 20	10 0
Check "	" 13	" 22	" 8 to 10	11 0

On account of poor germination there was a very poor stand of plants on all the plots, but so far as the growth was concerned there was not a striking difference between the mulch and check plots. The date ready for use was

in favour of the mulch plots by four days, but while the check plots were later the range of season of harvesting was about the same. The heads harvested from the check plots were heavier and firmer.

MUSKMELON

The plants were started in a hotbed. Pieces of sod three inches thick were placed in flats with the grass side down and cut into squares of about four inches each way. Three or four seeds were planted in each square and placed in the hotbed to germinate. When the plants had become well established they were then reduced to one plant to each square of sod.

After the danger of chilling was past the plants were set out in the field. A three-foot wide strip of paper was put down and the plants were spaced one foot apart along the edge after which another strip of paper was put down on the opposite side with a one-inch space between the strips of paper through which the plants grew.

MUSKMELON—RESULTS OF MULCH PAPER TEST

—	Date of sowing	Date of planting	Date of blooming	Ready for use	Average yield					
					Marketable		Unmarketable		Green	
					Number of fruits	Yield	Number of fruits	Yield	Number of fruits	Yield
						lb. oz.		lb. oz.		lb. oz.
Mulch—Hearts of Gold	May 4	June 5	June 20	Aug. 24	28	42 11	56	72 2	74	74 8
Check—Hearts of Gold	" 4	" 5	" 21	" 26	35	43 11	32	39 9	87	90 0

The results as tabulated indicate that the first ripe fruit was picked from the mulched plots two days earlier than from the checks; the fruits were larger in size on the mulch plots. These large fruits, twenty-eight of which weighed only one pound less than thirty-five fruits from the check plots, thus showed a decided advantage for mulch paper treatment. The number of unmarketable melons was greater from mulch paper but this was due to melon rust. The disease seemed to do greater damage and spread much more rapidly in the mulched plots.

A further analysis of the crop for the whole season shows that the mulch plots produced 158 fruits weighing 193 pounds 5 ounces, while the check plots produced 154 fruits weighing 173 pounds 4 ounces.

Another feature about this test, is that the vines on the mulched plots were more vigorous and covered the whole area, while the vines in the check plots lacked the extreme vigour and did not cover the ground well at all.

ONION

Two methods of onion growing were tried. Seed was sown in the greenhouse in flats March 22, pricked out into flats one by one inch apart. These plants were transplanted into the plots in the field. In the second method, seed was sown in the open field in the drills along the edge of the mulch paper, after which another strip of paper was laid down, allowing about one inch between the strips of paper. It was noticed that the plants in the mulched plots seemed to be more vigorous than those in the check plots. This condition continued until the plants began to bulb, when the difference between the plots disappeared. Unfortunately onion root maggot did serious damage in spite of the control measures taken. There did not seem to be any advantage in using mulch for this crop.

PEPPER

An early maturing variety of pepper was chosen for this test to be reasonably sure of obtaining a good crop of ripe fruit. The plants were started in the greenhouse and grown in hotbeds until the danger of loss by frost was past. The rows were spaced thirty-six inches apart with the plants eighteen inches apart in the rows. The plants were set along the edge of the paper after which another strip was put down on the opposite side allowing one inch of bare ground between the strips of paper.

PEPPER—RESULTS OF MULCH PAPER TEST

—	Date of sowing	Date of planting	Date ready for use	Average number fruits			Total average number of fruits
				Ripe	Green, marketable	Green, unmarketable	
Mulch—Harris Earliest.....	Mar. 22	June 15	Aug. 1–7	38	50	19	107
Check "	" 22	" 15	" 7–10	26	18	22	66

In the above table it will be seen that there was an advantage in number of ripe fruit in favour of mulch paper and also in the number of marketable green fruits. The check plots gave a smaller number of ripe fruits; less marketable green fruit and more unmarketable green fruit. These facts compared, seem to show some advantage in favour of the use of mulch paper. The total average yield also shows a considerable difference in favour of mulch paper.

The plants growing in the mulched plots were more vigorous than those in the check plots, a fact that was noted to prevail from quite early in the season until the plants were killed by frost.

POTATO

Two varieties were used, an early and a late or main crop variety. The sets were planted in drills that were opened along the edges of the strips of mulch paper. The drills were four inches deep and the sets spaced twelve inches apart. The paper was three feet wide.

POTATOES—RESULTS OF MULCH PAPER TEST

—	Date of planting	Date of germination	Date of bloom	Aug. 15 — 15 hills dug as early				Sept. 27 — 15 hills end of season			
				Marketable		Unmarketable		Marketable		Unmarketable	
				lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
Mulch—Irish Cobbler.....	May 20	June 3–5	July 3–6	19	12	0	15	21	8	2	4
Check "	" 20	" 5–6	" 5–7	19	12	2	1	22	8	2	0
Mulch—Green Mountain.....	May 20	June 4	July 3	22	0	1	7	32	4	1	10
Check "	" 20	" 5	" 4	18	1	1	6	31	12	1	8

The results as tabulated are the average yields from two plots of each variety and give a very good idea of the actual performance of this crop under these conditions. In all the mulched plots the plants showed increased vigour. Apparently the increase in top growth did not produce a large crop of tubers.

In the Irish Cobbler plots, the late dug portion of the check plots produced one pound more of marketable tubers over the same number of mulched hills. In the Green Mountain plots the yield was slightly in favour of mulch paper but hardly enough to create an argument in its favour.

SPINACH

One variety was used. The seed was sown along the edge of eighteen inch wide mulch paper and eighteen inches between the rows in the check plots. The plants were thinned to stand six inches apart in the rows. Uneven germination made it difficult to have continuous rows of plants six inches apart. Both mulched plots and cultivated plots were alike in unevenness of stand.

SPINACH—RESULTS OF MULCH PAPER TEST

—	Date of sowing	Date of germination	Date ready for use	Average yield			
				Marketable		Unmarketable	
				Number of plants	Weight	Number of plants	Weight
					lb. oz.		lb. oz.
Mulch—King of Denmark....	May 13	May 20	July 26	24	4 3	3	1 2
Check "	" 13	"20-21	" 26	21	3 15	2	0 7

From this table it is quite evident that there was no advantage gained by using mulch paper. The earliness and yield of the plots was not influenced.

TOMATO

Ten plants of one variety were planted out in mulch and check plots in duplicate, spaced three by three feet apart. In the mulch plots the plants were set along the edge of the paper and not set through holes cut in the paper.

TOMATO—RESULTS OF MULCH PAPER TEST

—	Date of sowing	Date of planting	Ready for use	Average yields							
				Ripe fruits						Green	
				Month, marketable		Season, marketable		Unmarketable			
				Number of fruits	Weight	Number of fruits	Weight	Number of fruits	Weight	Number of fruits	Weight
					lb. oz.		lb. oz.		lb. oz.		lb. oz.
Mulch—Bonny Best.....	April 13	June 10	Aug. 9	22	5 11	344	112 10	7	1 13	560	140 4
Check—Bonny Best.....	" 13	" 10	"9-11	32	8 12	242	71 1	6	1 8	236	58 0

In the foregoing table it will be noticed that the yield of early fruit was slightly in favour of the check plots. While in that portion under the heading of "Season," ripe and green fruit, the yield was greater from the plants under mulched conditions. Taking these facts into consideration it is quite evident that the yield of early fruit from mulch paper plots would hardly be profitable. To be a commercial success the amount of ripe fruit must be large in the first two weeks of the tomato season, or at the latest during the period included under the heading of the month.

To arrive at the division of the season into various headings, an early maturing strain of Earliana is used, when this variety produces ripe fruit this is taken as the standard for comparison; thus all varieties can then be classified quite satisfactorily. It is quite clear in the above table that none of the treatments produced ripe fruit early enough to be ready for market when the price was high. In other words, the crop was ready when other tomatoes were being offered.

CONCLUSIONS

The control of weeds was complete in the mulch plots, with the exception of those that grew between the plants in the rows.

Since this test was conducted only one season, it would be out of the question to make too strong a statement regarding the merits or demerits of mulch paper; but it would seem from the observations made during the one season, that crops that require warm conditions responded fairly well where mulch paper was used. To be profitable high priced vegetables must be used, since the cost of mulching is quite high, coupled with the prospect of having to purchase new mulch paper each year.

PURITY TEST

With the growth of a demand for pure, true varieties of vegetable seeds there has developed a considerable increase in the checking up on all vegetable seeds imported into Canada from the large seed-growing centres of foreign countries. This past season the purity test, in co-operation with the Seed Branch, was again conducted. The inspectors at the various ports of entry and elsewhere, when found necessary, collected samples of seed, which were submitted to their own laboratory for germination test, and thence to the Division of Horticulture for a field or growing test. Practically all of these samples were taken from lots of seed being brought into Canada from the large seed growing centre of foreign countries, while a small percentage were of Canadian origin. The latter samples were submitted chiefly to find if they could be passed as stock seed for the growing of registered seed.

The following statement will give some idea of the extent of this test in number of samples:—

Beans—9.	Corn—3.
Beet—136.	Onion—1.
Broccoli—1.	Parsley—2.
Brussels sprouts—1.	Peas—326.
Cabbage—2.	Pepper—2.
Cauliflower—1.	Tomato—2.
Celery—3.	

In a great many cases, as will be seen, the samples were very satisfactory, while others were inferior or were wrongly named. In some of the samples it was found that they were true to a type but did not conform to the type that the name which they were submitted under called for, therefore they could not be passed.

BEAN

391—Giant Stringless Green Pod.. .. .. A true, uniform sample.
392—Brittle Wax.. .. .. This is a good sample of Round Pod Kidney Wax.
393—Improved Kidney Wax.. .. .. Identical to Stringless Kidney Wax. A very true sample.
394—Refugee Stringless.. .. .. A true sample.
395—Refugee Golden Wax.. .. .. This sample is very uniform and true and is quite the same as Refugee Wax.

BEAN—*Concluded*

396—Stringless Green Pod	This is a true sample.
397—Giant Stringless Green Pod	A true sample.
1000—Red Mahogany Kidney, Strasser & Konig	The plants were very much like Well's Red Kidney.
666—White Giant	Although badly damaged by leaf hoppers the pods and beans resembled White Dutch Runner.

BEETS

254—Early Wonder		A very uniform sample of Crosby-like roots.
262	" "	This sample varied considerably from Flat Egyptian to deep, full roots like Detroit Dark Red. Six roots were off colour.
274	" "	The tops varied in size and colour and the roots were as follows: 9 Flat Egyptian, 2 Scarlet Globe, 1 Half Long and 10 Crosby Egyptian.
307	" "	The top growth very even both for size and colour. The roots were very much off type. 3 Flat Egyptian, 3 Scarlet Globe type and 2 that were like Half Long.
321	" "	The tops were uniform in size and colour and the roots uniform and true to Crosby Egyptian type. A true sample of the latter type.
344	" "	Tops uneven colour and roots varying. 3 Crimson Globe type, 24 Crosby Egyptian and one Mangold.
532	" "	Tops fairly even in size but the colour is uneven. The roots varied; 3 Half Long type, 8 Crosby Egyptian and 9 Detroit Dark Red.
541	" "	This is considered a fair sample. 19 roots are Crosby Egyptian and 1 Flat Egyptian.
550	" "	This sample had 19 Crosby Egyptian shape and 4 Eclipse type.
599	" "	The tops vary in colour and the roots vary; 2 roots are Half Long, 16 Crosby Egyptian, 4 Flat Egyptian.
613	" "	There is some variation in the size and colour of the tops. The roots were variable; 7 Flat Egyptian, 2 Half Long and 11 Crosby Egyptian.
630	" "	The plants were quite evenly divided into two types, with one completely off type—10 Crosby Egyptian, 9 Flat Egyptian and 1 root Half Long.
253—Eclipse		A real mixture—2 tankard, 5 Scarlet Globe, 3 Detroit Dark Red and 3 Crosby Egyptian.
261	"	3 Scarlet Mangold, 2 Flat Egyptian, 7 Detroit Dark Red and 8 Crosby Egyptian.
266	"	8 Tankard-shaped, 5 Crimson Globe, 5 Detroit Dark Red and 2 Eclipse.
271	"	5 Tankards, 8 Eclipse type, 1 Detroit Dark Red and 2 Scarlet Globe.
283	"	This sample varies in root shape and colour of skin. The inside colour is quite scarlet. This is not true enough to one type.
300	"	Four different types—just a mixture.
311	"	11 roots somewhat tankard-like, 5 Eclipse and 5 Crosby-like roots.
336	"	16 roots Eclipse-like, 4 like Detroit Dark Red and 2 are Mangolds. The colour inside varies from scarlet to purplish red.
338	"	This is a very good sample of Eclipse.

BEETS—*Continued*

534	Eclipse—*Con.*	A mixture of types of roots.
574	"	This is a very good sample.
559	"	This is a poor sample—quite Mangold-like when cut—purple with broad white rings. Not true.
575	"	This is a fair sample, except for 2 Mangolds.
601	"	A mixture. 3 Crosby Egyptian, 7 Crimson Globe, 6 are Half Long, 4 are Eclipse-like.
619	"	The roots are very much like Crimson Globe; 2 roots are true out of 20.
259	Early Blood Turnip	A typical, true sample of Eclipse.
273	" " "	A good sample of Detroit Dark Red.
276	" " "	A mixture, most of which are like Eclipse.
279	" " "	This sample is much like Eclipse in form of roots, but the colour is varied from crimson to purple and red with white rings.
291	" " "	This is a mixture of 16 Detroit Dark Red and 4 Half Long.
292	Early Blood Red	A mixture of Detroit Dark Red and Eclipse.
293	" " "	A very fair sample of Detroit Dark Red.
298	" " "	This is a very fair sample of Detroit Dark Red.
299	" " "	Three types—Detroit Dark Red, Early Flat Egyptian and Crosby Egyptian. More of the roots were like the latter.
302	" " "	This is a mixture of types— Crimson Globe, Tankard, with Crosby Egyptian predominating.
312	" " "	The Egyptian types predominate; would pass for a poor strain of Crosby Egyptian.
331	" " "	Eclipse, Detroit Dark Red, Tankard and Crosby Egyptian.
335	" " "	A poor selection of Detroit Dark Red.
513	" " "	Just a mixture.
545	" " "	An uneven sample of Eclipse. Very poor.
584	" " "	A fair sample of Crosby Egyptian with a few Flat Egyptian roots.
591	Early Blood Turnip	Most of the roots are like Detroit Dark Red; about 5 per cent are Crimson Globe.
626	" " "	A mixture of types, shapes and colours.
629	" " "	Average good sample of Detroit Dark Red.
631	" " "	A mixture of 13 Detroit Dark Red, 5 Crimson Globe and 2 Flat Egyptian.
239	Crosby Egyptian	An excellent strain of Crosby Egyptian.
241	" "	This is an excellent strain of Crosby Egyptian.
247	" "	Flat Egyptian and Crosby Egyptian mixture.
249	" "	More like a variable strain of Detroit Dark Red, with a few Flat Egyptian, than a Crosby strain.
251	" "	10 Crosby Egyptian, 7 Detroit Dark Red, 3 Crimson Globe and 3 Mangolds.
252	" "	A very fair sample of Crosby.
264	" "	An even, true strain.
265	" "	Just a mixture.
275	" "	A mixture.
289	" "	A poor sample, off type.
310	" "	All the roots were Eclipse colour. Not true.
316	" "	Eclipse type predominated.
326	" "	A mixture; 14 Crosby Egyptian, 3 Flat type, 1 Mangold type, 2 Tankard shape. The colour was fairly good, but not true enough.
339	" "	This is a moderately good sample of Crosby Egyptian.
343	" "	The roots conformed to type for Crosby Egyptian, but were off in colour, being like Eclipse. Would pass for a sample of Eclipse.

BEETS—*Continued*

509	Crosby Egyptian—*Con.*	A fairly good strain.
510	" "	The majority of the roots were Crosby Egyptian-like, but there were 2 Crimson Globe, 1 Eclipse and 3 very flat roots. The colour was typical for the variety.
514	" "	A very good commercial sample.
520	" "	A good commercial sample.
525	" "	16 Crosby Egyptian, 1 Eclipse, 2 Mangold.
529	" "	All roots off in colour. Resembles Eclipse.
533	" "	This is a fairly good strain.
539	" "	11 Crosby Egyptian, 3 Globe type, 6 Flat Egyptian. The inside colour of the roots was excellent.
340	" "	The roots vary in shape and the colour of the inside is like Eclipse.
543	" "	This is a very good sample, quite true to type and colour of roots.
548	" "	An exceedingly good Crosby Egyptian sample. Very true.
554	" "	This is a fairly good strain of Crosby Egyptian.
558	" "	14 Crosby Egyptian, 4 very flat roots, 1 Mangold, 1 Half Long. The colour of all roots was dark.
560	" "	A fairly good sample.
561	" "	16 roots Crosby Egyptian, 3 Detroit Dark Red and 1 Half Long.
563	" "	The roots were all off in colour. 15 poor Crosby Egyptian type, 3 Detroit Dark Red, 1 real Mangold and 1 Globe shape.
567	" "	This is a very good sample of considerable merit.
568	" "	This is a very good sample but a little on the flat order.
570	" "	All off type and colour.
577	" "	This is a very good sample, but on the flat order.
578	" "	The roots are very even but somewhat flattened.
579	" "	This sample is a fairly good one of Crosby Egyptian.
583	" "	A very good commercial sample.
589	" "	The most of the roots are like Flat Egyptian. 10 Flat Egyptian, 8 Crosby Egyptian, 2 Detroit Dark Red and 1 Mangold-like root.
594	" "	13 Crosby Egyptian, 4 Flat Egyptian, 3 Detroit Dark Red. The colour was off considerably and 3 roots were of the Eclipse colour.
604	" "	This is a good sample, true to type and colour.
608	" "	18 roots are Eclipse colour and 2 dark red.
617	" "	An exceptionally uniform, true sample.
623	" "	This is an exceptionally uniform, true sample.
255	Half Long Blood	This sample of Half Long is quite good, except for one root that is mangold-like.
257	Crimson Globe	8 roots are globe-shape or nearly so, 12 are true Detroit Dark Red shape. The inside colour is in conformity with Crimson Globe.
258	Blood Turnip	7 are Half Long, 13 are of flat and full-shaped turnip roots a mixture.
260	Edmand Blood	A decided mixture—12 Crimson Globe, 6 Detroit Dark Red, 1 Flat Egyptian, 1 Mangold.
277	Red Egyptian	This is a very true sample of Early Flat Egyptian.
281	Long Smooth Dark Red	A very true sample.
286	Improved Long Blood	This is a good, true sample.

BEETS—*Continued*

288—Covent Garden	A very true sample of Half Long.
290—Long Smooth Blood	17 roots are Half Long type and 3 roots true to the long type.
296—Edmand Blood Turnip	18 are Crimson Globe, 2 are Mangolds.
297—Edmand Improved Blood	Not two roots exactly alike.
306—Crimson Globe	15 are poor globe shape, 4 Crosby Egyptian, 1 Mangold.
327—Spinach	Swiss Chard-like; Lucullus.
332—Half Long Crimson	An excellent sample of Half Long.
337—Crimson Globe	12 good Globe shape, 5 Detroit Dark Red, 3 Crosby Egyptian.
342—Boston Crosby	13 Crosby Egyptian, 7 Crimson Globe. The latter are true to form and inside colouring.
531—Crimson Globe	The tops varied in size and colour. 4 Crimson Globe, 8 Half Long, 8 were of no particular type—just beets.
535—Fireball	A fairly good sample that could be classed as Crimson Globe.
551—Crimson Globe	This is a very fair sample of Crimson Globe.
556—Round Globe	Just a mixture.
586—Fireball	12 are very representative of Crimson Globe, 8 are off type.
587—Egyptian Turnip	18 are Early Flat Egyptian, 2 are Mangolds.
582—Long Dark Smooth	A true sample of Half Long.
598—Long Dark Smooth Blood	The roots vary in form, 6 being typical of the variety, 14 are true Half Long. The inside flesh colour is an excellent dark red.
606—Long Smooth Blood	The roots are short for Long Smooth, but are uniform in shape and inside colour.
616—Crimson Globe	9 are true, 11 are of the Crosby Egyptian type.
620—Crimson Globe	This is a good strain. The roots are very uniform in shape and have typical flesh colour.
622—Globe	This is a fair strain of Crimson Globe type.
625—Long Red	The roots are more of the Half Long type. Very uniform for shape and inside flesh colour.
628—Cardinal Globe	16 are true Crimson Globe, 4 are elongated to tankard shape, 4 of which have purple coloured rings.
632—Kelway Perfect Model Globe	A very uniform Crimson Globe sample.
633—Sutton Blood Red	A very uniform intermediate type between the long and half long types. Very true.
13455—U.S. Orange Globe	There is not a single Orange Globe root in the whole sample. A mixture of colours.
13455—U.S. Boston Crosby	2 Half Long, 2 Crimson Globe type. 16 are a fair sample of Crosby Egyptian.
4730—Black Red Ball	2 are ball-like. The balance are of the Detroit Dark Red type but vary in flesh colour.
C48-3464—Half Long Victor	A very true sample of Half Long.
C248—Kitchener Barrel	The roots conformed somewhat to a cylindrical form or pineapple shape; some were quite like Half Long. The sample apparently is not from a true strain.
CC-1053—Reliance Globe 28-29	10 roots Crimson Globe and 10 roots Detroit Dark Red.
C-1089—Johnson Dark	17 poor Crosby Egyptian, 2 Mangolds, 1 Detroit Dark Red.
C38-1106—Detroit (Kenall & Whitney)	10 like Detroit Dark Red, 9 Globe shape, 1 Half Long. A mixture of flesh colours.
C38-60—Dark Red (Morse) I. Hurston	The roots are elongated cylindrically to a considerable degree and in some cases slightly ball-like. The flesh colour is very dark with indistinct rings.

BEETS—*Concluded*

C38-1279—Blood Turnip.. .. ..The whole sample would pass for a good sample of Detroit Dark Red.
W. H. Maule
Globe (James).. .. ..In all likelihood a sample of Crimson Globe. There is a slight variation in the shape of the roots, but the flesh colouring inside is quite even and typical.
New Red Bird (Buckbee).. .. ..This is a real mixture, Half Long and semi-globe shape.
Johnson Perfection Sugar Beet.. ..The roots are true to one type but there is a red colouring showing in the flesh of some of the roots.

BROCCOLI

2012—Early Roscoff, Sutton & Sons.. .. ..The plants were very uniform but did not produce heads due to unfavourable seasonal conditions.

BRUSSELS SPROUTS

Extra Dwarf, Steele Briggs.. .. .. ..Much the same as Imp. Half Dwarf only not as uniform, was very variable in height.

CARROT

CC-1068—Defiance Intermediate.. .. .. .. .A strain similar to James Intermediate.
C-28074—Coreless (Rice).. .. ..There is considerable variation in this sample. About half of the roots grow with one-third above the ground; sunburn badly like Amsterdam, while some roots are similar to Nantes. A mixture of long cylindrical, blunt-ended carrots.
5827—Coreless (Rice).. .. ..Tops variable; root crown vary so that some are hollowed about the crown. Some roots are growing one-third out of the ground and look like Amsterdam, while others are like Nantes. 1 root is white, large and coarse like White Belgian.
4070A—Half Long Orange.. .. ..The roots varied widely. 19 St. Valery, 10 Oxheart, 4 Long Orange, 1 Amsterdam, 1 Danvers type.
Perfection (McKenzie).. .. ..A mixture, 1 White Belgian, 2 Scarlet Horn, 6 Nantes Half Long, 6 St. Valery and 5 intermediate field types.
Johnson Favorite (Swede).. .. ..A purple top Swede of the Canadian Gem type. The type is fairly good for a comercial strain.

CABBAGE

Baltic Copenhagen, F. C. Stokes.. ..A fairly good strain of Copenhagen Market.
Northern Favorite, A. E. McKenzie..A true Charleston Wakefield type.

CAULIFLOWER

339—Early Snow Cap, A. E. McKenzie.. ..A good strain of Snowball.

CELERY

368—Brandon Prize, A. E. McKenzie.. ..A mixture of White Plume.
371—Golden Self Blanching.. .. ..A very good strain.
372—Golden Heart Self Blanching.. .. ..This is a strain of Golden Self Blanching with the typical heart.

CORN

Vanguard, F. C. Stokes.. .. ..The plants are very variable in height as well as the height of the ears from the ground. Some plants like Cory.
Lord's Golden Age.. .. ..Two distinct types of plants, tall and short. Ears with long and short shank, heavy and light husking. Lacks uniformity.
493—Whipple Early Yellow, A. E. McKenzie. This sample was quite typical of other samples of Whipple Early Yellow grown.

ONION

Potato or Multiplier, O. R. Symon..The bulbs when planted reproduced and acted in a manner identical to that of the Potato onion. In every way the same as Potato onion.

PARSLEY

Exhibition, Steele Briggs.. .. ..Very poor germination—only three plants grew and these were like double curled or crested type.

Green Gem, Hurst.. .. ..A very uniform, dwarf, compact dark green variety. Quite distinct from the regular varieties generally grown.

PEAS

659—Blue Bantam.. .. ..The vines were uniformly very dwarf, more like Laxton Superb, and the pods were identical to the latter.

187 " " The vines varied from 14 to 20 inches in height. The dwarf ones were like Laxton Superb, while the taller ones resembled Blue Bantam—in reality a mixture.

199 " " The vines were 22 to 29 inches high. In every respect they were identical to Pilot. The hulm was slender and leaves scant. The pods were Pilot-like. Not Blue Bantam.

186 " " This is a variable strain, the vines varying in height from 14 to 20 inches, but the foliage and pods were quite typical of Blue Bantam.

438 " " This is a mixture of types. The pods vary from straight broad to backward curved long pods and narrow short pods of the American Wonder type. Not satisfactory.

200 " " A very satisfactory commercial strain.

346 " " The vines ranged from 13 to 15 inches and resembled Laxton Superb very closely.

700 " " This is a evry good sample of Laxton Superb. Vines 13 to 15 inches high.

114 " " A good strain of Laxton Superb. Vines 12 to 16 inches high.

374 " " This is a very uniform strain of Blue Bantam or Laxtonian.

115 " " There were a considerable range of variation in vine height from 13 to 20 inches. The pods varied in size and shape. Not a true strain.

396 " " A very true strain of Laxton Superb type—both vines and pods indicated this.

380 " " There were three distinct types of vines and pods.

189—Thomas Laxton.. .. ..This strain was true but lacked vigour.

108 " " This strain, while uniform, was very typical of Gradus.

148 " " A true strain of some merit.

109 " " Found to be a good strain.

113 " " Found to be a good commercial strain.

697 " " Not Thomas Laxton at all, but belongs to the Telephone class. The vines ranged to 48 inches high and was only ready for use when Thomas Laxton was ripe.

696 " " A very variable strain. 50 per cent flat pods and not characteristic of the variety indicated by the name.

188 " " A variable strain; over three-quarters of the vines were true but the balance were tall. Not a desirable strain.

PEAS—*Continued*

358	Thomas Laxton—*Con.*	This is a very fair sample of commercial seed There was only a slight variation in vine height.
436	" "	This is also a fairly good commercial sample.
707	" "	A weak growing strain but true to type.
385	Laxtonian	This is a fairly uniform sample so far as vine development is concerned. The pods vary considerably in shape.
386	"	A very uniform strain. True to one type.
376	"	A mixture of types—large and small pods.
192	"	This is a very weak-growing, poor strain, below the average size. Pods very variable.
173	"	This was found to be a very good strain of Laxtonian.
190	"	Two Blue Bantam type plants, with large pods decidedly curved backwards. The balance of the plants were decidedly poor, being under size and off type.
191	"	This is a very uniform, good strain.
131	"	Two distinct types in this sample—one with large, backward curved pods and those with straight but pointed pods.
193	"	A true strain of a commercial sample.
132	"	This is a very true strain of Thomas Laxton and not as indicated by the variety name.
133	"	There was one plant off type in a row of seven feet, otherwise this is a very fair sample.
129	"	The vines were uniformly 18 inches high, producing large, backward curved pods. This resembles a good sample of the Blue Bantam strain.
134	"	This is a true strain of Laxtonian.
130	"	This is a mixture of varieties. Some vines produced small pods, while others produced pods of the Thomas Laxton type. There were, however, some of the vines that resembled Laxtonian.
402	"	This strain is more of the Blue Bantam type and would pass for this variety.
347	"	This is a typical Blue Bantam strain.
236	Perfection	A very true strain.
237	Perfection	A very true strain.
180	Sutton Giant	There is a mixture. The vines vary from 18 to 43 inches high. Evidently a mixture.
181	Sutton Early Giant	The vines vary in height from 25 to 49 inches high. Some are characteristic of Blue Bantam, while the tall ones resemble, to a degree, Telephone.
223	Stratagem	This is a very good sample of Stratagem.
156	"	There is a great variation in the habit of the vines and type of pods produced. Too variable.
218	"	This is a very uniform sample of this variety.
157	"	There is too great a range of variation both in vine height and pod sizes. Not a true enough strain.
158	"	Not true, at least three types of vines and pods.
225	"	This is a very good strain—quite true to one type.
224	"	This is a good strain—true to one type.
693	"	Not true—resembles Perfection.
169	"	This is a fairly good commercial sample of Stratagem.
112	"	A mixture. The vines vary from 27 to 40 inches high.

PEAS—*Continued*

110	Stratagem—*Con.*	There was only 4 feet of row; 3 plants out of 16 were off type entirely and only one of the balance was a good specimen of the variety.
111	"	There were two plants off type. The balance of the plants conformed very well to Stratagem.
160	"	Some plants are very much like Telephone. Two distinct types of pods.
159	"	The plants vary in height from 30 to 46 inches. About one-quarter of the plants are quite tall.
161	"	A very uniform strain and exceedingly good for commercial seed.
217	"	Two distinct types of vines and pods. Not true.
708	"	Identical to Dwarf Telephone or Daisy, both in vine and pod character.
692	"	Quite identical to Dwarf Telephone or Daisy, both in vines and pods.
412	"	Three distinct types present, which includes both vines and pods.
416	"	This is a very good commercial sample. The plants are quite uniform in height and produce pods of uniform, large size.
404	"	The vines vary in height from 30 to 42 inches and produce pods of three distinct types.
348	"	The vines vary in height from 22 to 36 inches. Three types of pods were produced. Only a few of the vines and pods were typical of Stratagem.
709	"	The vines are very variable, ranging from 33 to 42 inches high. This is a variable mixture.
368	"	The vines varied in height from 21 to 35 inches. The pods were of two types, blunt-ended, round, closely filled, while the others resembled Stratagem to only a very slight degree.
122	Daisy (Dwarf Telephone)	A mixture of Stratagem, Dwarf Telephone and Tall Telephone. The vine heights ranged from 23 to 40 inches.
381	" "	This is a very good sample that is true to one type.
233	" "	This is only a fair sample. Not as uniform as 381. Several plants were off colour.
235	" "	There are several plants; about 5 per cent that are off type or rogues. The balance are quite representative of the variety.
121	" "	The entire lot of plants were weak-growing and could not be considered representative of the variety.
392	" "	The plants varied in height from 21 to 32 inches. A considerable difference existed in the shape of the pods.
655	" "	The plants varied in height from 20 to 30 inches. Some of the vines resemble Stratagem.
356	" "	This sample was found to conform to the type of Daisy or Dwarf Telephone.
167	" "	The vines vary from 25 to 45 inches high. The tall vines look like Telephone.
634	" "	A fairly true strain but resembles Stratagem to a greater extent than the variety Daisy.
705	" "	The vines vary in height from 22 to 36 inches, likewise the pods.
166	" "	The vines vary in height from 31 to 41 inches and the pods vary in shape. Not true.

PEAS—*Continued*

168—Daisy (Dwarf Telephone)—*Con.*	The vines vary from 22 to 36 inches. Not true.
227—Daffodil	A poor strain of the Laxtonian variety. Most of the vines were identical to Laxtonian—the others were of no particular type.
454—Sutton V. C. (The Super Pea)	The vines varied from 34 to 54 inches and the pods were of three distinct types; all large. Not true.
711—Yorkshire Hero	The vines vary from 18 to 40 inches high, with three distinct types of pods.
664—Peerless	There was a difference in the vine heights, 17 to 24 inches. The pods were of two distinct types, more of the marrow-fat type.
650—Peerless	This is a very uniform strain, producing pods of short, blunt-ended type. The pods are decidedly crease-back.
662—British Lion	The vines varied from 21 to 55 inches high. A real mixture.
715—Superlative	The vines vary from 28 to 33 inches high. Three distinct pod types were noted.
637—Gladstone	A very uniform sample of Gladstone, having characteristic backward-curved pods.
641—Gladstone	The vines vary from 30 to 40 inches in height and produced pods of two distinct types.
359—Rival Marrowfat	The vines varied from 25 to 37 inches high. The pods were of three distinct types.
681—Admiral Beatty	This is not a true strain. The vines varied from 28 to 44 inches and produced pods of four different types.
394—World Record	The vines were slender, with scant foliage, quite uniform in height and markings. The pods were also uniform. Quite distinct from all other varieties.
635—Bountiful	The vines varied from 18 to 36 inches, very variable. Three types were present, one of which was decidedly like Alaska.
648—Alaska	A true sample of Alaska.
426 "	This sample lacked uniformity. The vines varied from 20 to 33 inches in height and was not as uniform as 648.
666 "	A very true sample.
686 "	This is a very good strain. The vines vary slightly in height, from 29 to 32 inches.
234 "	This is a quite uniform sample, the variation being only slight.
137 "	A variable strain, ranging from 26 to 44 inches tall. Some wrinkled seeds.
401 "	10 plants were off type, late maturing. The balance were quite representative of Alaska.
636 "	A very true strain for commercial seed.
516 "	A very true strain.
367—Nott Excelsior	The vines are from 25 to 26 inches high, rather tall for this variety, and are late maturing.
229 " "	The vines vary from 14 to 22 inches, and is a later maturing pea than Nott's Excelsior —3 types of pods.
431 " "	The vines vary from 18 to 28 inches—12 veins in a 30-foot row are of the latter height. Not true.
232 " "	A very variable strain. The vines vary in height from 25 to 39 inches, with four distinct types of pods produced.
383 " "	The vines vary from 13 to 20 inches high. Is not considered true.
389 " "	A very true strain. The plants are of uniform height and producing pods of uniform size and shape.

PEAS—*Continued*

355—New Surprise	This sort is quite identical to Laxtonian and would pass for a true strain of the latter.
678—Surprise	A very true strain. The vines average 30 inches and are quite slender with scant foliage; pods uniform, small, straight.
682 "	This is not as uniform a sample as 678, but possesses many of the characteristics and may be termed as a fair strain.
672 "	This is a true strain. The vines are characteristically slender with typical pods.
687 "	Not as uniform plants as in the sample 672, but is no doubt an inferior strain of this variety.
677 "	The vines range from 29 to 41 inches high and produced pods of several types. This is likely a hybrid.
382—First and Best	The vines range in height from 18 to 48 inches. Some pods are at the edible stage while other vines have the pods just forming and others are just coming into bloom. Not true.
409 " "	A very uniform sample. True to one type. Seed smooth, dimpled, cream.
646 " "	A uniform, true sample.
391 " "	A variable sample. The vines range from 12 to 29 inches high.
390 " "	The vines are all heights from intermediate to very tall. A mixture.
684—Davis Perfection	The correct name is Canners Perfection (Davis Perfection). A very uniform sample, all one type.
673 " "	A very uniform, good sample.
683 " "	A very uniform, good sample.
642 " "	A very uniform, good sample.
660—Perfection	This is a very even sample, true to type. Quite the same as Advancer.
668—Perfection	A variable lot, both for vine length and pod shape and size—a mixture.
135—Champion of England	The vines range in height from 45 to 60 inches, with three different types of pods.
213 " "	Four types of pods produced—broad plump, broad flat, narrow rounded straight short, narrow rounded curved-back short.
155 " "	A very uniform, true sample.
208 " "	A very badly off type sample.
135 " "	Not true to one type, hardly two vines produced pods of a similar type. Varying from $2\frac{3}{4}$ to $3\frac{1}{4}$ inches long.
154 " "	A very good, uniform sample that is relatively true to one type.
437—Peter Pan	This is a very true sample of Blue Bantam.
432—Peter Pan	The plants were of one type but lacked vigour.
201—Hundredfold	An excellent sample, quite the same as Blue Bantam or of the Laxtonian type.
422 "	An even strain of Blue Bantam-like, Laxtonian peas.
205 "	A fairly uniform sample of Laxtonian type.
384 "	A very good Laxtonian selection.
194—Little Gem	This sample varied in height of vines from 21 to 29 inches, which is tall for the variety. The vines and foliage were quite identical for colour and habit.
149 " "	This is a fairly true sample.
414 " "	The vines vary from 14 to 24 inches. A mixture.
417 " "	An even strain of the variety.

PEAS—*Continued*

405—Prizewinner	This strain resembled Stratagem very closely and would pass for a good strain of that sort, particularly as to vine foliage and pods.
425—Peter Pan	Two types were present—Blue Bantam and Laxtonian curved back pods were present and those that were straight.
375—Premium Gem	About one-quarter of the vines were off in type.
219 " "	A true sample.
230 " "	A true sample, one of the best tested.
139—Admiral Dewey	Varying from 43 to 55 inches in height. 3 distinct types of pods.
691—Horal	This is a true, uniform strain corresponding to the sample tested that was supplied by the originators.
702 "	A true sample.
703 "	A true sample.
663 "	A true sample.
639 "	A true strain.
363—Hundredfold	The vines vary somewhat in height but resemble one another. The pods are of two types of Laxtonian and Blue Bantam shape.
651—Duke of Albany	This is a very fair strain of the variety.
712—Latest of All	Vines vary in height from 32 to 42 inches. This is evidently a uniformly late variety.
453—Superb	A very uniform, pure sample.
361—McLean Little Gem	A very good strain of Little Gem.
667—Early Giant	A very good strain of a Stratagem-like sort.
364—Mammoth Podded Extra Early	This is a strain of Pilot, the pods and vines are identical.
468—Michaelmas	The vines varied somewhat in height from 38 to 43 inches. It was a very late maturing variety somewhat like Latest of All.
406—Mayflower	A uniform variety growing to a height of 18 inches and resembling Blue Bantam.
198—Prince of Wales	The vines varied from 29 to 34 inches in height and were of three different types and three types of pods.
647 " "	Two distinct types of vines and pods.
197 " "	A very variable strain. The vines vary from 30 to 37 inches and produce three different types of pods.
390 " "	A mixture of types, as indicated by the different types of pods.
400 " "	A mixture of types.
401 " "	A mixture of types.
688—Dwarf Defiance	Resembles Blue Bantam. An exceedingly good sample; vines 22 inches tall, very even.
694—Defiance	Resembles Stratagem in type and habit of vine, shape and colour of foliage. The pods are quite typical of this variety also. A very true strain.
697—Glory of Devon	This sample is too dwarf for Glory of Devon, but corresponds to other goods samples of Blue Bantam and Laxtonian.
645—Glory of Devon	A variable sample, ranging from 20 to 40 inches in height.
644—Ne Plus Ultra	A very uniform sample, apparently true to type—not very productive.
649—Ne Plus Ultra	This is a mixture. The vines range from 45 to 72 inches tall.
720—English Wonder	A very even strain.
170—English Wonder	Two rogues present, otherwise a good sample.
656—Pioneer	So much like Laxtonian that it is impossible to see any difference. The sample is very uniform.

PEAS—*Continued*

377—Pioneer	This is a Laxtonian type also but not as uniform as the former sample.
162—Pilot	A true sample.
178—World Wonder	A very good sample of Pilot type, with two off-type plants.
176—Union Jack	The vines range in height from 24 to 36 inches. Three different types of pods are evident. An unfixed strain.
717—Dwarf Gem	A good strain of Stratagem.
231—Dwarf Sugar	An even sample of this variety. French or Dwarf Gray Sugar is the correct name.
179—Bluebird	This is a distinct mixture.
398—Eight Week (Carter)	A very true sample.
354—Senator	A very uniform sample that corresponds in every way with the description of this variety.
657—Quite Content	A very good sample. Quite true.
360—Sutton Ideal	This sample corresponded to Pilot in every way. Vines slender, scant foliage and typical pods of Pilot.
699—Phenomenon	This sample is very uniform and corresponds to the description.
713—Matchless	This is a very uniform sample, very much like Stratagem. The true Matchless should be about 6 feet tall, therefore this is not true.
228—Melting Sugar	The vines vary from 44 to 66 inches in height, indicating that this is an unfixed lot of peas.
706—Victor	The vines vary from 20 to 24 inches in height. The pods are pointed, resembling the Dwarf Telephone group. Compared with Dwarf Telephone the vines are quite identical.
714—Best of All	A late maturing variety or strain, somewhat like Senator only more dwarf.
362—Prince Edward	Vines vary in height from 38 to 45 inches, likewise the pods vary in form. Not true to one type.
423—Extra Early (Pedigree)	This is a very true sample of Extra Early (First and Best).
397—Dwarf Gray Sugar	Vines uniform for height, 23 to 24 inches. One type of pods 3 inches long, backward curved, distorted.
138—Excelsior	This looks like a weak strain of Laxtonian, only a few plants having developed.
643—Sherwood	The vines are quite uniform, 22 inches tall. The pods vary in shape, some straight, while others are curved backwards. Very Stratagem-like.
349—Laxton Progress	A true sample of this strain.
125 " "	A mixture varying from 14 to 22 inches high.
126 " "	A true sample, very uniform.
127 " "	A true sample, very uniform.
640 " "	A true strain, very uniform.
220 " "	A true strain, very uniform.
182 " "	A true strain, very uniform.
128 " "	A true strain, very uniform.
183 " "	A true strain, very uniform.
719 " "	This sample is only fair; there is a slight variation in the vine habit and also the pods.
698 " "	A variable strain. The vines vary from 14 to 18 inches in height. Some plants are identical in habit to Blue Bantam.
214 " "	A mixture of early and late maturing plants.
675 " "	A very uniform, good strain.
215 " "	Only 11 plants but all are true to the Laxton Progress type.
345 " "	A very true strain.

PEAS—*Continued*

421	American	Wonder	A uniform, true sample.
226	"	"	In a row 3 feet long there was one vine of Canners Perfection.
212	"	"	A very true, uniform sample.
654	"	"	The vines are too tall for this variety, being too late maturing, but correspond to Canners Perfection.
413	"	"	This is a mixture; there are vines 12 inches high and 24 inches high.
710	"	"	A uniform strain of peas that is very similar to Nott Excelsior. This is not true American Wonder.
172	"	"	This strain very uneven, ranging from 9 to 12 inches high. It is a rather uneven sample when compared with others that are true.
669	"	"	The vines range from 26 to 34 inches high. Not American Wonder.
357	"	"	The vines vary from 19 to 36 inches and therefore can only be considered as a mixture.
433	"	"	A variable sample. The vines vary from 15 to 27 inches.
353	"	"	A very true, even sample.
369	"	"	The vines were 19 inches and slightly more, as well as producing broad, long pods. This is not American Wonder.
146	"	"	The vines varied from 16 to 25 inches in height. Not true.
145	"	"	This sample is identical to Canners Perfection.
211	"	"	A true sample.
210	"	"	This is an uneven sample of Canners Perfection. Not American Wonder.
147	"	"	Canners Perfection type, although somewhat uneven in height. Not American Wonder.
153	"	"	An uneven sample, ranging from 26 to 34 inches in height.
427	"	"	This is an excellent sample that corresponds to the Little Marvel type.
429	"	"	A mixture of types. The vines vary from 17 to 26 inches high and the pods vary.
204	"	"	This is a very fair sample of American Wonder.
387	"	"	This is a very typical sample, being the best for American Wonder.
171	"	"	This sample is fairly good, but six plants were decidedly off type.
185	"	"	A mixture.
120	"	"	This sample is quite identical to Little Marvel.
116	"	"	The vines vary from 22 to 32 inches high. Not American Wonder.
410	"	"	The vines vary from 16 to 28 inches tall. Not true.
117	"	"	Not true as the vines vary from 18 to 36 inches high.
118	"	"	A very uniform sample, 16 inches in height, producing pods that are off type for American Wonder. The peas are loosely arranged in the pods. Not true.
119	"	"	The vine heights varied from 19 to 34 inches. Not true.
652	Little	Marvel	A true sample.
412	"	"	A true sample.
434	"	"	A true sample.
373	"	"	This sample is very uniform and true.
399	"	"	A true sample.
370	"	"	Not true to one type. The vines vary from 14 to 23 inches tall.

PEAS—*Continued*

395	Little Marvel—*Con.*	Varies from 18 to 30 inches in height. Not true.
388	" "	A true sample.
184	" "	A very uniform strain.
195	" "	A very variable sample. Not true.
196	" "	This sample is slightly variable in vine heights, but resembles quite closely the American Wonder variety. It could not be considered a desirable strain.
152	" "	Too variable for a true sample, varying in height from 16 to 22 inches.
351	" "	This is a fairly good sample.
350	" "	There is some variation, ranging from 15 to 20 inches in height.
174	" "	Not true.
379	" "	This is an even, good sample.
366	" "	Very variable, about half of the vines were 13 inches tall, while the balance were between 16 and 19 inches. Not true.
150	" "	Uneven, variable, not true.
151	" "	Not true, vines ranged from 19 to 28 inches high.
124	" "	A very good sample. True to type. Very poor germination.
415	" "	A very true strain, good.
106	Gradus	Not true, the vines ranged from 36 to 42 inches and produced variable pods.
411	"	The vines varied from 30 to 58 inches high; 10 per cent were of the latter height.
105	"	A very true strain.
400	"	Very much like Telephone (tall).
352	"	A true sample.
658	"	A true sample.
690	"	A very fair, uniform sample, true.
424	"	A very true sample.
202	"	A very true sample, very good.
107	"	Not a true sample; three types of pods.
203	"	Tall vine mixture, 30 to 48 and 54 inches high. Pods vary also.
430	"	Two plants were of Telephone type, otherwise a good sample.
175	"	This sample varied from 33 to 50 inches high.
674	Alderman	The plants vary from 32 to 44 and 50 inches high. Not true.
671	"	The plants vary from 47 to 66 inches high, but the pods are quite the same form. Not true enough.
695	"	This is a very uniform sample, both vines and pods are characteristic of the variety.
429	"	A very variable sample; vines 31 to 60 inches high with considerable variation in pod form. Not true.
420	"	The vines vary from 31 to 60 inches; four types of pods. Not true.
665	Laxton Superb	A uniform sample, true to type.
177	Laxton Superb	This is a very true sample.
716	Canners Gem	A true sample but later maturing than Gem. More like Canners Perfection.
685	" "	A true sample of this variety.
701	" "	A true sample of this variety.
676	" "	A true sample of this variety.
670	" "	A true strain, except for 2 vines that are like Canners Perfection.
704	" "	A mixture.
209	Telephone	This is a very good sample true to one type.
216	"	Not a true sample.
163	"	This is a very uniform sample, but the pods are darker green, which resembles Alderman.

PEAS—*Continued*

393—Telephone—*Con.*		Varies in plant heights from 42 to 54 inches. Not true.
165	"	Varies in vine length from 36 to 46 inches. Not true.
140	"	The vines vary from 24 to 50 inches high. Not true.
142	"	The vines are fairly uniform, but the pods are very variable. Only about 2 per cent are true Telephone type; the rest are broad, flat, dark green.
143	"	Slightly better than sample 142, but not true enough.
141	"	A genuine mixture; four distinct types of pods.
123	"	Vine heights varied from 37 to 48 inches, with various shaped pods. Not true.
661	"	Vines of three different types and three distinct types of pods.
144	"	This sample has a slight variation but is not true Telephone. It would pass for a variable sample of Alderman.
718	"	About 3 per cent of the vines were 56 inches high; the remainder were 48 inches high. Not true Telephone type pods.
418	"	The vines varied from 48 to 60 inches with various sized and shaped pods. Too rangy to be true.
435	"	Like Blue Bantam in some respects. The vines were from 14 to 22 inches high. Not true.
653	"	This is a very true sample. The vines are very uniform, 50 to 51 inches high. Pods conform to a type and are of medium pale green.
680	"	Vines vary from 48 to 64 inches high. Not true.
638	"	Vines vary from 38 to 70 inches high. Not true.
378	"	A mixture of Gradus-like plants and Telephone. The height of vines varied from 30 to 58 inches.
428	"	The vines varied in height; none of the pods produced were like Telephone, being short, blunt-ended. Not true.
689	"	This is not a true strain as indicated by the very variable vine growth and variable pods. Not true.
221	"	This sample lacks uniformity in pod character and shape, besides the colour of the pods varies from light to dark green. Not true.
222	"	The vines varied considerably. Not true. The sample was rather small as there was only enough seed for a row 7 feet long.
164	"	This is a mixture. The vines ranged from 27 inches to 60 inches high.
387—Horsford Market Garden		A true sample. Very good.
388—McLean Advancer		The vines varied from 24 to 50 inches high. Not true.
389—Surprise		This lot is too tall for Surprise, being 40 to 72 inches high.
68-11882—Reliance		Very much like Stratagem, in fact is quite the same. The vines, foliage and pods are indistinguishable from Stratagem.
Dwarf Edible		This sample lacks uniformity. The vines vary from 21 to 30 inches high.
4730—Radio		The vines and pods were identical to Laxtonian.

PEAS—*Concluded*

70-474A—Gran-d	A mixture. Some vines 28, some 38 and some 57 inches tall.
Lord Chancellor	The vines are quite uniform in height, averaging 34 inches. The pods are large, dark green, but vary in shape somewhat. To conform to the correct height the vines should be four feet high.
Cooper Champion	This sample was very much like Laxtonian, behaving in every way like that variety. A good sample.
C.X. 8-3951—Onward	The vines varied from 26 to 36 inches high. The pods varied greatly in length and shape.
Partridge	The vines varied from 29 to 50 inches high—not fixed for one type.
CC 1167-60478—Ormskirkian	44 to 59 inches tall, very variable in vine and pod development.

PEPPER

Sunnybrook, A. E. McKenzie	The same as that sold by W. A. Burpee under this name.
Early Jersey Giant, Graham	This belongs to the Chinese Giant type.

TOMATO

Royal Pink, Graham	A late-maturing, strong-growing strain like Livingstone Globe.
Essex Wonder, A. E. McKenzie	Decidedly different to any other variety grown.

ORNAMENTAL GARDENING

The increasing interest in gardening and home beautification in Canada is well indicated by the much greater number of visitors to the Ornamental Grounds at the Experimental Farm. With the general use of motor cars people come from long distances to see the Farm and thus the work there must have a wider and wider influence. In 1929 many horticultural societies ran excursions to the Experimental Farm, which gave a large number of those especially interested in ornamental horticulture an opportunity to see and study the trees, shrubs and herbaceous plants there.

It is not possible in an Annual Report to deal with more than a very few features of the work and this year the Polyantha Pompon roses have been chosen.

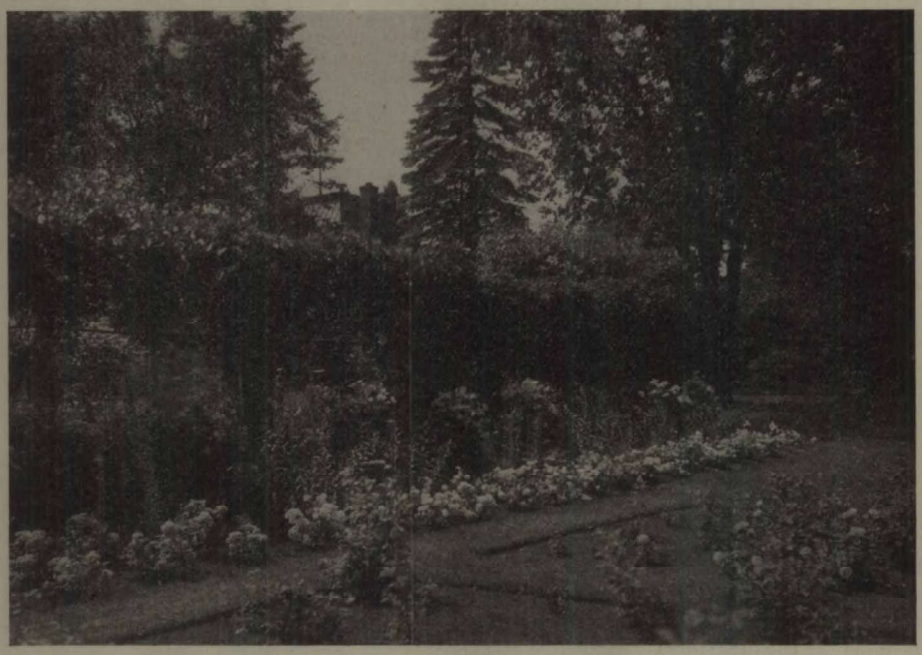
POLYANTHA POMPON ROSES TESTED AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

The Polyantha Pompon roses should be more commonly grown in Canada as they have many good qualities to recommend them to the garden enthusiast. They are easily grown, not very susceptible to disease, continuous bloomers and hardier than Hybrid Teas. Because of their dwarf, compact growth they are easy to protect in districts where winter protection is necessary. They do not need very hard pruning but all dead wood and weak shoots should be removed. The bushes start to bloom early and continue all through the season. All dead flowers should be kept cut off so as to encourage new growth and bloom.

The first of this type of rose was Paquerette, which was introduced into commerce in 1875. The exact origin is obscure, but it is supposed that *R. multiflora*, a strong growing, summer-flowering species, was crossed with some dwarf, late-flowering kind. The new race is different from either parent, showing, as

it does, some characters of both. The large clusters of flowers are inherited from *multiflora* and the dwarf compact growth and everblooming habit from the other parent. In some of the more recent varieties Hybrid Tea blood has been introduced and we now have varieties like Kirsten Poulsen and Salmon Spray, which are sometimes listed as Hybrid Teas and sometimes as Polyantha Pompons.

Descriptions of the Polyantha pompon roses grown at the Central Experimental Farm were taken in 1929 and are here given. The name in brackets is that of the originator. The colours have been compared to those in Ridgeway's Colour Chart.



Polyantha Pompon roses as an edging to rose beds at the Central Experimental Farm, Ottawa.

AMAURY FONSECA (SOUPERT & NOTTING).—Height 24 inches; foliage dark cress green; leaflets medium large, showing a little black spot late in season. Flowers: bud, round cone, over one hundred in truss, venetian pink; expanded bloom white, flushed with pale rose pink, fading to white. Season from June 28 until October. No use as a cut flower.

ANNCHEN MULLER (SCHMIDT).—Height 14-22 inches; foliage cress green; leaflets small, some black-spot in midseason, increasing later. Flowers: bud, medium long cone, 15 to 25 in a cluster, spinel red; expanded bloom double rose colour, fading to amaranth pink. Lasts three days in water. Season June 25 continuously until severe frost.

ASCHENBRODEL (LAMBERT).—Height 10-15 inches; foliage spinach green, leaflets medium small, very little black-spot late in season. Flowers: bud, round cone, 10-20 in cluster, thulite pink; expanded bloom round double, cameo pink, fading paler, very fragrant. Cut blooms last two days. Season June 26 to October.

BABY LYON (TURBAT).—Height 10-15 inches; foliage cedar green, leaflets medium small; black-spot developed at midseason and increased rapidly. Flowers: bud, oval, 2-5 in cluster, pomegranate purple to rose red; expanded bloom, deep rose pink, fading paler; very fragrant. Cut bloom lasts two days. Season June 27 to end of September. This has a beautiful bud but is not so useful for mass effects as the varieties with larger clusters.

BORDURE (BARBIER).—Height 14 inches; foliage dark cress green, leaflets small; black-spot slight late in season. Flowers: bud, small, cone open end, 35-50 in cluster, thulite pink to spinel red; expanded bloom spinel pink, double. Cut bloom lasts two days. Season July 3 to end of October, constantly in bloom.

CHATILLON ROSE (NONIN).—Height 15-25 inches; foliage cedar green, leaflets large; black-spot seen late in season. Flowers: bud fairly large, 70-90 in cluster, amaranth to pomegranate purple; expanded bloom semi-single, tyrian rose with white centre, fading to tyrian pink. Season June 26 continuously until hard frost.

CORAL CLUSTER (MURRELL).—Height 25 inches; foliage cress green, leaflets medium large; black-spot very slight. Flowers: bud small, jasper pink, 20-40 in cluster; expanded bloom medium size, double, la france pink, fading to cameo pink. Season July 1st continuously until hard frost. This variety is a sport from Orleans and occasionally reverts and has red flowers. Except for this it is one of the best.

CORONET (PAUL).—Height 15 inches; foliage dark cress green, leaflets medium; black-spot started in midseason and developed rapidly. Flowers: bud round, 8-15 in cluster, yellow shaded with rose; expanded bloom semi-double, yellow overlaid with rose colour, fading paler. Season June 18 to July 6, August to 1st week in September.

CRIMSON ORLEANS (LAXTON).—Foliage forest green, leaflets medium large; some black-spot late in season. Flowers: bud round cone, 20-30 in cluster, bordeaux to amaranth purple; expanded bloom double, rich, deep tyrian rose, white-rayed from white centre. Lasts 5 days in water. Season July 1 to October. This is a sport of Orleans so may revert.

CYCLOPE.—Height 15 inches; foliage light cress green, leaflets small; black-spot very little late in season. Flowers: bud long-pointed, 5 in cluster, bordeaux; expanded bloom semi-double, rich velvety bordeaux rayed with white; attractive fragrance; useless as cut flower. Season June 20 to September but not continuously.

ÉBLOUISSANT (TURBAT).—Height 15 inches; foliage medium size, shows a little black-spot all through the season. Flower: bud longish cone-shaped, 12 in cluster, bordeaux; expanded bloom double with wavy petals, velvety deep pomegranate purple with whitish centre, holds colour well. Lasts three days when cut. Season June 20 to October, but not continuously.

ECHO (LAMBERT & SCHULTHEIS).—Height 12 inches; foliage shiny cerro green, leaflets small; black-spot noticed throughout season. Flowers: bud round, 15 or more in cluster; expanded bloom, double, large, rosolane pink suffused with rosolane purple towards margin, fading to pale rosolane pink. Good as cut flower, lasts 6-7 days in water. Season June 24 until frost. This is a sport of the climbing rose, Tausendschon, to which it frequently reverts.

EDITH CAVELL (JAN SPEK).—Height 20 inches; foliage dark cress green, leaflets medium; black-spot almost free except for few small spots late in season. Flowers: bud short, round cone, 30-45 in cluster, bordeaux; expanded bloom double, rich glowing pomegranite purple, included to sunburn. Lasts 3 days in water. Season June 29 continuously until severe frost.

ELLEN POULSEN (POULSEN).—Height 10 inches; foliage cress green, very little black-spot. Flowers: bud 3-9 in cluster; expanded bloom large, double, glowing rose colour, paler towards centre, fading to rose pink. Lasts 7 days when cut; fragrant. Season June 24 until frost. This is one of the best of the polyanthas; although there are not so many flowers in a cluster as in some of the others, the individual blooms are larger. The colour also is very pleasing.

ELSE POULSEN (POULSEN).—Height 12-18 inches; foliage dark cress green, leaflets large, a little black-spot late in season. Flowers: bud long cone, 3-6 in cluster, pomegranate purple; expanded bloom large, semi-single, cupped, deep rose pink, fading to whitish pink. Lasts 6 days when cut. Season June 26 to frost, though not always full of bloom as in some of the other varieties.

ERNA TESCHENDORFF (TESCHENDORFF).—Height 10-14 inches foliage cress green, leaflets medium size. Flowers: bud round cone, 20-40 in cluster, bordeaux; expanded bloom medium size, double, amaranth purple to tyrian rose with white centre; fragrance attractive. Lasts 6 days in water. Season June 28 continuously until hard frost.

EUGÉNIE LAMESCH (LAMBERT).—Height 8-16 inches; foliage dark cress green, leaflets medium size; black-spot quite bad late in the season. Flowers: bud round and fat, 10-15 in cluster, light salmon orange splashed with carmine; expanded bloom medium large, double, maize yellow, deeper in centre, sometimes flushed with rose pink; fragrance attractive. Lasts 1-2 days in water. Season June 27 intermittently until frost. A very dainty rose but not so floriferous as many of the others.

EVA TESCHENDORFF (TESCHENDORFF).—Height 17 inches; foliage dark cress green, leaflets medium large; black-spot a little late in season. Flowers: bud medium small, oval, 15 to 25 in cluster, white tinged with greenish yellow; expanded bloom large, double, round, cream fading to white. Useless as cut flower. Season June 26 intermittently until October.

EXCELLENS.—Height 12-24 inches; foliage cress green, leaflets small to medium; black-spot bad late in the season. Flowers: bud oval, 40-50 in cluster, spinel red; expanded bloom large, double, round, rose-pink, becoming spotted with age. Lasts 3 days in water. Season June 24 continuously until frost.

FRAU CECILE WALTER (LAMBERT).—Height 10 inches; foliage cress green, leaflets medium size; some black-spot all through the season. Flowers: bud round cone, 5-10 in cluster, capucine buff; expanded bloom medium size, round, double, creamy white. Lasts 3 days in water. Season June 18 fairly continuously until September.

GEORGE ELGER (TURBAT).—Height 10 inches; foliage biscay green, leaflets small, a little black-spot late in season. Flowers: bud medium long, oval, 2-15 in cluster; expanded bloom medium size, double maize yellow fading to creamy white. Useless as cut flower. Fragrance attractive. Season July 1 until frost. This is a dainty little rose, but not floriferous enough to be very effective.

GRUSS AN AACHEN (GEDULVIG).—Height 12-20 inches; foliage large, a little black-spot early in season, increasing later. Flowers: bud broad-based cone, 1-5 in cluster, ochraceous salmon overlaid with spinel red; expanded bloom creamy cameo pink fading to white, large, fragrant, double, opening out flat. Lasts 3 days in water. Season June 23 intermittently until September. This is a very attractive variety, more like a Hybrid Tea than a polyantha. It makes a fine bed.

IDEAL (JAN SPEK).—Height 12 inches; foliage dark cress green edged with red, leaflets medium size; black-spot started midseason and developed rapidly. Flowers: bud small, round cone, 5-15 in cluster, bordeaux; expanded bloom medium large, round, double, deep velvety blend of carmine and amaranth purple, rayed white. Lasts 5 days in water. Season July 5 to September. Very dark red sport of Edith Cavell, burns in strong sunlight.

JEANNE D'ARC (LEVAVASSEUR).—Height 16-21 inches; foliage dark cress green, leaflets small; very little black-spot late in season. Flowers: bud flat, round, about 50 in cluster, seafoam yellow; expanded bloom medium size, very double, white with yellow stamens, very fragrant. Season June 15 continuously until frost. Very similar to Katherine Zeimet.

JEANNY SOUPERT (SOUPERT & NOTTING).—Height 18-24 inches; foliage dark cress green, leaflets medium large; black-spot very little, developing late in season. Flowers: bud round with short pointed tip, creamy yellow at base to spinel pink; expanded bloom medium size, double, showing centre when open, cameo pink, fading to white, delicate fragrance. Season June 24 to July. Useless as cut flower.

JESSIE (MERRYWEATHER).—Height, 16 inches; foliage bright glossy, leaflets medium, large, black-spot very bad late in season. Flowers: bud small, round cone, 25-30 in cluster, pomegranate purple; expanded bloom small, double, tyrian rose with flush and streaks from centre. Season June 27 until frost. Lasts 4 days in water. This rose is not recommended as great numbers of the buds fail to open. As this fault has been noticed by several people where roses are grown under different conditions, it must be a weakness of the variety.

KATHERINE ZEIMET (LAMBERT).—Height 14-21 inches; foliage cress green, leaflets small, black-spot very slight late in season. Flowers: buds roundish with short pointed tip, 30-50 in cluster, maize yellow to creamy white; expanded bloom medium size, full double, creamy white with orange stamens, very fragrant. Season June 19 until severe frost. Very similar to Jeanne d'Arc.

KOSTER'S ORLEANS (KOSTER).—Height 24 inches; foliage dark cress green, leaflets medium large, free from black-spot until midseason when it developed rapidly. Flowers: bud round cone, 30-40 in cluster, pomegranate purple; expanded bloom semi-double, cupped, deep tyrian rose with white centre, fading lighter; lasts 4 days in water. Season July continuously until severe frost.

LADY READING.—Height 12 inches; foliage dark cress green, leaflets medium small, black-spot starting about midseason and developing rapidly. Flowers: bud round, medium long cone, 1-6 in cluster, pomegranate purple; expanded bloom, medium large, double, glowing tyrian rose; lasts 4 days in water. Season June 24 continuously until frost.

LA MARNE (BARBIER.)—Height 15-18 inches; foliage dark cress green, leaflets medium large; black-spot free until late in season. Flowers: bud medium long, uneven edge, 3-6 in cluster, tyrian rose; expanded bloom medium large, cupped, semi-single, rose colour with cream white centre, fading quickly; lasts 6 days in water. Season June 26 until severe frost.

LOUISE WALTER (WALTER).—Height 11 inches; foliage jade green, leaflets medium small; black-spot started midseason and developed rapidly. Flowers: bud short, round cone, 10-18 in cluster, spinel pink; expanded bloom cupped, double, spinel pink, white centre, fading white, splashed with pink; lasts 3 days in water. Season June 24 until frost.

MADAME JULES GOUCHAULT (TURBAT.)—Height 15-20 inches; foliage cress green, leaflets medium large; black-spot free until midseason, developing rapidly

later. Flowers: bud short, round cone, 30-50 in cluster, pomegranate purple; expanded bloom round, full double, rose colour, fading paler; lasts 3 days in water. Season June 26 continuously until severe frost.

MME. NORBERT LEVAVASSEUR (LÉVÊQUE).—Height 17-25 inches; foliage hellebore green, leaflets small, black-spot free until midseason, developing rapidly later. Flowers: bud round with short pointed tip, about 70 in cluster, rosolane purple; expanded bloom small, double with open centre, tyrian pink to rhodamine purple; lasts 5 days in water. Season June 24 continuously until severe frost.

MADAME TAFT (LEVAVASSEUR).—Height 20-25 inches; foliage dark cress green, leaflets medium small; black-spot slight, developing late in season. Flowers: bud broad, round-based cone, amaranth purple, 55-65 in cluster; expanded bloom double, medium small, tyrian rose fading to tyrian pink; lasts 4 days in water. Season June 25 until frost. Considered to be an improved form of Mme Norbert Levavasseur but is not quite such a continuous bloomer.

MAGENTA (BARBIER).—Height 12-20 inches; foliage cress green, leaflets medium large; some black-spot, developing rapidly late in season. Flowers: bud round, 30-40 in cluster, dahlia carmine; expanded bloom, round cupped, semi-double, open centre, aster purple fading through magenta to mallow pink; lasts 2 days in water. Season June 24 to end of July, with a second season in September and October. This is not an attractive colour.

MAMAN TURBAT (TURBAT).—Height 14 inches; foliage hellebore green, leaflets medium; some black-spot developed late in season. Flowers: bud round to short pointed tip, 25-35 in cluster, deep rose pink; expanded bloom medium size, double rounded ball; rose colour. No use as cut flower. Season June 19, fairly continuous until severe frost.

MERVEILLE DES ROUGES (DUBREUIL).—Height 11 inches; foliage dark cress green, leaflets medium large; black-spot very little all through the season. Flowers; bud medium long cone, 3-4 in cluster, dahlia carmine; expanded bloom round, semi-cupped, velvety deep pomegranate purple with whitish centre; lasts 5 days in water. Season June 24 continuously until frost.

MIMI PINSON (BARBIER).—Height 23 inches; foliage jade green; leaflets medium; black-spot present all through the season. Flowers: bud round to short point, 60-70 in cluster, rosolane purple; expanded bloom round, double, opening to expose centre, deep tyrian pink fading to deep rose pink; lasts 4 days in water. Season June 23 continuously until severe frost.

MRS. W. H. CUTBUSH (CUTBUSH).—Height 19 inches; foliage forest green, leaflets medium; black-spot present all through season. Flowers: bud wide-based cone, 50 or more in cluster, spinel red; expanded bloom round, double, rose colour fading to rose pink; lasts 5 days in water. Season June 24 continuously until severe frost, with a slight falling off in August.

ORANGE KING (CUTBUSH).—Height 17 inches; foliage dark cress green, leaflets medium large, black-spot a little late in the season. Flowers: bud round, 20-35 in cluster, coral red; expanded bloom small, round, double, vivid coral red to grenadine; lasts 4 days in water. Season July 3 continuously until frost. The colour of this rose is quite attractive but cannot be used with the ordinary red and pink varieties.

ORLEANS (LEVAVASSEUR).—Height 15-25 inches; foliage cress green, leaflets medium; black-spot very slight, developing late in the season. Flowers: bud round cone, 20-40 in cluster, amaranth purple; expanded bloom semi-double, tyrian rose to rose colour, with white centre; lasts 3 days in water. Season June 28 continuously until severe frost.

PAQUERETTE (GUILLOT).—Height 15 inches; foliage dark cress green, leaflets small; black-spot almost free. Flowers: bud small, round cone, 80-90 in cluster, cream tinged with venetian pink; expanded bloom cupped, double, white; lasts 3 days in water. Season June 15 until September, with breaks at end of July and end of August.

PERLE DES ROUGES (DUBREUIL).—Height 12 inches; foliage cress green, leaflets medium; black-spot present all through the season. Flowers: bud round-based cone, 5-10 in cluster, pomegranate purple; expanded bloom full double, velvety tyrian rose; lasts 4 days in water. Season June 22 intermittently until September.

PERLE D'OR (DUBREUIL).—Height 10-20 inches; foliage medium large; black-spot slight all through season. Flowers: bud long cone, beautiful form, 5-8 in cluster, flesh to coral pink; expanded bloom full, double, tips reflexed, light salmon orange, fading paler, fragrance delicate and attractive; lasts 3 days in water. Season June 24 intermittently until September.

PERLE ORLEANAISE (DUVEAU).—Height 10-15 inches; foliage dark green, reddish tinted, leaflets medium size; little black-spot, increasing as season advances. Flowers: bud short, round cone, 8-15 in cluster, spinel red; expanded bloom round, cupped, double, la france pink shaded yellow, fading to pale venetian pink; lasts 4 days in water. Season June 26 continuously until severe frost.

PETIT CONSTANT (SOUPERT & NOTTING).—Height 10-15 inches; foliage dark cress green, leaflets medium large; black-spot very slight, developing late in season. Flowers: bud medium long, open end, 2-6 in cluster, light jasper red; expanded bloom double, opening almost flat, la france pink shaded with yellow in centre, fading paler; fragrance very attractive; lasts 3 days in water. Season July 1 intermittently until frost.

PHYLLIS (MERRYWEATHER).—Height 12-16 inches; foliage cress green, leaflets small; some black-spot developing rapidly towards end of season. Flowers: bud round, flat cone, 30-35 in cluster, spinel red; expanded bloom round, double, rose colour fading to rose pink; lasts 6 days in water. Season June 22 continuously until severe frost.

PINK DELIGHT (LAXTON).—Height 20 inches; foliage cress green, edged with reddish, leaflets large, some black-spot developing late in season. Flowers: bud long cone, 1-8 in cluster, spinel red; expanded bloom, large, single, rose pink; lasts 4 days in water. Season July 1 intermittently until September; not very floriferous.

RENONCLE (BARBIER).—Height 12 inches; foliage medium large; some black-spot all through the season. Flowers: bud round cone, 20-35 in cluster, amaranth purple; expanded bloom ranunculus shaped, double, rose colour; lasts 4-5 days in water. Season July 3 continuously until severe frost.

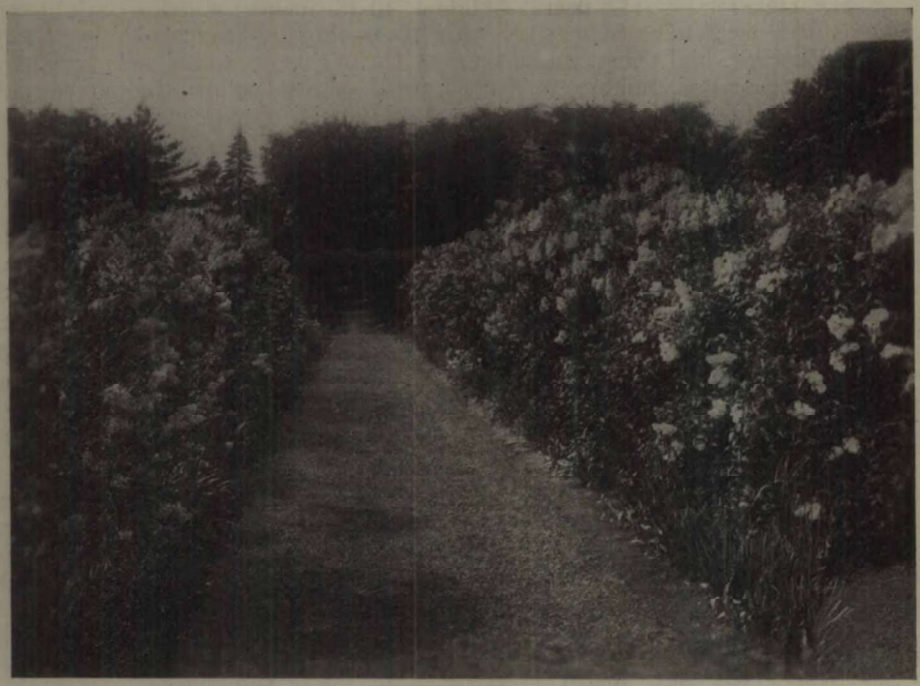
RODHATTE (POULSEN).—Height 18; foliage elm green, leaflets large; black-spot developing rapidly towards end of season. Flowers: bud, medium long, uneven open end, 2-6 in cluster, bordeaux; expanded bloom, large, semi-double, cupped, tyrian rose, paler centre, fading to deep rose pink; lasts 6 days in water. Season June 25 fairly continuously until frost, except when weakened and defoliated by black-spot.

RUDOLPH KLUIS.—Height 10 inches; foliage cress green, leaflets small; some black-spot developing rapidly towards end of the season. Flowers: bud round to short point at tip, 5 in cluster, pomegranate purple; expanded bloom round, double, petal edges reflexed and rolled, tyrian rose fading to deep rose pink; fragrant; lasts 6 days in water. Season June 24 continuously until severe frost.

SUSIE (EASLEA).—Foliage lincoln green, leaflets medium, some leafspot all through the season. Flowers: bud round full centre, open at the tip, oxblood red, 3-8 in cluster; expanded bloom rosette, opening slowly, venetian pink, quickly blotched with rose colour; very fragrant; lasts 3-4 days in water. Season June 20-July 20, August 20-September 30.

THERMIDOR.—Height 20-24 inches; foliage dark cress green, leaflets large; very little black-spot. Flowers: bud round cone, 15-25 in cluster, maize yellow to buff yellow; expanded bloom double, opening flat showing stamens, creamy white, strong distinct fragrance; lasts 3 days in water. Season July 1-29, mid-August to mid-September.

TINY TIM (EASLEA).—Height 17 inches; foliage dark cress green, leaflets medium large, very little black-spot. Flowers: bud long cone, 8 in cluster, spinel red; expanded bloom large, double, thulite pink fading to white, delicate and attractive fragrance; lasts 4-5 days in water. Season June 25 until frost, with a short break at end of July.



Lilac walk, Central Experimental Farm, Ottawa.
(Photo by Frank T. Shutt)

TIP-TOP (LAMBERT).—Height 7 inches; foliage yew green, leaflets medium small, very little black-spot. Flowers: bud round with pointed tip, 1-3 in cluster, cadmium yellow to maize, edged with tyrian pink; expanded bloom, full double, outer petals reflexed, creamy white centre, shading to tyrian pink on the edges of petals, very fragrant; lasts 2 days in water. Season June 20 intermittently until frost.

TRIOMPHE D'ORLEANAISE (PEANGER).—Height 14 inches; foliage bright and glossy cress green, leaflets medium size; no black-spot until midseason when it develops rapidly. Flowers: bud cone to medium long point, 25 in cluster, amaranth purple; expanded bloom, round, double, opening to show centre, amaranth purple, fading to tyrian rose; lasts 3 days in water. Season June 23 continuously until severe frost.

VERDUN (BARBIER).—Height 18 inches; foliage dark cress green, leaflets large, a little black-spot developing late in season. Flowers: bud very round to very short pointed tip, amaranth purple; expanded bloom double, globular, deep tyrian rose; lasts 6 days in water. Season June 29 continuously to very severe frost.

WHITE CECILE BRUNNER (EASLEA).—Height 17 inches; foliage cress green, leaflets medium small, black-spot very bad. Flowers: bud round, 2-15 in cluster, cream tinged with pink; expanded bloom round, double rosette, pure white. Useless as cut flowers. Season June 21 continuously until frost.

YVONNE RABIER (TURBAT).—Height 17 inches; foliage glossy, dark cress green, leaflets medium large; a little black-spot late in the season. Flowers: bud very fat, round cone, 15-25 in cluster, white, outer petals green, sometimes tinted with rose; expanded bloom round, double, cupped, white, fragrant. Useless as cut bloom. Season July 1 continuously until severe frost.

There are two distinct types of these roses, those with large clusters of small flowers, which are extremely useful for bedding, although the individual flowers are frequently of poor form, and those with fewer blooms in a cluster but with well shaped buds.

A selection of the best varieties follows:—

Blooms in large clusters:—

Chatillon
Coral Cluster
Edith Cavell
Ellen Poulsen
Erna Teschendorff
Eva Teschendorff
Katherine Zeimet
Koster's Orleans
Mrs. W. H. Cutbush
Orleans
Yvonne Rabier

Flowers of good form:—

Baby Lyon
Cecile Brunner
Eugénie Lamesch.
George Elger
Perle d'or
Tiny Tim
Tip Top

GREENHOUSES

The experimental work in the greenhouses was continued along much the same lines in 1929 as in previous years. A comparison was made of yield of cut flowers and quality of bloom of standard varieties and novelties of antirrhinums, carnations and sweet peas. Varieties of schizanthus, cyclamen and geranium were also tested for comparison. The breeding of new varieties of chrysanthemums was continued while varieties in the main collection were compared as to relative merits.

The forcing cucumber originated in the Division of Horticulture, a cross between Hescrow and Deltus, again did well. Selection was continued to obtain an even better type. The breeding of tomatoes, egg plants, onions, cabbage and other vegetables was also carried on and the project for developing a head lettuce of good size, especially suited for greenhouses, was continued.

Much cross-breeding of fruits was also done in the greenhouse as in previous years, working with apples, pears, plums, cherries, gooseberries, blueberries, raspberries and blackberries.

NEW CHRYSANTHEMUMS ORIGINATED IN THE HORTICULTURAL DIVISION

Only three of the new varieties originated in the Horticultural Division were named in 1929; these were as follows:—

BARBARA MACKAY.—Seedling of Pomona. An attractive pale pink variety with yellow centre. Single.

MRS. R. A. KINGMAN.—Seedling of Lizzie Monson. A distinct rose pink. Single.

ELLA SUTHERLAND.—Seedling of Pomona. An anemone type, white with a yellow centre. Very attractive.

SWEET PEA EXPERIMENT IN GREENHOUSE

The sweet pea is a very important florist's flower and succeeds well in greenhouses. Four good crops have been grown and many varieties especially recommended for winter blooming have been tested.

In the following table will be found the yield of flowers for the winter of 1928-29, and also the average yield for each variety for the three seasons, 1926-27, 1927-28 and 1928-29. The crop for 1925-26 is not included in the average as the plants had to be pulled before the season was over that year.

There were 44 different lots of sweet peas grown in the main greenhouse in 1928-29. The seed was sown in 2½-inch pots on October 23, 1928, and the plants set out in the bed on December 15, 1928. The soil was 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 May 25, at which time they had reached a height of about twelve feet and were still growing and blooming well, though the flower stems were short. The total number of stems cut from all varieties was 27,434, or 48 stems per square foot.

SWEET PEA—RESULTS OF GREENHOUSE EXPERIMENT

Name of variety and source of seed	Number of plants	Date of first bloom	Date of first cut	Date of last cut	Number of cuttings	Average Number of flowers per stem first cutting	Average Number of flowers per stem all cuttings	Average length of stem 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 1928–29	Average number of stems per plant 3 crops 1926–27, 1927–28, 1928–29
		1929	1929	1929				in.	in.					
Rose Queen (B) mauve pink	15	Mar. 5	Mar. 8	May 5	21	2	3	16	18	32	109	932	62	91
Mrs. W. G. Harding (B) light mauve lavender	12	" 1	" 4	" 25	23	2	3	9½	13	39	113	591	49	87
Harmony (B) mauve-lavender	12	" 4	" 8	" 25	23	2	3	10	13	14	56	506	42	80
Ey. Lavender King, mauve-lavender	15	" 5	" 8	" 20	21	2	3	12	14	26	94	737	49	79
Fordhook Pink and White, white tinged mauve pink	12	" 15	" 18	" 25	18	2	3	14	14	5	51	586	49	78
Illumination, rosy red	12	" 5	" 8	" 25	23	2	3	12	14	15	52	584	49	73
Miss Louise Gude, mauve pink suffused white	12	" 15	" 18	" 25	22	2	3	16	16	6	55	845	70	72*
Glorious, rosy-purple	15	" 5	" 8	" 25	21	2	3	11	13	52	133	849	57	71
Ey. Bluebird, bluish-purple	12	" 4	" 8	" 25	23	2	3	11	14	32	74	639	53	71
Pink Profusion, mauve-pink suffused white	12	" 8	" 15	" 25	22	2	4	15	15	4	60	593	49	70
Columbia, rosy pink and white	12	" 18	" 23	" 25	19	2	3	14	14	.....	13	717	60	69
Penrose, rose suffused lighter shades	12	" 18	" 23	" 25	18	2	3	14	13	.....	22	487	41	69
Peach Blossom, mauve-pink	12	" 4	" 8	" 25	23	2	4	13	15	13	48	548	46	67*
Imp, Snowstorm, white	12	" 5	" 8	" 25	21	2	3	11½	13	12	53	674	56	67*
Eldorado, orange-salmon	12	" 1	" 4	" 25	23	2	3	13	14	48	101	698	58	66*
Mrs. Kerr, salmon-pink suffused white	12	" 5	" 8	" 25	22	2	3	12	14	15	41	531	44	65
Fire King, rosy-red	12	" 8	" 15	" 25	21	2	3	12	14	10	45	526	44	65
Cheerful, salmon-cerise suffused white	15	" 18	" 23	" 25	15	2	3	14	14	.....	7	645	43	63
Milkmaid, white	12	" 5	" 8	" 25	22	2	3	11	14	26	63	608	51	63
Enchantress, mauve-pink	12	Feb. 14	Feb. 23	" 25	26	2	3	11	15	94	153	543	45	62*
Ey. Giant Rose, mauve-pink	15	Mar. 15	Mar. 18	" 25	16	2	3	14	13	14	30	728	48	62
Ey. Canary Bird, very pale yellow	3	" 18	" 23	" 25	15	2	3	13	13	.....	1	177	59	62
Flamingo, salmon and rosy red	6	" 15	" 18	" 25	19	2	3	17	16	2	11	295	49	60
Vulcan, bright scarlet cerise	12	" 15	" 18	" 25	21	2	3	18	15	13	55	787	66	59*
Superior Pink, deep lively rose	15	" 2	" 8	" 25	19	2	3	12	13	8	65	966	64	59*
Glitters, rosy-red	12	" 8	" 23	" 25	16	2	3	16	15	.....	206	578	48	58
Grenadier, deep rosy red	12	" 2	" 4	" 25	25	2	3	14	17	28	71	466	39	58
Ey. Loveliness, mauve-pink and white	12	Feb. 14	Feb. 23	" 25	24	2	3	11	13	100	165	672	56	56*
Burpee's True Blue, light violet blue	15	Mar. 15	Mar. 18	" 25	19	2	3	12	14	24	110	845	56	56**
Jeanne Mamitsch, mauve-pink suffused white	12	" 5	" 8	" 25	23	2	3	12	17	31	90	544	45	56*
Sunlight, salmon-pink suffused white	12	Feb. 28	" 4	" 25	23	2	3	11	14	10	48	482	40	53
Spring Song, rose pink	15	Mar. 5	" 8	" 20	20	2	3	12	13	17	57	779	52	52**
Gilda Gray, salmon and pink	15	" 18	" 28	" 25	16	2	3	14	14	.....	24	692	46	52*
Mrs. Calvin Coolidge, rosy red and salmon suffused white	18	" 8	" 18	" 25	17	2	3	13	15	3	19	872	48	51*
Chevalier, deep mauve	15	" 8	" 18	" 25	19	2	3	13	14	2	45	897	60	49*
Burpee's Orange, orange-salmon	12	" 15	" 18	" 25	20	2	3	15	14	11	47	567	47	49

SWEET PEA—RESULTS OF GREENHOUSE EXPERIMENT—*Concluded*

Name of variety and source of seed	Number of plants	Date of first bloom	Date of first cut	Date of last cut	Number of cuttings	Average Number of flowers per stem first cutting	Average Number of flowers per stem all cuttings	Average length of stem 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 1928–29	Average number of stems per plant 3 crops 1926–27, 1927–28, 1928–29
		1929	1929	1929				in.	in.					
Zvolanek Rose, mauve-pink suffused white	12	Mar. 4..	Mar. 8..	May 25..	21	2	3	9	15	14	45	484	40	49*
Sweet Lavender, light mauve-lavender	6	" 23..	" 23..	" 20..	17	2	3	13	13	.....	8	153	25	49*
Charm, pink	15	" 18..	" 23..	" 25..	19	2	3	12	14	7	63	727	48	48**
Gleam, bright pink	15	" 23..	" 30..	" 25..	15	2	3	15	15	.....	5	720	48	48**
Miss Spokane, orange salmon suffused rosy red	15	" 8..	" 18..	" 20..	20	2	3	14	14	11	59	635	42	47*
White Harmony, white	12	" 8..	" 15..	" 25..	20	2	3	12½	15	20	70	539	45	46*
Peerless Pink, mauve-pink suffused white	12	" 13..	" 18..	" 25..	21	2	3	17	16	15	64	538	45	42*
Gorgeous, salmon rose	12	" 18..	" 23..	" 25..	17	2	3	16	15	.....	14	442	37	37**
	552	.....	.....	.....	.....	.....	.....	.....	.....	773	2,705	27,434	51	63

* Grown only two years. ** Grown only one year.