DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

CAP ROUGE, QUE.

REPORT OF THE SUPERINTENDENT

G. A. LANGELIER, D.Sc.A.

FOR THE YEAR 1928

Printed by Authority of the Hon W. R. Motherwell, Minister of Agriculture
Ottawa, 1929

TABLE OF CONTENTS

DOMINION EXPERIMENTAL STATION, CAP ROUGE, P.Q.

REPORT OF THE SUPERINTENDENT, G. A. LANGELIER

THE SEASON

The growing season of 1928, from May to October inclusive, was a little warmer, much dryer, with somewhat more sunshine than the average for the last seventeen years, the figures being respectively 55·64 and 56·49 degrees Fahrenheit for mean temperature, 18·28 and 23·71 inches for precipitation, and 986·3 and 1077·8 hours for sunshine. The frost-free season only extended 115 days, from May 8 to September 1, which is the shortest one since 1912.

METEOROLOGICAL RECORDS AT CAP ROUGE, QUE., 1928

—	Temperature F.						Precipitation				Sunshine	
	Highest	Date	Lowest	Date	Mean	Average 17 years	Rain-fall	Snow-fall	Total	Average 17 years	Total	Average 17 years
	°	°	°	°	°	°	in.	in.	in.	in.	hours	hours
January	35·0	2	−20·0	28	12·05	9·75	.....	35·50	3·55	3·75	57·2	61·7
February	38·0	13-23	−19·0	26	11·19	10·71	0·10	18·25	1·92	2·75	76·3	85·5
March	41·0	25	− 9·0	6	20·38	21·94	1·38	12·00	2·58	2·84	100·0	134·6
April	53·0	6	10·0	1	32·73	36·33	0·80	8·75	1·67	2·82	123·3	170·3
May	73·0	17	32·0	8	50·13	50·41	2·65	.....	2·65	3·47	167·5	196·5
June	78·0	27	40·0	17	58·26	58·91	3·46	.....	3·46	4·04	179·1	198·2
July	83·0	3	34·0	31	64·64	65·83	4·41	.....	4·41	3·40	248·0	223·5
August	86·0	14-16	32·0	12	58·69	62·84	3·04	.....	3·04	3·79	174·1	210·4
September	73·0	9	25·0	19	47·98	54·77	1·87	.....	1·37	4·26	129·1	151·4
October	65·0	3-5	18·0	30	43·36	44·83	2·85	.....	2·85	4·29	88·5	104·8
November	48·0	16	− 1·0	30	30·43	30·87	1·40	7·25	2·12	3·55	86·1	61·3
December	44·0	17	− 9·0	30	22·52	16·58	0·71	22·75	2·98	3·17	43·5	49·9
Total	.....	.....	.....	.....	.....	.....	22·67	104·50	33·10	42·13	1,472·7	1,652·2
Average	.....	.....	.....	.....	37·70	38·62	1·39	8·71	2·76	3·51	122·7	137·7

THE CROPS

At this Station, hay and pasture, garden beans, beets, carrots, corn, onions, peas, gooseberries, ornamental trees, bushes and plants were very good; corn for silage, sunflowers, peas and oats for fodder, mangels, swede turnips, oats, field beans and peas, asparagus, cabbage, celery, potatoes, squash, tomatoes, apples, plums, strawberries were good; spring wheat, barley, flax for fibre and for seed, grapes, cauliflowers and muskmelons were medium; cherries, raspberries, parsnips and watermelons were poor.

ANIMAL HUSBANDRY

DAIRY CATTLE

The herd of pure-bred French-Canadian cattle comprising about 75 head, has been accredited for six years and has passed three successful tests for abortion. The three sires are Elite bulls and every female having finished two lactation periods is an advanced Registry cow. The world's 2-, 3- and 4-year old official records for the breed have at different times been held by animals bred at Cap Rouge.

COMPARISON OF BREEDING METHODS WITH DAIRY CATTLE

Without going into such details as were given in the 1926 report of this Station, it may be said that only two bulls with outside blood have been brought into the herd during the last fifteen years. The best results came through inbreeding followed by line-breeding.

GRADING UP A DAIRY HERD WITH PURE-BRED SIRES

There seems very little doubt that a great number of herds of nondescript cows may be improved by the use of a registered sire, because the average milk production of pure-bred herds is higher than that of other herds. But when a farmer has graded up his herd and improved the yield per cow he should be very careful indeed to get a sire out of a high producing dam. At Cap Rouge, when the milk yield of grade heifers was compared with that of their dams at the same age, it was found that the daughters only produced 73 per cent of what their mothers had given. The explanation was that nothing was known about the ancestry of the bull, which is unfortunately what happens in too many cases.

INFLUENCE OF A GOOD SIRE ON A DAIRY HERD

Three Advanced Registry cows were bred to a bull about whose ancestry nothing was known, also to bulls whose dams were high producers. In each case, the heifers by the bull about whose ancestry nothing was known were poor milkers, while the ones by the bulls whose dams were high producers became very good milkers, easily qualifying for Advanced Registry. This is practically always the case; the poor bull, even as a gift, is a costly proposition, while the good sire is cheap at a high price.

WHOLE MILK VERSUS SKIM-MILK AND SUBSTITUTES FOR CALVES

In an experiment conducted with 38 calves during 168 days, it was found that it cost 20·7 cents for feed per pound of gain when whole milk was used; 7·4 cents when Royal Purple Meal and skim-milk were used; 6·2 cents when a meal consisting of 6 parts, by weight, of corn, 3 parts of oats, and 1½ part of flax seed, ground together, were used with skim-milk. In another experiment, powdered skim-milk made gains at more than twice the cost of skim-milk.

The cattle barn on the Cap Rouge Station.

BEST QUANTITIES OF CONCENTRATES FOR MILCH COWS

An experiment was conducted during an average of 143 days per year, starting at the beginning of November, for five seasons, with twenty-seven cows. Animals were chosen of nearly the same weights and production, and all received practically the same quantities of roughage. If the quantity of milk given by the lot which had one pound of meal per 8 pounds of milk is taken as 100, that given by the lot which had one pound of meal per 4 pounds of milk would be 111, and that given by the lot which had all the meal it would clean up, one pound per 2·18 pounds of milk, would be 128.

INFLUENCE OF FEEDS ON THE DEVELOPMENT AND THE MILK PRODUCTION OF DAIRY CATTLE

To minimize the chance of error, twins were chosen for this experiment. The heifer which was well fed weighed 785 pounds just previous to dropping her calf at 2 years and 22 days, produced 11,392 pounds of milk during her two first lactation periods and qualified for Advanced Registry. The heifer which was not well fed weighed 600 pounds just previous to dropping her calf at 2 years and 83 days, produced 3,767 pounds of milk during the two first lactation periods and of course did not qualify for Advanced Registry. Both the sire and the dam of these twins had qualified for Advanced Registry, which shows that good breeding must be backed by good feeding.

WINTERING DAIRY CATTLE IN SINGLE BOARDED OPEN FRONT SHEDS

During the past fifteen years, ten different bulls and over one hundred heifers have been wintered in single boarded open front sheds. Calves which are not six months old on November first are kept in the stable, but all others go outside. Champion producers of the breed, in the 2-, 3- and 4-year old classes, were thus wintered and this no doubt helped to give them that vitality and ruggedness without which no big record can be made. Three points should however not be forgotten: no cow in milk nor weak calf can withstand the rigours of winter; all stock to be wintered thus should be turned outside not later than September first so as to gradually harden; the sheds should face south, to get all the benefit of the sun, and the three closed sides should have no hole or crack through which a draft may pass.

FEED REQUIREMENTS OF DAIRY HEIFERS UNTIL CALVING

Record was kept of all feed given to eight French Canadian heifers until they calved, at an average of 27 months and 9 days, when they weighed 813 pounds. Each of these heifers, on an average, received 536 pounds of whole milk, 5,668 of skim-milk, 830 of meal, 3,164 of hay, 5,521 of corn silage, 4,235 of swede turnips, 377 of green feed, and was 96 days at pasture. At current prices, it cost, for feed, $93.25 per heifer. The total cost of rearing would however also have to include loss by discarding heifers not fit to remain in the herd, or by death, interest and depreciation on buildings and equipment, labour, bedding, service fee of sire, while manure should be credited. This shows the importance of only using the best of breeding stock to produce heifers for the herd since the cost of rearing is so high and since it is almost as cheap to raise a good heifer as a poor one.

58462—2½

HORSES

The St. Joachim Horse Farm is under the supervision of the Superintendent of the Cap Rouge Experimental Station. There are generally between 75 and 100 pure-bred French-Canadian horses which are used for experimental work in breeding, feeding, housing, and management. From 1922 to 1927 inclusively, more prizes, especially firsts, have been won at the large Quebec exhibitions, by animals from this stud, than by animals of all other studs combined. Breeding stock has been shipped as far west as London, Ontario, and as far east as Prince Edward Island.

COMPARING METHODS OF BREEDING HORSES

During fifteen years, only one stallion and his sons have been used, so that inbreeding and line-breeding necessarily had to be resorted to. They have given good results, because there has been an improvement both in type and in weight. There is also much more uniformity in the stud now. This was to be expected with this kind of breeding. However, it calls for very rigid selection both for vitality and the desired conformation.

COST OF REARING HORSES

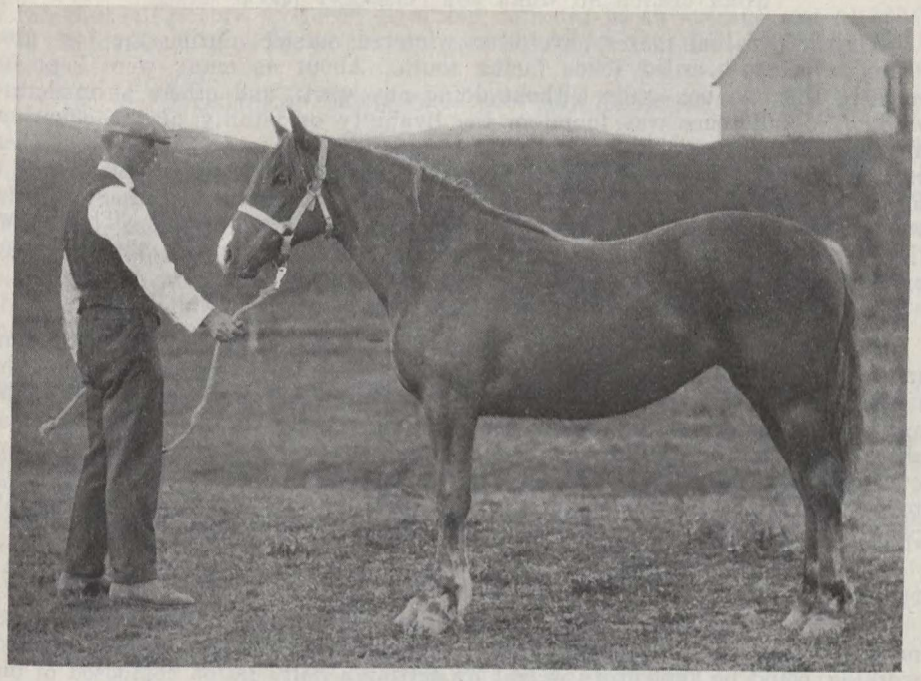
Feed given to 15 French Canadian colts and fillies was weighed from weaning time until they reached an average of 32 months and 26 days when they were ready to work, and weighed 1,240 pounds. Each of them received 9,992 pounds of hay, 4,632 pounds of oats, 4,178 pounds of bran, and averaged 216 days at pasture. At current prices for feed, the cost was $254.94 per horse. By stinting feed and raising under-sized colts, the cost could have been much lower. The above figures show the importance of using only the very best to breed from since it entails no extra work and only a slight extra cost.

COST OF HORSE LABOUR

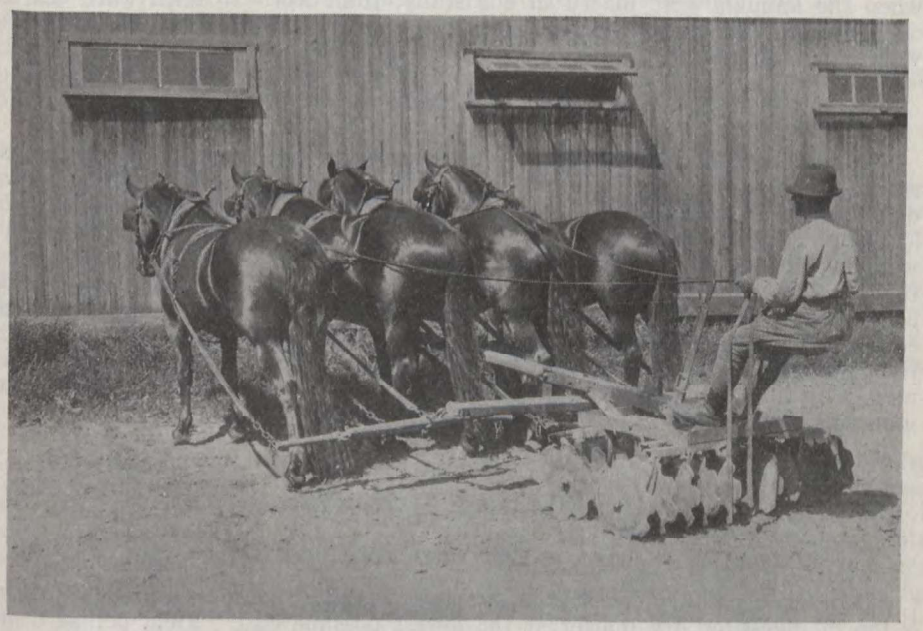
During 233 days, weights were recorded of all feed given to 13 French Canadian mares, averaging 11 years of age and 1,253 pounds in weight. On an average, each of these animals received 3,744 pounds of hay and 3,664 of concentrates, which was about 1·28 pound of hay and 1·26 pound of concentrates per 100 pounds live weight of horse per day. They averaged 5·12 hours of work per day, and at current prices, it cost a little more than 7½ cents per hour's work, just for feed. This took no account of interest and depreciation on buildings and equipment, labour, bedding, shoeing, veterinary expenses, blanketing, stable supplies, and harnessing. It is evident that no more horses should be kept than absolutely necessary, also that work in a stock should be profitably employed as many hours as possible each day.

INEXPENSIVE HOUSING OF HORSES

More than four hundred winters, since 1913, have been spent by horses, from weanlings to twenty-year-olds, under single boarded sheds facing south. Not one of the animals suffered, and the well known ruggedness and vitality of the St. Joachim French Canadian horses is evidence that this way of wintering is a good one. Three things are important, however. Foals dropped later than June, also sick or weak animals should be stabled; horses to be wintered outside should not be kept in later than the beginning of September, to give them a chance to harden up; sheds should face south and have no cracks or holes through which draughts can come.



A typical French Canadian filly.



French Canadian mares and fillies on a disk harrow.

WORK VERSUS NO WORK FOR PREGNANT BROOD MARES

Over 80 in-foal mares have been wintered outside, during the last nine years, in single-boarded sheds facing south. About as many were kept in, some of them in box-stalls without doing any work, and others at moderate work. No difference was found in the livability or vitality of the offspring. The same mare, to the service of the same stallion, gave six foals. When carrying two of them she was outside; when carrying two others she was in a loose box and turned out often for exercise; when carrying the other two, she was stabled and worked moderately. The six foals were strong. This shows that though exercise for the brood mare is no doubt important, the mode of exercising is not.

REARING FALL FOALS

During the last thirteen years, twelve foals were dropped by eight different mares, from September 20 to November 11. Contrary to expectations, the mares, in general, were got in foal as easily as they were when bred in the spring. An advantage of having a mare drop her foal in the autumn is that she is free to work during most of the cropping season. Care should however be taken that the dam is not too heavily fed, as the youngsters are liable to get top heavy and wrong in the legs, also that the hoofs of the foals be pared occasionally as they will grow quickly on the often damp litter.

WINTERING IDLE HORSES CHEAPLY

During six winters, with a gelding and three mares, some quiet, others nervous, aged five to eighteen years, it was found that the animals, without working, could be kept up to weight by getting a daily ration composed of one pound mixed hay, one pound straw, and one pound roots daily for each one hundred pounds of their weight. A good rule, which was followed, was to gradually cut down the work also the feed from November 1 until November 15 when the animals were placed in box stalls; from April 15 until work started on the fields, easy jobs were given and concentrates were allowed, at first in very small quantities.

SWINE

A small herd of Yorkshire swine has been kept for five years. Experiments are going on to determine the cost of feeding the herd sire and the brood sows, and the cost of raising pigs to weaning time. Seven sows were entered, in the spring of 1929, for Advanced Registry. Four pigs of each of these litters, when weighing about two hundred pounds, will be shipped to a slaughter house where they will be graded, and as a careful record is to be kept of the quantity, composition, and value of feed eaten by each lot, the finishing qualities and comparative production costs of each litter will be ascertained. This is really the important point, as a sow is valuable to her owner only if she will make money for him. Boars from such sows should also be worth more than the common run having only ordinary registration papers to recommend them.

FIELD HUSBANDRY

COST OF PRODUCING FARM CROPS

The main point to consider in the cost of producing crops is that of growing a ton of digestible dry matter at the lowest possible cost. Yield per acre and cost of dry matter per ton are not sufficient, because dry matter in different

feeds is not all equally digestible. Results of many years of careful work show that silage corn produced digestible nutrients at an average cost of $49.96 per ton, swede turnips $62.61 per ton, oats $61.09 per ton, and clover hay $21.14 per ton.

YIELD AND PROFIT FROM ROOT AND SILAGE CROPS

The man who has a herd of over twelve cows, with young cattle, and who calculates manual labour expended in growing crops, is better off with a silo than with roots. As mentioned above, a ton of digestible nutrients cost $49.96 with corn and $62.61 with swede turnips. It took an average of 113.81 hours of manual labour to grow and ensile an acre of corn, and 160·36 hours to grow and store an acre of swede turnips. The per cent of digestible nutrients was 14·3 in Longfellow corn and 9·4 in Good Luck swedes. Manual labour and per cent of digestible nutrients were two important factors.

COMPARISON OF CORN, SUNFLOWERS AND A MIXTURE OF PEAS AND OATS FOR SILAGE

Results of seven years show that both sunflowers and peas and oats produce a ton of dry matter at a lower cost than corn, and it is the digestibility of this dry matter which should decide the question. With the comparatively short growing season at Cap Rouge, sunflowers have had, according to analyses made at Ottawa, a higher percentage of dry matter than corn, and this may influence the respective digestibility of these two forage plants. In the meantime, sunflowers should not completely replace corn except on rather heavy and poorly drained land.

PREPARATION OF LAND FOR SILAGE CORN

Which will produce a ton of silage corn at the lowest price, summer ploughing followed by fall ploughing, fall ploughing only, or spring ploughing? Results of nine years show that there is practically no difference between fall and spring ploughing, so that the former is recommended for this district where the season is short and so much has to be done when land gets ready to be worked. Summer ploughing has given the lowest priced corn per ton, because it increased yields and cut down the manual labour required to fight weeds.

GROWING SILAGE CORN IN DRILLS VERSUS IN HILLS

Results of five seasons, on 57·3 acres of Longfellow corn, showed that the crop was 20,759 pounds per acre for drills 48 inches, 20,185 pounds per acre for drills 42 inches, 12,402 pounds for hills 36 inches, and 12,358 pounds for drills 42 inches. There was practically no difference in samples sent from each lot to the Dominion Chemist, so that the advantage was strongly in favour of drills on the comparatively clean sandy loam of Cap Rouge. On heavier soil badly infested with weeds, the hills would no doubt have given better results.

RATES OF SEEDING OATS

This experiment was conducted during eight years on ninety-six 1/60 acre plots, with Banner oats, comparing thirteen densities from one to four bushels per acre, going up by quarter of a bushel. After deducting the quantity of seed used, the highest yield of grain per acre was 2,001 pounds for the plots sown at the rate of 2½ bushels. Of course, in deciding how much to sow per acre, many factors have to be taken into consideration, such as the tillering propensity of different varieties, the size of the kernel, the kind and the fertility of the soil, and the method of seeding.

YIELD OF CLOVER HAY AFTER DIFFERENT RATES OF SOWING OATS

During six years, one hundred and thirty-two 1/60 acre plots were used for this experiment, comparing eleven densities from one to four bushels of Banner oats per acre, going up by quarter of a bushel. When the average was taken for all the crops of clover hay after what is arbitrarily called the low densities, that is from 1 to 2¼ bushels of oats per acre, the yield of hay was at the rate of 4,293 pounds per acre, whilst it was only 3,969 pounds after the high densities.

KIND OF NURSE CROP FOR CLOVER HAY

Four hundred and forty 1/60 acre plots were used during eight seasons for this experiment. The results show that for every 100 pounds of clover hay after barley, there was 97 after wheat, 93 after oats, and 76 after peas. The difference is comparatively small for barley, wheat, oats, and farmers should be guided by the kind of grain which will be most profitable under their special conditions.

RATES OF SEEDING TIMOTHY AND CLOVER

From 1913 to 1921 inclusive, one hundred and sixty plots of 1/60 acre each were used for this experiment. On half the number of these plots, 8 pounds timothy, 12 pounds red clover, and 2 pounds alsike were sown per acre, whilst half of these quantities was sown on the other plots. The thick seeding only gave an average of 314 pounds, or about 8 per cent more, which cost $2.81 at the current prices of seed. This did not pay. The conclusion is that on well tilled land, it is not necessary to sow large quantities of grass and clover seed, though it will probably always be a low premium to pay for the assurance of a better crop, on poor and badly worked land.

COST OF OPERATING TRACTOR

Notes were kept on the cost of operating a Fordson tractor during 1928. The depreciation was calculated on 10 per cent of the initial cost and the interest on 6 per cent of half of the initial cost, which amounted to $78.19; the repair parts, expert and home work were $97.97, bringing the total yearly fixed costs to $176.16. The gasoline and oil amounted to $266.88, and the tractor operator's wages to $229.80, making the total yearly costs $672.84. The machine was used to plough, disk, harrow, cultivate, load hay, thresh grain, cut, and ensile corn. It worked 766 hours with a total hourly cost of 87.8 cents.

HORTICULTURE

FRUITS

APPLE—VARIETY EXPERIMENT.—Unless one is within driving distance of a good market, not more than 5 per cent of the apples planted should be summer varieties. If the red colour of the fruit helps to sell it, Lowland Raspberry will suit best, otherwise one of two yellow ones, Rupert or Yellow Transparent can be put in. For autumn, Melba, a splendid C.E.F. seedling of McIntosh, should replace Duchess; Okabena is a heavy yielder but has not the quality of Melba, whilst Petrol has extra quality but poor colour. For early winter, Wealthy is still the old standby, but Pedro, a C.E.F. seedling, has undoubtedly better quality and will probably replace it in the near future. McIntosh and Fameuse are the standard winter varieties, with a marked preference for the first named. And if something later is wanted, Walton will about fill the bill. The man who intends to go into fruit growing commercially will not make any mistake by planting 15 per cent of Melba, 35 per cent of Wealthy, and 50 per cent of McIntosh.

APPLE—FERTILIZATION.—Results of five years show that an application of 5 pounds of nitrate of soda gave as good results as 5 pounds of nitrate of soda and 6 pounds of superphosphate per tree. It is remarkable to see that the increase was about ten times larger with summer varieties such as Lowland Raspberry and Red Astrachan than with winter varieties such as Fameuse and Milwaukee. It is intended to add potassium so as to find out the effect of a mixture containing the three principal fertilizing elements.

APPLE—COVER CROP EXPERIMENT.—In an orchard of McIntosh and Wealthy planted some fifteen years ago, a cover crop produced about 50 per cent more fruit and increased the diameter of the trees 14 per cent as compared with sod. Clover and rape in a two-year rotation have given the best results.

APPLE—COST OF ESTABLISHING AN ORCHARD.—For an orchard of 378 McIntosh and Wealthy planted some 15 years ago, the total expenditure for trees, fertilizers, seeds for cover crops, materials for protection against diseases and pests, manual, horse and tractor labour, use of machinery, and rent of land was a little over $2,000 or about $5.50 per tree. The total revenue was around $3,500 or some $9 per tree. It must not be forgotten, however, that most of the time, this orchard was under the direct supervision of a man who understood his work very well and who had the advantage of referring to the Dominion Horticulturist all questions about which he was in doubt.

CHERRY—VARIETY EXPERIMENT.—Everything considered, Montmorency Large has given the best satisfaction; Early Richmond has been a disappointment on account of its lack of hardiness; for the amateur who looks only to the quality of the fruit, Vladimir is probably the best.

CURRANT, BLACK—VARIETY EXPERIMENT.—Climax has easily been the heaviest producer with an average of about 8,000 pounds per acre for 15 years.

CURRANT, RED.—VARIETY EXPERIMENT.—Perfection has led all others with nearly 11,000 pounds per acre for an average of 15 years; for size and appearance of fruit. Cherry is by far the best. There is very little demand for this fruit and only a few bushes should be put in unless one is sure of having a suitable market.

CURRANT, WHITE—VARIETY EXPERIMENT.—White Grape is the best of the three varieties tested, having much better quality though yielding a little less, about 6,000 pounds, than White Cherry. This is another fruit which should be planted only for the home garden.

GOOSEBERRY—VARIETY EXPERIMENT.—Of the fourteen varieties tested since 1911, Silvia has been the most productive, at the rate of over 15,000 pounds per acre. No extensive plantation should be made, as the market for gooseberries is easily glutted.

GRAPE—VARIETY EXPERIMENT.—The season of Central Quebec is too short to grow grapes commercially. Champion may succeed but the quality is too poor. The one which will probably give best satisfaction is Winchell, sometimes called Green Mountain.

PEAR—VARIETY EXPERIMENT.—Pear culture cannot be recommended in this district as not one marketable fruit was produced by the 64 trees of 9 varieties planted from 1911 to 1923.

PLUM—VARIETY EXPERIMENT.—Probably because there is an abundance of moisture in the air, the Europeans have done best at Cap Rouge, whilst the Americans would probably succeed well further inland. The hardiest has been Quackenboss, blue, late, large, of good quality; a good one is Montmorency, not quite so hardy, yellow, early, medium size, of good quality; the highest quality fruit came from Bonne Sainte Anne, hardy, blue, early, large.

RASPBERRY—VARIETY EXPERIMENT.—Brighton and Newman 23 have given the best satisfaction. Freedom from disease is the most important point for the commercial grower, and canes should be bought only from Government inspected and disease-free plantations.

STRAWBERRY—VARIETY EXPERIMENT.—Dunlap has been the highest yielder of the forty odd varieties tested over fifteen years, and it is strongly recommended. Its average production per acre, for eleven seasons, was at the rate of about 8,500 pounds. Excelsior is the right thing for a very early berry, but the quality is rather poor.

STRAWBERRY—HILLS VERSUS MATTED ROWS.—The crop from plants set 12 inches apart in 30-inch rows was at the rate of 0·55 pound per plant and 9,550 pounds per acre, whilst from matted rows 42 by 12 inches it was at the rate of 0·67 pound per plant and 8,348 pounds per acre. This is the average for three cropping seasons.

ORNAMENTAL GARDENING

(For more details about all projects, see 1926 report of this Station)

ANNUALS—VARIETY EXPERIMENT.—Hundreds of annuals have been tested since 1911. The ones which are most likely to give satisfaction are ageratum as a border plant, antirrhinum, aster, didiscus, larkspur, poppy and scabious for long-stemmed flowers, nasturtium and petunia for ornamentation, cosmos and kochia for bedding.

EVERLASTING FLOWERS—VARIETY EXPERIMENT.—It is useless to get paper flowers for interior decoration when everlastings can be so easily grown. Of those tested, heliohrysum, helipterum and limonium (statice) have done well. The latter may be had as annual and as perennial.

WILD FLOWERS—VARIETY EXPERIMENT.—Among the wild flowers of the district, *Cornus canadensis, Hepatica trifolia, Trillium erectum,* and *Viola canadensis* have been grown with success. They should be given conditions somewhat similar to those to which they are accustomed.

HERBACEOUS PERENNIALS—VARIETY EXPERIMENT.—A perennial border should be near the home of every farmer of Central Quebec. To have flowers practically all the time, from the end of April to the beginning of November, the following may be put in: pansy for April, narcissus for May, paeony for June, delphinium for July, hollyhock for August, phlox for September, hardy aster for October, pansy for November.

TREES AND SHRUBS, ORNAMENTAL AND SHELTER—VARIETY EXPERIMENT.—Of the coniferous trees, Colorado, blue spruce and pyramidal arborvitae are pretty; amongst the deciduous trees, cut-leaved maple, rose acacia and white birch may be planted; and a choice can be made of a few of the following shrubs: tatarian honeysuckle, large-flowered hydrangea, Michel Buchner lilac, mock orange, *Viburnum lantana, Potentilla fruticosa, Spirea vanhouttei.*

HEDGES—VARIETY EXPERIMENT.—Of the eighteen kinds of trees and shrubs tested for hedges during more than fifteen years, American arborvitae and Norway spruce, amongst the conifers, also Siberian pea tree and Thunberg barberry, of the deciduous, are the most hardy and the prettiest.

ANTIRRHINUM—VARIETY EXPERIMENT.—This most useful annual must be sown inside during the second half of March, pricked twice, and planted out at the beginning of June, in Central Quebec. The prettiest is Old Gold and the most profuse bloomer is Canary Bird.

GLADIOLUS—VARIETY EXPERIMENT.—The gladiolus may safely be grown in Central Quebec as it will give satisfaction practically everywhere and is very pretty as a cut flower. The following are recommended when low price of corms is considered: Prince of Wales (salmon), Herada (mauve), Niagara (cream), Schwaben (yellow), American (lavender), Dominion (red), Baron J. Hulot (violet).

NARCISSUS—VARIETY EXPERIMENT.—An experiment conducted during five years has shown that the narcissus can be grown profitably for commerce. The doubles have practically no value, whilst the "stars", "poets", "hoop petticoats", "tazettas", "angel's tears", and "jonquils" are for the amateur. Of the single "large trumpets", which are the best for the average person, Emperor, yellow, and Victoria, bicolour, will likely give the best satisfaction.

PAEONY—VARIETY EXPERIMENT.—The paeony is considered by many the Queen of Perennials and does very well in this district. The four which will make the best combination of lovely flowers and duration of bloom are *Officinalis rubraplena*, very early, semi-double, dark crimson, Livingstone, semi-double, soft rose pink with silvery tips, *Festiva maxima*, double white, Felix Crousse, very late, semi-double, carmine red.

PHLOX, PERENNIAL—VARIETY EXPERIMENT.—Perennial phloxes come when there is very little bloom in the garden, so that they should be more extensively grown. Of the forty odd varieties tested during twelve years, the following may be recommended: Miss Lingard, the earliest of all, white with light pink eye, Rynstorm, rose pink, Selma, light pink with a purple-crimson eye, Jeanne d'Arc the latest, white.

ROSES—VARIETY EXPERIMENT.—About ninety per cent of over sixty varieties tested during seventeen years have not been hardy enough, and it seems folly to try and grow roses in this district without adequate winter protection. The three which have done best are Frau Karl Druschki, white, Gruss an Teplitz, bright crimson, and Hugh Dickson, crimson.

SWEET PEA—VARIETY EXPERIMENT.—Some 250 so-called varieties have been tested since 1911, and about 50 of these were deemed worthy of further trial in 1928. The six which will make the best combination are King White, white, Matchless, cream, Daisybird, light pink, Sapphire, blue, Royal Scot, light red, Fordhook Orange, orange.

VEGETABLES

PRELIMINARY TESTING OF VARIETIES AND STRAINS

The object is to try out in a preliminary way varieties and strains of vegetables which are new, of probable merit, or widely advertised. Small numbers of plants are grown in the nursery, alongside of the variety or strain, of the same class or season, which has given the best satisfaction, so that they may thus be easily compared. Everything is discarded the first year which has obvious defects, such as evident low production, poor quality, very late maturity, inclination to disease, bad appearance, or which is clearly the same as a well-known variety. The promising ones are kept for another year or two under observation, to be either discarded definitely or sent to the trial plots.

Season	Beet—Detroit Dark Red						Cabbage—Copenhagen Market						Carrot—Chantenay						Lettuce—Grand Rapids					
	Autumn			Spring			Autumn			Spring			Autumn			Spring			Autumn			Spring		
	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use
23-24	13-XI	.....	.....	14-V	43,560	24-X	13-XI	.....	.....	14-V	46,464	25-VIII	13-XI	13,649	21-VII	14-V	11,616	21-VII	13-XI	3,872	2-VII	14-V	6,776	14-VII
24-25	25-XI	.....	.....	28-V	32,525	6-X	25-XI	.....	.....	28-V	38,333	10-IX	25-XI	.....	.....	28-V	16,262	3-VIII	25-XI	1,684	29-V	28-V	9,680	23-VI
25-26	7-XI	.....	.....	16-VI	17,424	2-X	7-XI	.....	.....	16-VI	34,848	11-X	7-XI	12,778	16-VII	16-VI	23,232	2-X	7-XI	15,488	10-VII	16-VI	21,296	6-VIII
26-27	5-XI	14,520	15-IX	17-V	3,485	24-X	5-XI	.....	.....	17-V	.....	.....	5-XI	6,098	25-VII	17-V	17,134	10-XI	5-XI	6,776	22-VI	17-V	7,744	14-VII
27-28	2-XI	18,586	19-X	11-V	45,302	19-X	2-XI	.....	.....	11-V	47,626	31-VIII	2-XI	9,293	13-VII	11-V	18,586	21-VII	2-XI	9,196	1-VIII	11-V	15,488	10-VII
Average	10-XI	6,621	13-IX	23-V	28,459	15-X	10-XI	.....	.....	23-V	33,454	3-IX	10-XI	8,364	25-VII	23-V	17,366	17-VIII	10-XI	7,403	1-VII	23-V	12,197	14-VII

Season	Onions Wethersfield						Radish—Scarlet White Tipped						Turnip—Purple Milan					
	Autumn			Spring			Autumn			Spring			Autumn			Spring		
	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use	Date sown	Pounds per acre	Ready to use
23-24	13-XI	968	24-X	14-V	11,616	24-X	13-XI	1,200	14-VI	14-V	4,840	27-VI	13-XI	.....	.....	14-V	102,511	24-X
24-25	25-XI	.....	.....	28-V	8,112	6-VIII	25-XI	716	30-V	28-V	3,504	25-VI	25-XI	.....	.....	28-V	40,656	26-VII
25-26	7-XI	3,872	11-X	16-VI	4,840	11-X	7-XI	.....	.....	16-VI	17,424	16-VII	7-XI	.....	.....	16-VI	17,424	6-VIII
26-27	5-XI	.....	.....	17-V	3,388	24-X	5-XI	.....	.....	17-V	1,936	14-VII	5-XI	.....	.....	17-V	.....	.....
27-28	2-XI	3,872	19-X	11-V	9,680	19-X	2-XI	.....	.....	11-V	5,808	10-VII	2-XI	.....	.....	11-V	26,717	26-VII
Average	10-XI	1,742	11-X	23-V	7,527	4-VIII	10-XI	383	14-V	23-V	6,702	6-VII	10-XI	.....	.....	23-V	37,462	17-VIII

During five years, 224 varieties or strains were thus tested. Out of these, 97 were rejected the first year and 93 the second year. The other 34 are promising and 7 of them will be placed in the trial plots in 1929.

FALL SEEDING VERSUS SPRING SEEDING

The object is to compare results obtained from fall-sown seed with seed sown in the spring. Beets, cabbage, carrots, lettuce, onions, radishes and turnips were used for this experiment, seed from the same packet being sown in the autumn and the following spring.

It is clear that the spring seeding has given much better results. In fact, only twice out of thirty-five tests, once with beets and another time with carrots, has the autumn-sown seed yielded more than what was sown in the spring.

BEET, GARDEN—SEED PRODUCTION

The beet is a biennial which produces a root the first year and seed only the second year. As varieties freely intercross, only one should be used in seed production. At Cap Rouge, garden beet seed has been grown during eleven seasons, since 1915 inclusive, from Eclipse at first, but now from Black Red Ball, as it has been found that the latter is in much greater demand on the large markets of Central Quebec. It would be quite easy for any farmer to put aside half a dozen of the best shaped roots, in the autumn, to cut a small piece from each in the spring so as to find the darkest coloured, and to plant two or three for seed production. Whoever wishes to do so, should not fail to get a packet, at a very low figure, of the Cap Rouge selection of Black Red Ball, and at the same time ask for special circular No. 12 in which will be found directions as to how to proceed in growing the seed.

CABBAGE—VARIETY EXPERIMENT

Forty-three varieties and strains of cabbage have been tested during the last eighteen years. Those of the Savoy and Red groups are not very popular in this district; Drumhead is a good one amongst the first mentioned, and Dark Dutch amongst the latter. For a market gardener who must have something in this line to offer each week, the combination of Jersey Wakefield as very early, Copenhagen Market of Golden Acre as early, Succession for mid-season, and a Ballhead or Roundhead for winter would be a good one. For the trucker who sells to retailers, Copenhagen Market or Golden Acre followed by a Ballhead or Roundhead would meet practically all requirements.

The following table shows that the yield goes up with the number of days it takes to have cabbages ready to use.

FOUR VARIETIES OF CABBAGE COMPARED

Variety	Pounds of cabbage per acre																Days to date ready for use
	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	Average	
Jersey Wakefield	27,152	31,340	20,935	26,935	11,035	51,546	50,675	72,310	34,703	38,623	49,658	41,237	27,733	49,658	31,363	37,860	117
Copenhagen Market	8,712	57,064	29,476	26,862	8,567	36,155	64,614	108,174	27,298	30,492	51,691	41,092	34,122	47,190	43,270	40,985	119
Succession	48,787	63,388	27,298	35,066	13,141	95,106	39,204	92,057	35,719	68,825	60,258	45,302	64,759	47,335	50,530	52,452	131
Danish Roundhead	49,949	82.837	23,740	36,590	24,829	81,457	36,590	116,741	41.818	73,762	47,335	45,883	72,019	54,014	42,398	55,331	150

CABBAGE—BREEDING

Danish Roundhead was chosen for this because it was at the top of the varieties tested as a yielder and as a keeper. Seed was procured from Hartman, and work was started in 1915. The best heads are chosen each autumn and seed grown every year, the only exception being 1922, when no seed was harvested.

This continual selection has brought out not only a more uniform strain but a high yielding one, as may be seen by the following table:—

COMPARISON OF TWO STRAINS OF CABBAGE

Year	Danish Ballhead (Reed), pounds per acre	Danish Roundhead (C. R.), pounds per acre
1922	39,349	41,818
1923	59,677	73,762
1924	55,176	47,335
1925	51,691	45,883
1926	79,279	72,019
1927	54,450	54,014
1928	30,202	42,398
Average	52,832	53,890

The Reed strain, chosen for comparison, is one of the best known and very much advertised. As the heads which have not kept well during winter are not planted for seed, it is probable that the selection is also improving keeping qualities.

A limited quantity of this Cap Rouge seed is offered every year at a reasonable price.

CARROT—BREEDING FOR TRUENESS TO TYPE

Chantenay was chosen because it gave the best results in the trial plots. The object is to improve it by selection in regard to trueness to type and uniformity. Work was started in 1914, and eleven selections have been made since. The roots are examined carefully, and rigidly culled, both in the autumn and in the spring. Results to date show quite an improvement not only for uniformity of type and smoothness of roots, but for yield, as the average production was at the rate of 30,616 pounds per acre for the Cap Rouge selection and only 28,696 for the mother variety. A limited supply of seed is offered each year at a reasonable price.

CARROT, GARDEN—SEED PRODUCTION

At Cap Rouge, garden carrot seed was produced seven times in the course of selection work with Chantenay, and the same thing can be done practically anywhere. Just a very few of the best shaped and most uniform roots may be kept in a box of sand in a cellar, and three or four of the most desirable planted as early as possible the next spring. Seed of carrot ripens very unevenly so that it should be gathered at different intervals to save most of it. Anybody interested may get information in a special circular No. 12 which may be had from the Publications Branch, Department of Agriculture, Ottawa.

CAULIFLOWER—VARIETY EXPERIMENT

Ten varieties and strains of cauliflower have been tested since 1911. This is no doubt one of the hardest vegetables to grow profitably, as poor seed, lack of soil moisture, high temperatures, low atmospheric humidity all have a tendency to produce " buttony " heads which are practically worthless. There is practically only one type, the Erfurt, with early and late strains. Very often the one which succeeds best is the one which is ready to use either before or after the period of usual hot dry weather of the district. As will be seen by the following table, the late strain, or so called variety, has given the best satisfaction at Cap Rouge. Of course, where climatic conditions are not the same, this late strain may not do so well.

AN EARLY STRAIN OF CAULIFLOWER COMPARED WITH A LATE ONE

Year	Early Snowball		Late Algiers	
	Heads	Pounds	Heads	Pounds
1915	6,679	14,084	6,389	29,911
1916	1,742	8,494	4,937	11,471
1917	1,452	3,485	9,874	41,890
1920	2,904	4,937	4,646	17,714
1921	1,742	8,712	6,970	68,623
1922	0	0	2,904	8,857
1923	4,646	12,342	10,454	63,162
1924	5,227	23,668	9,874	49,949
1925	5,808	10,600	2,904	3,340
1926	9,874	17,279	4,066	24,974
1927	5,808	16,698	7,550	39,494
1928	2,904	7,841	6,389	26,136
Average	4,066	10,678	6,396	29,627
Days to ready for sale	114		139	

The above figures show that Algiers not only produces more marketable heads but that the heads are larger. It will be noticed that the crop of Snowball was a complete failure in 1922, when there was a severe midsummer drought.

Of course, early cauliflowers may be grown in the district, but it is a question whether it is profitable to do so; that is, the time given to them could probably be employed in a more remunerative way by growing late cauliflower or other vegetables.

CELERY—VARIETY EXPERIMENT

Thirteen varieties and strains of celery have been tested during the last eighteen years, and the following table gives yields of three good ones:—

Celery—Variety Experiment

Varieties	Pounds per acre												
	1916	1917	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	Average
Giant Pascal	28,234	20,509	22,869	35,196	29,040	19,602	37,389	43,741	32,670	25,228	29,766	31,399	29,637
Golden Self Blanching	21,780	22,782	17,787	18,557	19,420	14,883	22,143	41,926	27,951	21,054	22,143	30,855	23,440
White Plume	19,471	20,146	21,961	15,558	20,509	8,349	16,516	37,207	32,620	16,698	21,054	29,403	21,628

If a ready sale can be had for Giant Pascal at the price of the others, per pound, there is no doubt that it is the one to grow. But this does not happen on the Quebec city markets, so that this variety cannot be recommended as the most profitable one, though it does produce more than the others. When samples were sent to retailers they invariably placed White Plume first, Golden Self Blanching second, and Giant Pascal last. The reason is probably because the so-called self-blanching varieties can now be had from one end of the year to the other from some parts of North America.

Comparison of methods of blanching celery—with boards, with roofing paper, and with soil.

For a market gardener within driving distance of a good market, White Plume, attractive and of high quality, will pay best. It is a poor keeper, though, and will have to be disposed of early in the winter. Golden Self Blanching has been rather subject to disease, at Cap Rouge, but is nevertheless the one which will be the most profitable to grow. Giant Pascal is a good keeper and of much better quality than its looks show it to be, but it has to beg for buyers, in this district at least, when the others sell readily.

CORN—VARIETY EXPERIMENT

More than eighty varieties and strains of sweet corn have been tested since 1911. One thing which has been found out is that it is useless to grow tasteless varieties such as Adams when sweet corn may be had ready for the table from five to ten days earlier. The three which have outstanding merits are Early Malakoff, which for an average of 13 years has been ready to use 91 days after sowing and yielded at the rate of 24,436 ears per acre, whilst the figures were respectively 103 days and 22,056 ears for Golden Bantam and 129 days and 14,211 ears for Country Gentleman. These three, if planted the same day, would lengthen the picking season by over one month, or the same result may be had by sowing Early Malakoff at three intervals of some two weeks.

FIVE VARIETIES AND STRAINS OF GARDEN CORN COMPARED

Variety	1913		1915		1916		1917		1920		1921		1922	
	Ears	Days	Ears	Days	Ears	Days	Ears	Days	Ears	Days	Ears	Days	Ears	Days
Country Gentlemen	2,904	116	18,392	119	25,652	112	7,502	114	20,812	127	14,520	127	13,552	124
Early Malakoff	17,424	85	28,072	94	36,784	91	23,232	100	17,908	91	20,328	87	31,460	93
Early Malcolm	13,068	85	18,876	91	30,492	85	16,456	100	20,812	91	35,816	87	26,136	93
Golden Bantam	11,616	96	20,328	109	24,200	98	15,246	108	30,972	102	19,360	103	27,588	103
Extra Early Adams	13,068	94	11,132	97	16,456	92	6,776	110	14,520	91	13,552	84	15,488	90

Variety	1923		1924		1925		1926		1927		1928		Average for 13 years	
	Ears	Days	Ears	Days	Ears	Days	Ears	Days	Ears	Days	Ears	Days	Ears	Days
Country Gentlemen	14,520	143	23,716	126	14,036	141	10,648	143	8,228	152	10,648	135	14,241	129
Early Malakoff	41,104	93	35,816	89	15,488	77	18,876	91	17,908	101	23,232	90	24,436	91
Early Malcolm	28,556	94	27,104	90	32,912	97	17,208	99	21,296	105	27,104	100	24,295	94
Golden Bantam	30,492	103	30,976	97	25,652	111	23,662	101	6,776	115	19,844	95	22,056	103
Extra Early Adams	20,328	99	10,164	78	16,456	84	15,730	90	17,908	101	15,972	100	14,427	93

In general, the early varieties are by far the most profitable, as prices are always high at the beginning of the season. And, though this is not conclusively proven, sweet corn may be sown a couple of weeks before field corn, without running as many risks as one would believe.

CORN—BREEDING FOR YIELD

It seems useless to dwell very long on the popularity of sweet corn, as it is rare indeed to find anybody who does not like this vegetable. The only drawback is that it is not available on the cob for a very long period each year, but the canning industry is certainly a great boon to the producer who happens to be within hauling distance of it. In a plant which naturally cross-pollinizes, such as corn, there are myriads of so-called varieties and strains, and it is certainly hard for the farmer, the trucker, or the market gardener to know which to choose. For certain districts, such as Central Quebec, earliness is one of the main considerations, but yield and quality must not be forgotten, to ensure profit.

In 1911, the Central Experimental Farm, Ottawa, sent to Cap Rouge, for the trial plots, twelve varieties and strains of sweet corn among which was Early Malakoff. Nothing was earlier that year, and it stood third for yield. The following season, Early Malakoff was leading for yield, and in 1913, two plots, each from a different ear, were both the earliest and the heaviest yielders. Since that time, it was grown in the trial plots with the result that in 1923 it was the second earliest and the heaviest yielder. A very important problem for the growers of sweet corn who wish to make a profit is to find out how many ears per stalk they grow. At Cap Rouge, in 1923, the results were as follows: Malakoff, Cap Rouge 18, 2·8; Extra Early Adams, 2·1; Black Mexican, 2·0; Early Malcolm, 2·0; Whipple Early, 1·7; Pickaninny, 1·6; Golden Bantam, 1·4; Country Gentleman, 1·0. As the yield was calculated for the same number of growing plants, none had any advantage over the other.

Malakoff, Cap Rouge 18, is the earliest grown in the test plots with the exception of Pickaninny. But for the three years during which they were tested together, it yielded 2·1 ears per stalk weighing 0·35 pound each, or 0·73 pound of ears per stalk, to 1·7 ear per stalk weighing 0·19 pound each, or 0·32 pound of ears per stalk for Pickaninny. The colour of the latter, black, is also strongly against it, and it may be considered as valuable only in the far north where Malakoff may be too late.

Its only other serious competitor is Golden Bantam and it must be said right here that they are about on equal terms for quality, which leaves the questions of earliness and yield to decide the supremacy. For the six years during which both were tested in the same piece of ground, Malakoff matured, on an average, in 88 days, compared with 100 for Golden Bantam, and it produced an average of 2·1 ears weighing 0·73 pound per stalk compared with 1·5 ear weighing 0·55 pound per stalk for Golden Bantam. The latter may continue to be the most popular in Central Quebec, but to do this it has to live on its reputation of days gone by, for, at the present moment, Malakoff, Cap Rouge 18, is certainly superior to it.

CORN—SEED PRODUCTION

When a home gardener has decided to save seed from the sweet corn which he grows for market, he will no doubt have chosen some good way of selecting from the plants which produce ears such as will bring him the most profit. One of the most important points is to properly cure these seed ears. To leave them freeze before they are well cured will injure germination, and the same thing will happen if the corn, husked or not, is thrown in a large pile, which will develop heat. When only a small quantity is required, tying the ears so that they will not touch each other will give very good results; if there is too much to use this method, the corn may be placed on a slatted floor, made of lath spaced one inch apart, about one foot in depth, but loosely arranged so that the air will circulate right through. As soon as all the moisture is out of the cob, the corn may be shelled or the ears stored away.

CORN—SUCKERING EXPERIMENT

The object of this experiment is to determine the effect of suckering corn from the standpoint of earliness, yield and ear development. All suckers are removed as they appear, on one lot, while they are kept on the other, an equal number of stalks being left to each hill. The following figures show the results for three years:—

CORN—SUCKERING EXPERIMENT

Years	Tillers removed			Tillers left		
	Ears per acre	Pounds per acre	Days ready to use	Ears per acre	Pounds per acre	Days ready to use
1926	19,602	8,906	99	20,183	9,360	101
1927	24,829	9,970	99	27,104	10,556	102
1928	28,072	11,100	91	31,218	13,189	97
Average	24,168	9,992	96	26,168	11,045	100

Though the experiment has not been conducted long enough to come to definite conclusions, it seems that the only advantage gained by suckering is to hasten the date when corn is ready to use; both the number of ears per acre and the weight of these ears were greater when tillers were left.

CORN OF DIFFERENT SEASONS VERSUS ONE VARIETY SOWN AT DIFFERENT DATES

This project is to compare the advantage, if any, of a succession of varieties of different seasons with one variety planted on different dates. Three varieties are sown on the same date, one early, one medium, and one late maturing sort, and one early maturing sort is sown at intervals of about one week, data being kept on the length of season for table use and on the yield.

CORN OF DIFFERENT SEASONS VERSUS ONE VARIETY SOWN AT DIFFERENT DATES

Year	Variety	Sown	Number of days during which the crop was marketable			Pounds of ears per acre		
			One picking	Three varieties	One variety	One picking	Three varieties	One variety
1926	Extra Early Adams	May 19	8	.....	.....	6,050	.....	.....
	Golden Bantam	" 19	29	.....	.....	10,043	.....	.....
	Early Malcolm	" 19	32	23	.....	12,584	9,559	.....
	Early Malcolm	" 29	35	.....	.....	13,310	.....	.....
	Early Malcolm	June 8	35	.....	34	11,568	.....	12,487
1927	Extra Early Adams	May 20	7	.....	.....	13,063	.....	.....
	Golden Bantam	" 20	7	.....	.....	5,518	.....	.....
	Early Malcolm	" 20	7	7	.....	13,310	10,630	.....
	Early Malcolm	" 28	7	.....	.....	8,325	.....	.....
	Early Malcolm	June 4	8	.....	7	13,673	.....	11,769
1928	Extra Early Adams	May 30	12	.....	.....	12,463	.....	.....
	Golden Bantam	" 30	18	.....	.....	4,477	.....	.....
	Early Malcolm	" 30	13	14	.....	10,648	9,196	.....
	Early Malcolm	June 9	17	.....	.....	12,342	.....	.....
	Early Malcolm	" 21	16	.....	15	10,648	.....	11,213
	Average	.....	.....	15	19	.....	9,795	11,823

Though three years are not sufficient to come to definite conclusions, it looks as if an early maturing variety such as Malcolm would lengthen the season during which corn is marketable for table use, besides increasing the yield.

CORN—HILLS VERSUS ROWS

The object is to determine which method of culture gives the earliest and best ear development. As the experiment was only made once, in 1928, this must only be considered a progress report.

Seed was sown in rows 3 feet apart and thinned to 9 inches in the row after danger from cutworm was over, and the crop was compared with that of another lot where seed was sown in hills 3 by 3 feet apart and thinned to three plants to a hill. The variety Sunshine was used.

The rows had 108 stalks and gave 117 ears weighing 63·25 pounds or 0·54 pound each, whilst the hills had 90 stalks and gave 97 ears weighing 49·75 pounds or 0·51 pound each. The first corn from the last lot was ready to use about 4 days before the one from the rows.

MUSKMELON—VARIETY EXPERIMENT

Out of 18 varieties and strains of muskmelons tested since 1911, only three were left in 1928, Early Green Citron, Hackensack, and Montreal Market. The first-named is earlier and produces a larger number of pounds of fruit but has less market value than the other two. Melon culture should be left to the expert market gardener, in Central Quebec, as it requires the use of hotbeds or individual cold frames to start the plants, a warm soil to shove them ahead quick afterwards, and a good market. For home use, farmers can grow Early Green Citron, whilst for commerce, either Hackensack or Montreal Market would be much better. A good deal could no doubt be done by selection to improve one of the latter, as regards earliness.

Details for the five years during which the above-mentioned three varieties were tested together are herewith given:—

MUSKMELON—VARIETY EXPERIMENT

Year	Early Green Citron, pounds per acre	Hackensack, pounds per acre	Montreal Market, pounds per acre
1924	21,511	582	403
1925	83,356	15,058	11,293
1926	115,085	19,898	18,284
1927	91,019	32,132	23,931
1928	67,043	10,397	14,744
Average	75,603	15,613	13,731

MUSKMELON—HOTBED VS. COLD FRAME VS. OUTSIDE SOWING

The object is to ascertain the advantages, if any, of growing muskmelons which have been started in a hotbed or under individual cold frames as against sowing seed and maturing fruit outside. The three varieties which have succeeded best at Cap Rouge were used in 1925 and in 1927 for this experiment, details about which are given in the following table:—

MUSKMELON, HOTBED VS. COLD FRAME VERSUS OUTSIDE SOWING

Variety		Hotbed			Cold Frame			Outside		
		Sown	Germinated	Pounds per acre	Sown	Germinated	Pounds per acre	Sown	Germinated	Pounds per acre
Green Citron	1925	21–IV	26–IV	95,994	28–V	4–VI	83,356	28–V	5–VI	61,845
	1927	19–IV	3–V	67,491	22–IV	6–V	91,019	13–VI	22–VI	55,660
Average		20–IV	29–IV	81,742	10–V	20–V	87,187	5–VI	13–VI	58,752
Hackensack	1925	21–IV	26–IV	12,638	28–V	4–VI	15,058	28–V	8–VI	10,218
	1927	19–IV	29–IV	20,436	22–IV	6–V	32,132	13–VI	22–VI	17,478
Average		20–IV	27–IV	16,537	10–V	20–V	23,595	5–VI	15–VI	13,848
Montreal Market	1925	21–VI	26–IV	8,604	28–V	4–VI	11,293	28–V	4–VI	10,218
	1927	19–VI	29–IV	12,369	22–IV	6–V	23,931	13–VI	22–VI	9,680
Average		20–IV	27–IV	10,486	10–V	20–V	17,612	5–VI	13–VI	9,949

One thing which has been found out in variety tests of muskmelons at this Station is that the season of Central Quebec is too short to grow them with profit when the seed is sown directly outside. The present project shows that yields are highest when a few seeds are sown in small individual cold frames, followed by the lot from the hotbed.

It will require at least three years more before definite conclusions may be arrived at.

WATERMELONS—VARIETY EXPERIMENT

Twenty-two varieties and strains of watermelons were tested during fifteen years with the result that this vegetable is not recommended for the late springs and short seasons of Central Quebec. Even if, by starting seed in hotbeds, fruit could be matured in reasonable quantity, it would come on the market when there is normally no demand for the crop. In 1912, 1914 and 1916 not

one of the twenty varieties or strains tested gave a single marketable fruit; in 1917, 1920 and 1928 only five out of twelve produced edible watermelons, which leaves just nine years out of fifteen when there was something to sell from each kind tested. For the trucker with a special clientèle, or for the home garden, Red Citron will give the best results.

ONION—VARIETY EXPERIMENT

Twenty-four varieties and strains of onions were tested during fifteen years, including different shapes, flat, oval, globular, and various colours, from dark red to dull white. The difference is slight in reference to the time it takes to get them ready for market, and a gardener who wishes to have early stuff should plant sets instead of sowing seed. The following table gives details regarding yield, for varieties which have been grown the same seasons for eight years:—

ONION—VARIETY EXPERIMENT

Variety	Pounds per acre								
	1916	1917	1918	1924	1925	1926	1927	1928	Average
Prizetaker	53,724	40,656	51,110	61,274	70,858	65,630	76,666	63,307	60,403
Yellow Globe	38,623	45,593	56,628	32,234	37,752	24,684	69,986	56,338	45,230
Wethersfield	31,944	33,686	38,623	31,363	43,850	28,459	66,792	52,272	40,874
Yellow Danvers	37,171	31,363	29,621	28,169	40,946	33,686	59,532	58,080	39,821
Red Globe	44,431	38,914	48,206	37,171	37,171	10,745	60,403	36,881	39,240
White Globe	30,782	29,040	58,951	28,459	37,752	17,134	52,272	49,658	38,006
Early Red	27,007	19,747	39,785	6,970	11,906	6,970	51,982	44,722	26,136

It has been found at Cap Rouge that the yield of onions is much greater when seed is sown in hotbeds and plants put out in the open later on. During five out of the eight years mentioned on the above table, this method was used, which may have given some advantage to Prizetaker. Seed of Yellow Globe was procured from a master breeder, while that of Wethersfield was the ordinary commercial stuff. Taking into consideration the good keeping quality of the last-named variety, it may be recommended as a good one for Central Quebec when no transplanting is done.

It is seen that given too much space, such as three inches between the plants, decreased the yield, and there was no exception to this with any of the four varieties, even with a comparatively large one like Prizetaker.

So as to minimize the error due to not thinning exactly at the correct distances, the experiment was conducted in 1922 with Large Red Wethersfield which was sown in hotbeds on April 10, and transplanted on June 6 at 1, 2, and 3 inches. For a row of thirty feet of each lot, the yields were respectively 8 pounds and 8 ounces at 1 inch, 6 pounds and 12 ounces at 2 inches, and 5 pounds and 10 ounces at 3 inches. This corroborates the experiment with seed sown in the open and plants thinned afterwards.

PEA—VARIETY EXPERIMENT

Practically every well advertised variety of garden pea has been tested during the last 15 years. The edible-podded sorts are not well known enough in America to give them much attention, whilst the climbing sorts cost too much for staking and cannot be taken into consideration commercially. Between the smooth and wrinkled, the latter are of much better quality and should be chosen, because some of them are just as early as any of the others. Regarding colour, the greens are more attractive than the lighter ones and will generally sell better. Amongst the very early varieties, Gregory Surprise has been ready in

58 days after sowing, for an average of 9 years, which is 4 days before Sutton Excelsior, its nearest competitor for precocity, and it yielded at the rate of 1,431 quarts of green shelled peas per acre. For the main crop, Juno and Stratagem have been the leaders, the former remaining at the top, after 9 years, with a production at the rate of 1,660 quarts of green shelled peas per acre, and the first picking being ready to sell 70 days after sowing.

The following table gives details about the four above-mentioned varieties:—

PEA—VARIETY EXPERIMENT

Year	Gregory Surprise		Sutton Excelsior		Juno		Stratagem	
	Quarts shelled peas per acre	Days ready to use after sowing	Quarts shelled peas per acre	Days ready to use after sowing	Quarts shelled peas per acre	Days ready to use after sowing	Quarts shelled peas per acre	Days ready to use after sowing
1911	726	43	484	48	1,089	61	1,452	61
1912	605	56	968	61	847	73	605	72
1913	968	50	1,694	59	1,210	67	1,694	61
1915	847	63	1,331	63	1,331	74	726	79
1922	1,331	64	1,452	69	1,452	75	1,452	78
1923	682	59	924	62	1,089	59	987	73
1926	2,420	56	2,420	58	2,904	66	2,096	70
1927	1,694	69	2,236	70	3,146	82	3,388	78
1928	968	63	1,370	66	1,873	77	1,854	75
Average	1,138	58	1,431	62	1,660	70	1,584	76

PEA—BREEDING FOR YIELD

After the trial plots had shown that Juno was the highest yielder of the 43 varieties and strains tested, the improvement of this heavy producer was started by selection. During five years, 903 individual plants were examined and everything was gradually discarded until the best remained to be compared with well known commercial sorts. That the progeny test gradually eliminated the poor yielding strains is shown by a comparison of the highest with the lowest, which was as 251 to 100 the first year, 179 to 100 the second year, 155 to 100 the third year, and 117 to 100 the fourth year, the difference dwindling down as selection advanced. The Cap Rouge selection of Juno, since 1922 inclusive, has been tested against the mother variety, and has averaged, for five seasons, 2,194 quarts of shelled green peas per acre compared with 2,093 for the other. A limited quantity of seed is offered each year at a reasonable price.

POTATO—VARIETY EXPERIMENT

From 1911 to 1920 inclusive, the two varieties which did best were Irish Cobbler for an early sort and Green Mountain for a late one. In 1921, however, Dooley was placed in the test plots and it has forged ahead, as will be seen by the following table:—

Variety	Size	Form	Colour	Season	Pounds per acre								
					1921	1922	1923	1924	1925	1926	1927	1928	Average
Dooley	Large	Oval	White	Late	34,848	15,477	14,421	19,008	17,688	20,288	13,728	11,880	18,417
Dreer Standard	"	"	"	"	21,582	4,224	1,386	19,272	14,256	7,920	12,276	1,914	10,354
Morgan Seedling	"	"	"	Medium	26,202	10,230	6,930	13,464	14,520	3,036	8,052	*	10,304
Green Mountain	"	Oblong	"	Late	28,512	8,910	5,709	7,920	8,184	2,904	8,316	1,452	8,988
Irish Cobbler	Medium	Round	"	Early	22,902	3,432	4,785	11,616	11,316	4,620	10,692	2,046	8,926

* No marketable potatoes—all small.

The warm dry summers and the shallow soil of Cap Rouge, with shale not far from the surface, are not favourable to the production of disease-free potatoes, and it is probable that with a change of seed every two or three years, the production of Irish Cobbler and Green Mountain would be increased. These two varieties are the ones generally asked for by the dealers, and their type, in early and late, should be grown if growers do not wish to have any difficulty in getting rid of their surplus.

POTATO—STRAW MULCH VERSUS CULTIVATION

The object is to determine the advantage, if any, of the straw mulch over the regular cultivation. This experiment was conducted only in 1928 and this is just a progress report. Two plots of Irish Cobblers were used. As soon as the sprouts were through the ground, one plot was covered with straw four or five inches deep and received no further cultivation, while the other plot was cultivated in the usual manner. There was practically no difference, less than one-half per cent, in the total yield, and very little, about two per cent, in the crop of marketable tubers. This will be continued at least during four more seasons before conclusions may be arrived at.

PUMPKIN—VARIETY EXPERIMENT

Eight varieties or strains of pumpkins have been tested for twelve seasons. The large ones produce more per acre, as will be seen by the following table, but they are a drug on the Quebec city markets where the smaller ones, though producing less, would bring more money per acre. Pumpkins are generally sold at so much a piece and a strain of Sugar is recommended as the most profitable to grow for human consumption.

PUMPKIN—VARIETY EXPERIMENT

Year	Connecticut Field	Jumbo	King of Mammouth	Small Sugar	Sugar
	lb.	lb.	lb.	lb.	lb.
1924	64,623	42,574	48,221	37,645	20,077
1925	64,892	74,931	53,419	45,173	34,597
1926	38,451	46,518	49,117	20,570	27,427
1927	92,543	69,374	70,359	39,706	51,985
Average	65,127	58,349	55,279	35,773	33,521

RHUBARB—VARIETY EXPERIMENT

This test was conducted on a well manured and well tilled but naturally poor sandy loam. That there is a considerable difference in the yielding power of certain varieties under conditions such as exist at Cap Rouge is shown by the result of the first five years, when the average production per acre was at the following rates: St. Martin 36,463 pounds, Hobday Giant 28,868, Prima Donna 19,929, Victoria 19,793, Linnaeus 14,729. In 1921, a new plantation was started with only the first two mentioned, which were compared during four seasons, St. Martin producing at the rate of 45,001 pounds per acre compared with 28,546 for Hobday Giant. Two advantages for St. Martin, which is strongly recommended, are that the stalks are large, and it does not come to seed early. Its colour, dull green, is somewhat against it, however, and two very good red sorts, one from the Central Experimental Farm, Ottawa, and the other from Macdonald College are now tested alongside of it.

SQUASH—VARIETY EXPERIMENT

Of the twenty-nine varieties and strains of squash tested during thirteen seasons, the Crooknecks and Scalloped have such a small proportion of edible fruit that there is practically no demand for them. For the person who only has limited room, one of the Bush sorts will do, as it does not spread out like the others. The Long Vegetable is a very heavy yielder, sometimes at the rate of 35 to 40 tons per acre, and where high production counts, it is certainly the one to take. For a discriminate clientèle, however, the Hubbards will often bring more money for a certain area.

The following table gives details:—

SQUASH—VARIETY EXPERIMENT

Variety	Pounds per acre							
	1913	1914	1915	1916	1925	1926	1927	Average
Vegetable Marrow	25,634	39,258	59,514	74,572	42,485	22,452	56,556	45,781
Hubbard	6,991	1,972	22,407	26,979	40,692	39,796	31,460	24,328
Delicious	7,708	15,058	27,785	26,530	30,653	17,926	33,880	22,791
White Bush	15,596	6,633	20,211	24,469	18,822	24,738	42,813	21,912
Golden Hubbard	2,689	10,218	27,203	27,875	23,483	16,133	39,813	21,018

TOMATO—VARIETY EXPERIMENT

Ninety-five varieties and strains of tomatoes have been tested since 1911. There seems no doubt that quite a few of these differed in name only. Four have shown outstanding qualities. and the following table gives details about them:—

YIELD OF RIPE FRUIT AND TIME TO MATURE—FOUR LEADING VARIETIES AND STRAINS OF TOMATOES

Year	Prosperity		Capiana (a)		Burbank Early		Alacrity	
	Pounds of ripe fruit per acre	Days to come to maturity	Pounds of ripe fruit per acre	Days to come to maturity	Pounds of ripe fruit per acre	Days to come to maturity	Pounds of ripe fruit per acre	Days to come to maturity
1917	9,120	157	15,110	160	12,523	158	5,173	165
1918	8,508	150	8,372	147	10,550	150	9,529	150
1919	58,874	136	44,104	133	45,942	141	35,392	133
1920	24,298	146	42,199	144	17,832	145	18,989	146
1921	48,188	149	49,549	146	46,691	149	30,084	149
1922	31,717	146	25,728	151	23,073	146	30,220	141
1923	9,393	172	11,843	172	19,466	154	18,921	161
1924	20,010	171	20,827	162	14,701	163	13,885	161
1925	23,686	143	15,518	146	25,047	143	17,968	143
1926	3,539	180	3,948	180	2,178	180	6,806	167
1927	27,633	163	23,141	163	27,497	163	6,262	163
1928	25,591	141	17,320	151	11,467	151	18,578	139
Average	24,213	154	23,138	154	21,414	153	17,650	151

(a) A Cap Rouge selection of Earliana.

The main point for this district is to have the greatest number of pounds of ripe fruit at as early a date as possible, and Capiana leads in this. Danish Export and Alacrity are earlier, but do not yield enough. Prosperity produces more but the bulk of the ripe crop comes rather late when prices are going down; for instance, in 1928, its first ripe fruit was 14 days after that of another variety.

Up to date, Prosperity is the only serious rival of Capiana, and it seems that some strain of Earliana should be used for the short season of this district. These strains are generally too acid and are apt to crack around the stem, but they could be improved by breeding. Anyhow, it is surely better, in Central Quebec, to grow a rough early tomato than a smooth late one.

TOMATO—IMPROVEMENT BY SELECTION

Seed of Earliana was procured from Burpee in 1911, and hundreds of selections have been made since, the object in view being the largest possible quantity of ripe fruit as early as possible in the season, when prices are high. Attention was directed towards the whole plant and not only to a part of it, as it is a mistake to save seed from a plant which bore only one very early fruit whilst the others were rather late in maturing.

Strain No. 17 was named Capiana and the reader is referred to the experiment "Tomato—Variety Experiment" where it will be seen that it surpasses all others for yield of ripe tomatoes early in the season when prices are high. A limited quantity of seed is offered each year at 25 cents per packet of 100 seeds.

TURNIP—VARIETY EXPERIMENT

Twenty-five varieties and strains of turnips and swedes have been tested during thirteen years. In general, the latter, though they are preferred at the end of the season and keep much better through winter, are too late to bring good prices early in the summer.

THREE GOOD VARIETIES OF TURNIP COMPARED

Variety	Pounds per acre						
	1919	1920	1925	1926	1927	1928	Average
Golden Ball	27,298	36,445	32,815	30,056	9,874	28,459	27,491
Milan	35,864	45,448	23,688	27,588	36,300	32,525	33,565
Snowball	27,733	46,754	25,846	33,396	33,106	30,202	32,839

As will be seen by the above table, Milan has been the heaviest yielder of the three varieties which gave best results.

This is a vegetable to be grown only by persons who are within driving distance of a good market, and which should generally be sold when small, in bunches.

TURNIP, SWEDE—FOR TABLE USE

The ordinary turnip is not as well liked on the Quebec city markets as the swede, so that a certain number of these have been tested during the last few years.

TURNIP, SWEDE, FOR TABLE USE

Variety	Pounds per acre				
	1925	1926	1927	1928	Average
Bangholm	32,960	28,604	76,375	47,335	46,318
Good Luck	28,459	36,010	91,040	53,869	52,344
Shirving	35,574	20,038	71,729	56,338	45,920
Golden Ball	32,815	30,056	9,874	28,459	25,301
Milan	23,668	27,588	36,300	32,525	30,020
Snowball	25,846	33,396	33,106	30,202	30,637

It is evident that the swedes yield more than the others, also that Good Luck is at the head of all of them.

A good plan would be for a person who is within driving distance of a good market to grow a few ordinary turnips, possibly Milan, to sell early in the season, bunched, and to put the main crop in Swedes, say Good Luck, for autumn and winter use.

CEREALS

BARLEY—VARIETY TESTS

Some thirty varieties and strains of barley have been tested since 1911. The six-rowed, on an average, yielded about $2\frac{3}{4}$ bushels more per acre and matured a week earlier than the two-rowed. Manchurian has been recommended and will give good satisfaction. Comparative tests show that it is not advantageous, from the point of view of digestible nutrients per acre, to grow barley in Central Quebec, wherever oats do well.

BARLEY—SELECTION FROM GOOD VARIETIES

One of the best ways to bring the growing of barley to a profitable basis is to grow more per acre. To try to do this, selections were made at Cap Rouge of Manchurian, the variety which gave the best satisfaction. The reader is referred to the 1927 report of this Station for details regarding this experiment. Manchurian Cap Rouge 14, during the last ten years, has been at the head of all the varieties tested, and a limited quantity of seed is offered for sale at a reasonable price.

BARLEY—PERCENTAGE OF HULL IN DIFFERENT VARIETIES

It is not always the highest yielder of grain per acre which furnishes the largest quantity of digestible nutrients, as varieties differ in the percentage of hull which is mostly fibre. This is why the present experiment was commenced in 1927. It is interesting to note that, to date, two selections of Manchurian have respectively been practically at the top and at the bottom of the list, as regards per cent kernel.

Sowing small trial plots by hand.

BEANS, FIELD—VARIETY TESTS

Tests at Cap Rouge during the last fifteen years show that field beans do not produce as much digestible nutrients per acre as field peas, so that they cannot be taken into consideration for live stock feeding. The producer who grows for human consumption should find out if white or coloured beans are wanted on his particular market, as the demand is not uniform everywhere, in this regard. The heaviest yielder has been Norwegian, yellowish brown, among the coloured sorts, and Navy among the whites. Freedom from disease is the important factor for high production, so that the careful grower should first select pods without blotches on them, and afterwards seed also free of blotches.

FLAX—VARIETY TESTS

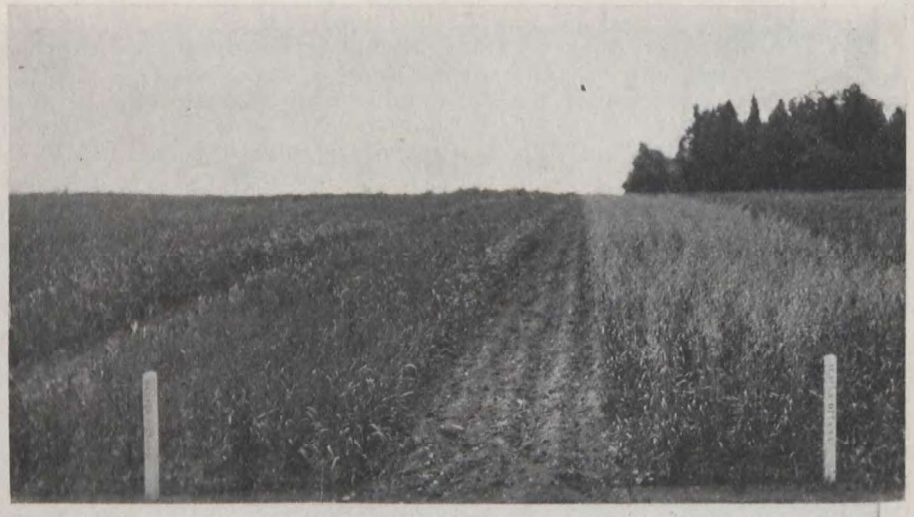
The great handicap in profitable flax growing is the amount of manual labour required, so that this crop cannot now compete with others generally grown in Central Quebec. That the climate and soil are favourable to its production for fibre has however amply been shown by repeated trials at Cap Rouge. Longstem has been the highest yielder of fibre and Novelty of seed.

OATS—VARIETY TESTS

Tests during fifteen years have conclusively shown that, on a sandy loam of good fertility, oats yielded more digestible nutrients per acre than either barley or wheat, which is the important point from a live stock feeding point of view. Neither hulless nor side oats gave as good results as Banner which is very strongly recommended for Central Quebec.

OATS—SELECTION FROM GOOD VARIETIES

Since 1916, selection work has been going on with Banner and the results have been very gratifying indeed. During seven years, Banner Cap Rouge 31 has produced at the average rate of 2,410 pounds per acre, followed by Victory 2148, Banner Ottawa 2125, and Gold Rain 1944. A reselection was started in 1927 and this may have to be done every ten years or so. A limited quantity of seed is offered every year at a reasonable price.



Alaska is much earlier than Banner oats, but the latter yields more digestible nutrients per acre in most of Central Quebec.

OATS—PERCENTAGE OF HULL IN DIFFERENT VARIETIES

It was thought that hulless or early varieties might yield more digestible nutrients per acre than Banner, though producing less grain, so Liberty and Alaska were compared with the latter. Results show that Banner is beating them all, not only for number of pounds of grain but also for number of pounds of kernel per acre.

PEAS, FIELD—VARIETY TESTS

During seventeen years, compared with oats, barley, and wheat, field peas have produced more protein per acre than any of them, which means that they are the most profitable from a live stock feeding point of view. There is also a large demand for human consumption, but, in this case, only the white varieties are wanted, and, among these, Arthur has given the best satisfaction. Of the coloured varieties, Solo has produced the most; in fact, it is the heaviest yielder of all those tested for more than five years.

PEAS, FIELD—SELECTION FROM GOOD VARIETIES

Selection work is going on with Solo and Arthur, the two varieties which have proven to be the best in their respective class, coloured and white. These strains must show up well in the trial plots for an average of at least five years before they are offered as seed.

WHEAT—VARIETY TESTS

According to tests at Cap Rouge, wheat does not yield enough here to be grown profitably for live stock, as either field peas or oats produce more digestible nutrients per acre. There may, however, be strong soils on which oats lodge and where wheat might be grown to advantage. Huron has given the best results and is strongly recommended where particular conditions make wheat a profitable crop to grow.

WHEAT—SELECTION FROM GOOD VARIETIES

Work was commenced in 1914 with Huron, the variety best adapted to conditions in Central Quebec. The Cap Rouge selection, placed in the trial plots, has outyielded all others here, its nearest competitor being Huron, Ottawa 3, the parent variety. A limited quantity of seed is yearly offered at reasonable prices, quality considered.

FORAGE PLANTS

INDIAN CORN FOR SILAGE—VARIETY TESTS

About sixty varieties and strains of corn have been tested for silage production during the last fifteen years. After a few seasons, it was found out that the small varieties, though producing ears in the early glazed stage, did not yield enough tonnage to be profitable, and they were transfered to another experiment where the production of grain is the important point. Of the ones tested together for twelve years, Wisconsin No. 7 stands at the head, closely followed by Longfellow, for total dry matter per acre, which is really the important point. As Longfellow has long been the standard variety in the district, it is still recommended.

INDIAN CORN FOR GRAIN—VARIETY TESTS

During the last seven years, about fifteen varieties and strains of corn have been tested for grain production. Two of them, Twitchell's Pride and Quebec 28 averaged over thirty bushels of shelled grain per acre, which shows the possibilities, if home grown seed is put in as early as possible after danger of frost is passed in the spring, and the crop picked before heavy frosts, and properly cured.

SUNFLOWERS FOR SILAGE—VARIETY TESTS

Where conditions of climate or soil make the growing of sunflowers more advantageous than that of corn, for silage production, it is important to find out the variety or strain which will produce not only the most tonnage per acre, but the most dry matter. Since 1923, ten varieties or strains have been tested, and it is clear that Russian is at the top of the list, with the Giant strain (Disco) yielding over 1,000 pounds more dry matter per acre than the Mammoth.

CARROTS, FIELD—VARIETY TESTS

Experiments during fifteen years have shown that this class of roots, compared with mangels and swede turnips, is not profitable to grow, as it does not produce enough tonnage or dry matter per acre. Of the twenty-two varieties and strains tested, including long, intermediate, and short, White Belgian has been the highest yielder.

MANGELS—VARIETY TESTS

On the comparatively light and shallow soil of the Cap Rouge Station, compared with swede turnips, mangels have not produced more than three-fourths as much dry matter per acre, so that they are not recommended for Central Quebec, except on the relatively limited area of naturally drained alluvial soils of this district. Of the sixty odd varieties and strains tested since 1911, comprising the half sugar, long, intermediate, tankard, and globe types, Yellow Intermediate has been the heaviest yielder both of raw material and of dry matter per acre.

METHODS OF HELPING THE GERMINATION OF MANGEL SEED

The results of twelve different tests made in flats, in the greenhouse, show that if the check is taken as 100, soaking seed in water for fifteen hours would give a germination of 106; soaking seed in a mixture of liquid manure and water for fifteen hours, 104; packing the soil, 99; watering every day, 99; packing the soil and watering, 95; mixing a complete fertilizer with the soil as in harrowing, 84; applying a complete fertilizer in the row with the seed, 55; mixing salt with the soil as in harrowing, 48; applying salt in the row with the seed, 14.

SUGAR BEETS—VARIETY TESTS

The average of 26 tests, with seed from 24 sources, both European and Canadian, from 1920 to 1927 inclusive, was at the rate of 16,529 pounds of roots per acre, with a per cent of 19·38 of sugar in juice, and a co-efficient of purity of 87·41. There seems no doubt that the climate of the district is suitable for this crop, and if they sow them on the right kind of soil, farmers can make money growing sugar beets whenever factories are established.

TURNIPS, SWEDE—VARIETY TESTS

For large herds, silage is more profitable than roots, but the latter certainly have their place in small herds, and where manual labour has not to be paid for. Of all kinds of roots tested at Cap Rouge since eighteen years, swede turnips have produced the most dry matter per acre, so that they are the most advantageous to grow. In general, the purple tops have been the highest yielders, with Good Luck and Bangholm at the top.

TURNIPS, FALL—VARIETY TESTS

The fifteen varieties and strains of fall turnips tested during the last twelve years have not produced as much dry matter per acre as swede turnips or mangels, but they come in handy for very early feeding. Greystone was the heaviest yielder, but it is hard to recommend a variety or strain, as the average trueness to type was not 46 per cent, for the four seasons when actual measurements and careful examinations were made.

ALFALFA—VARIETY TESTS

A hay with a very high protein content is needed to produce milk and meat at a lower price, and alfalfa fills the bill for this kind of hay. But it must be hardy, as a ninety per cent germination test means very little when eighty per cent of the plants die during the first winter. Variegated and Grimm have given the best results to date. Farmers must however understand that alfalfa requires a deep, dry, reasonably rich, well tilled, inoculated soil with enough lime, and that it should not be cut or pastured too close or too late. Those who cannot have these conditions should continue using red clover, or alsike on wet acid ground.

RED CLOVER—VARIETY TESTS

During the last five years, fourteen lots were tested, the seed coming from Northern and Southern Europe, from Western Canada, from Ontario and from Quebec. Seed from Southern Europe did not produce plants hardy enough for this district and should not be employed. What came from Sweden gave very good results, in fact was at the head for yield of dry matter per acre, followed by Quebec, Ontario and Western Canada seed.

RED CLOVER—SEED GROWING VERSUS HAY FOR PROFIT

It is admitted that the red clover seed required in Canada should be produced in the country, but as all districts are not equally suitable for red clover seed production, an experiment was conducted during six seasons to find out if it would pay better than growing hay, in Central Quebec. When a crop of hay and one of seed gave products having a value of $59.71 per acre, two crops of hay, gave products having a value of $61.70 per acre. Samples of the threshed hay were sent to the Dominion Chemist who reported that "all the data point unmistakeably to the inferior character of the threshed clover hay as a fodder."

RED CLOVER—BROADCAST VERSUS ROW SEEDING FOR THE PRODUCTION OF SEED

When it has been proven that red clover seed production is profitable in a district, it is important to find out how it can be grown to the best advantage.

An experiment conducted during five seasons has shown that for every 100 pounds of seed produced when sown broadcast and the first crop was cut for hay, there were 102 pounds when sown in 24-inch drills, 123 pounds when sown in 12-inch drills, and 127 pounds when sown broadcast and the first crop was cut for seed. However, the value of the products were respectively $62.86 when sown broadcast and the first crop was cut for hay, $55 when sown broadcast and the first crop was cut for seed, $51.18 when sown in 12-inch drills, and $43.60 when sown in 24-inch drills. The comparatively high value of the first crop of hay gave the advantage to that method.

Loading hay with a tractor.

TIMOTHY—VARIETY TESTS

Timothy seed produced at the Central Experimental Farm was compared, for hay production, with that from Sweden and the United States, also with the commercial article bought for the Cap Rouge and St. Joachim Stations. The three first lots were well bred, whilst not much was known about the latter, which was last. This shows that with plants, as with animals, uniform good feeding cannot supplement what is lost by poor breeding.

ANNUAL HAYS—VARIETY TESTS OF VARIETIES FOR SUITABILITY

Hay and pastures are now, and will for a long while yet continue to be, the most important factors for the production of milk and meat in Central Quebec. It is thus important to know how they can quickly be temporarily replaced when they fail. Results of five years show that the average yields in pounds of digestible nutrients per acre were as follows: Victory oats, 3,530, Gold Rain oats, 3,429; Banner oats and vetches, 3,317; Banner oats and Arthur peas, 2,980; Banner oats, 2,889; clover and timothy hay, 2,162. From a feeding point of view, the mixture of peas and oats would probably be the most profitable, on account of its high percentage of protein, and also because it may be used for hay, for soiling, for silage, or for grain.

FERTILIZERS

COMPARATIVE VALUE OF DIFFERENT FORMS OF NITROGEN

Through excessive growing of grain and timothy, the loss of nitrogen has been going on for a long time in the older settled parts of Central Quebec, and this is now, at many places, the limiting factor to profitable farming. An experiment was thus conducted to see which of the two well known nitrogen bearing fertilizers, nitrate of soda and sulphate of ammonia, would give the best results on a well tilled but comparatively poor sandy loam. The rotation was of three years, and if 100 is taken as the crop obtained from sulphate of ammonia, then the crops obtained with the use of nitrate of soda would be represented by 138 for potatoes, 101 for oats, and 100 for clover hay. The quantity of nitrogen applied was the same in both cases.

COMPARATIVE VALUE OF DIFFERENT FORMS OF PHOSPHORUS

The object of the experiment was to compare superphosphate, basic slag, and bone meal as sources of phosphorus, when the elements nitrogen and potassium were in sufficient quantity. The soil was a sandy loam, in good tilth, but of only average fertility, and the rotation was of three years. If 100 is taken for the crops obtained by the use of superphosphate, the crops obtained by the use of basic slag would be represented by 56 for potatoes, 100 for oats, 110 for clover hay, and the crops obtained by the use of bone meal would be represented by 47 for potatoes, 113 for oats, 115 for clover hay. The quantity of phosphorus applied was the same in the three cases.

POULTRY

About twelve years ago, one hundred Barred Rock females were bought, and a few male birds were sent to Cap Rouge from the Central Experimental Farm, Ottawa. Trapnests were used from the beginning and only four hens were found which had laid over 150 eggs the first year. Not more than a dozen birds have been brought into the flock since and, in 1929, more than one hundred females, all with yearly records of over 175 eggs, are mated to males whose dams have laid more than 200 eggs in a year.

These results are good, but it is hard to exactly define the relative parts which breeding, feeding, and management have played in this improvement.

As far as breeding goes, there seems a tendency to believe that mating a cock out of a high record dam to hens which themselves have high records is practically the only thing to do to ensure success. However, the most thoughtful breeders believe that high egg production is not a definite character like, for instance, red ear lobe, but is rather the result of a combination of several production characters, each of which is distinct and inheritable. Going further, one may say that these characters vary in intensity, being of better quality in certain individuals.

Among production characters may be mentioned early maturity, non-broodiness, intensity, high persistency, and these are no doubt combined in different ways, and are probably inherited from both the sire and the dam. This would tend to explain why success sometimes comes when least expected, also the disappointments of various breeding operations. And it means that although the trapnest alone may single out the good producers, it must have the help of a careful analysis of records, to find out the good reproducers, that is the breeders which will give progeny better than they were themselves at the same age under the same conditions.

FERTILITY AND HATCHABILITY OF EGGS AND VIABILITY OF CHICKS FROM PULLETS AND FROM HENS

Can pullets be profitably used in the breeding flock? Will their eggs be as fertile and hatch as well, and will their chicks be as vigorous as if from two year old hens? Practically everybody would have answered in the negative until a few years ago, when the results of experimental work at the Ontario and New Hampshire Colleges of Agriculture were made known. Professors Graham and Richardson both came to the conclusion that pullets were at least as good as two year old hens for breeding purposes; and, at Guelph, visitors are shown splendid flocks of pullets that have been bred for five or six generations from pullet eggs.

The following figures give details for an experiment conducted during seven years at Cap Rouge:—

BREEDING FOR FERTILITY, HATCHABILITY AND LIVABILITY, HENS VERSUS PULLETS

Year	Total eggs set	Number fertile eggs	Per cent fertile	Number chicks hatched	Per cent total eggs hatched	Per cent total fertile eggs hatched	Number chicks alive at 3 weeks	Per cent chicks hatched alive at 3 weeks	Total eggs required for one chick	Total fertile eggs for one chick hatched	Total eggs for one chick alive at 3 weeks
Hens											
1922	476	394	82·8	179	37·6	45·4	142	79·3	2·66	2·20	3·35
1923	663	617	93·1	192	29·0	31·1	172	89·6	3·45	3·21	3·85
1924	1,306	1,152	88·2	374	28·6	32·5	308	82·3	3·49	3·08	4·24
1925	890	788	88·5	387	43·5	49·1	343	88·6	2·30	2·04	2·59
1926	1,117	966	86·5	481	43·1	49·8	462	96·0	2·32	2·01	2·42
1927	2,311	2,120	91·7	757	32·8	35·7	705	93·1	3·05	2·80	3·28
1928	865	793	91·7	390	45·1	49·2	381	97·7	2·21	2·03	2·27
Average for seven years....	1,090	976	89·5	394	36·1	40·4	359	91·1	2·77	2·48	3·04
Pullets											
1922	212	180	84·9	87	41·0	48·3	71	81·6	2·44	2·07	2·99
1923	905	851	94·0	406	44·9	47·7	338	83·2	2·23	2·10	2·68
1924	1,781	1,696	95·2	782	43·9	46·1	594	76·0	2·28	2·17	3·00
1925	1,113	916	82·3	470	42·2	51·3	409	87·0	2·37	1·95	2·72
1926	1,865	1,784	95·7	856	45·9	48·0	808	94·4	2·18	2·08	2·31
1927	1,424	1,304	91·6	543	38·1	41·6	487	89·7	2·62	2·40	2·92
1928	1,244	1,165	93·6	591	47·5	50·7	580	98·1	2·10	1·97	2·14
Average for seven years....	1,221	1,128	92·4	534	43·7	47·3	470	88·0	2·29	2·11	2·60

It must not be forgotten, when breeding with pullets, that they must be old enough, and that they should be in fine shape, as it seems that it is the condition of the organs and appetite of the birds that makes their value as breeders.

FERTILITY AND HATCHABILITY OF EGGS ALSO VIABILITY OF CHICKS FROM GOOD AND POOR LAYERS

The object of this experiment is to find out which, good or poor layers, will produce the largest per cent of fertile and hatchable eggs, and of chicks living at three weeks of age, when they are practically saved. It is sometimes claimed that a hen which lays a great many eggs loses strength and cannot be a very good breeder. The present project is to throw light on this question and the following table gives details:—

BREEDING FOR FERTILITY, HATCHABILITY AND LIVABILITY, GOOD VERSUS POOR LAYERS

Year	Total eggs set	Number fertile eggs	Per cent fertile	Number chicks hatched	Per cent total eggs hatched	Per cent total fertile eggs hatched	Number chicks alive at 3 weeks	Per cent chicks hatched alive at 3 weeks	Total eggs required for one chick	Total fertile eggs for one chick hatched	Total eggs for one chick alive at 3 weeks	Average number of eggs laid by each layer
Good layers												
1919 to 1924	2,226	1,949	87·6	763	34·3	39·1	594	77·9	2·92	2·55	3·75	195·4
1925	720	634	88·1	303	42·1	47·8	284	93·7	2·38	2·09	2·54	209·0
1926	673	559	83·1	224	33·3	40·1	212	94·6	3·00	2·50	3·17	217·0
1927	2,765	2,525	91·3	913	33·0	36·2	849	93·0	3·03	2·77	3·26	204·0
1928	1,420	1,325	93·3	632	44·5	47·7	616	97·5	2·25	2·10	2·31	201·0
Average for 10 years	780	699	89·6	283	36·3	40·5	255	90·1	2·76	2·47	3·05	203·5
Poor layers												
1919 to 1924	1,157	1,012	87·5	442	38·2	43·7	330	74·7	2·62	2·29	3·51	154·3
1925	187	161	86·1	74	39·6	46·0	69	93·2	2·53	2·18	2·71	160·0
1926	60	60	100·0	20	33·3	33·3	19	95·0	3·00	3·00	3·16	156·0
1927	329	292	88·7	122	37·1	41·8	109	89·3	2·70	2·39	3·02	157·0
1928	231	212	91·8	113	48·9	53·3	111	98·2	2·04	1·88	2·08	161·0
Average for 10 years	196	174	88·8	77	39·3	44·3	64	83·1	2·55	2·26	3·09	157·3

The dividing line may seem arbitrary but it had to be placed somewhere, and it was decided that to be classed as a good layer a pullet should have a record of 175 eggs during the twelve months following the first one she laid. The number of good layers used for this experiment during ten years was 343; their average yearly egg production as pullets was 203; and it took 3·05 of their eggs for one chick alive at three weeks; there were 82 poor layers with an average production of 157 eggs, and it took 3·09 eggs for one chick at three weeks.

The conclusion is that the good layer, when strong and healthy, will give as good results as the ordinary one.

BREEDING FOR EGG SIZE

The object is to develop high producing strains laying eggs of normal size, 24 ounces to the dozen. The procedure has been to use male birds whose dams laid eggs above normal size, so as to increase egg size of their daughters.

The results were not as good as anticipated. Male bird L 14, out of hen J 143, with an annual record of 205 eggs weighing, in the pullet year, 25 ounces to the dozen, was mated to 8 females whose annual production averaged 208 eggs weighing, in the pullet year, 22·7 ounces to the dozen. It was expected to thus increase the weight of eggs of pullets from these hens. But the average weight of the fourteen daughters' eggs was only 20·8 ounces.

Male bird L 12, out of hen J 155, with an annual record of 202 eggs weighing, in the pullet year, 26 ounces to the dozen, was mated to 4 females whose annual production averaged 200 eggs weighing, in the pullet year, 23·7 ounces to the dozen. It was expected to thus increase the weight of eggs of pullets from these hens. But the average weight of the six daughters' eggs was only 22·8 ounces.

It is probable that more than one factor is responsible for egg weight. Attwood, for instance, found that a ration consisting of whole grain only, fed in winter, reduced the weight of the eggs about 12 per cent. Jull writes that, with

Barred Rocks, the earlier the pullets lay, the lower is the mean egg weight of the total production. Lippincott also pretends that age at first egg is an important factor in the seasonal distribution of egg weights throughout the entire first laying year. Parkhust is of the opinion that body weight influences the weight of eggs more than it does the number of eggs produced, the smaller birds laying smaller eggs than the larger birds.

All this shows that, whilst choosing a male bird out a hen laying eggs above normal weight is probably one of the good ways to increase the weight of eggs of his daughters, it is certainly not the only way, and too much should not be expected of such matings, unless all other influencing factors are known and controlled.

CONTINUANCE OF STERILITY

The object of this test is to ascertain the extent to which individual birds are consistent in non-fertility from year to year. Not one bird was found during the last ten years which was non-fertile from year to year.

G 4.—In 1923, 15 eggs from her were set and not one was fertile; in 1924, 37 eggs were set, 36 were fertile; in 1925, 3 eggs were set and 3 were fertile.

G 28.—The first year, the percentage of fertility was 3·7; the second year, 93·5; the third year, 95·8; the fourth year, 84·6.

D 27.—The first year, the percentage of fertility was 15·8; the second year, 100·0; the third year, 87·5.

I 158.—The first year, the percentage of fertility was 36·8; the second year, 69·7; the third year, 94·7.

D 91.—No eggs were set in the pullet year; the second year, the percentage of fertility was 25·0; the third year, 100·0.

E 157.—No eggs were set in the pullet year; the second year, the percentage of fertility was 25·0; the third year, 100·0.

E 41.—No eggs were set in the pullet year; the second year, the percentage of fertility was 7·7; the third year, 100·0; the fourth year 90·9.

PERCENTAGE OF FERTILITY IN DIFFERENT YEARS OF LAYING

Number of birds	Percentage of fertility					Year when fertility was	
	Pullet year	Second year	Third year	Fourth year	Average fertility	Highest	Lowest
	%	%	%	%	%		
5	74·2	93·4	76·1	83·6	81·8	Second	Pullet
9	80·8	90·5	90·9	.....	87·4	Third	Pullet
23	89·5	84·5	.....	.....	87·0	Pullet	Second
27	.....	88·1	83·6	.....	85·8	Third	Second
10	.....	77·8	86·2	89·1	84·4	Fourth	Second

It is seen by the above figures that there is no year when fertility is always the highest or the lowest. And, according to the Cap Rouge figures, with a flock of Barred Rocks, it would not seem safe, when a bird is well bred, to discard it just after one year of low fertility.

DRY VERSUS WET MASH FOR WINTER EGG PRODUCTION

During four winters, from November 1 to February 10, on an average, two groups of pullets were housed, handled and fed alike except that one lot received dry mash constantly in hoppers, and the other wet mash fed at intervals during the day. The following table gives details:—

DRY VERSUS WET MASH FOR WINTER LAYERS

Season	Number of birds per pen	Total weight of birds at beginning of experiment November 1	Total weight of birds at end of experiment	Weight gained or lost during experiment at $0.30 per pound	Number of eggs laid at 60c. per dozen	Average weight of eggs per dozen in ounces	Value of eggs	Total value of products	Pounds of grain at $2.20 per 100 pounds	Pounds of skim-milk at at $0.25 per 100 pounds	Pounds of meal at $2.20 per 100 pounds
DRY MASH											
1924–25	25	110·0	139·0	29·0	520	21·0	$26 00	$34 70	576,0	500,0	16·5
1925–26	23	110·0	122·0	12·0	966	22·5	48 30	51 90	511·0	335·0	99·0
1926–27	23	110·0	131·0	21·0	775	21·89	38 75	45 05	520·0	340·0	94·0
1927–28	23	104·0	142·0	38·0	759	21·9	37 95	49 35	488·0	400·0	93·0
Average for 4 years..	23	108·5	133·5	25·0	755	21·82	37 75	45 25	523·7	393·75	75·62
WET MASH											
1924–25	25	120·0	146·0	26·0	465	21·0	23 25	31 05	588·0	500·0	59·0
1925–26	27	135·0	142·0	7·0	913	23·5	45 65	47 75	548·0	335·0	98·0
1926–27	27	132·5	145·0	12·5	598	21·2	29 90	33 65	548·0	340·0	88·5
1927–28	27	127·0	151·0	24·0	435	22·47	21 75	28 95	520·0	400·0	98·0
Average for 4 years..	26	128·6	146·0	17·4	603	22·04	30 15	35 37	551·0	393·75	85·87

A. 1924–25 = Feby. 14; 1925–26 = Feby. 8; 1926–27 = Feby. 10; 1927–28 = Feby. 10.

Season	Number of birds per pen	Pounds of roots at $4 per ton	Pounds of meat meal at $3.75 per 100 pounds	Pounds of sprouted oats at $2 per 100 pounds	Pounds of raw meat at $3 per 100 pounds	Pounds of shells at $1.25 per 100 pounds	Total value of feed consumed	Loss or gain per pen	Loss or gain per head	Cost of one dozen of eggs	Cost of one pound of eggs
DRY MASH											
1924–25	25	.....	4·5	104·0	63·5	25·5	$18 75	+$15 95	+$0 638	$0 368	$0 286
1925–26	23	.....	11·0	59·0	33·5	32·5	17 27	+ 34 63	+ 1 506	0 214	0 152
1926–27	23	.....	.....	48·0	39·5	29·0	16 86	+ 28 19	+ 1 225	0 261	0 199
1927–28	23	45·0	.....	50·0	31·5	44·5	16 38	+ 32 97	+ 1 433	0 259	0 189
Average for 4 years..	23	11·25	3·87	65·25	42·0	32·87	17 30	+ 27 95	+ 1 215	0 275	0 202
WET MASH											
1924–25	25	.....	19·5	104·0	61·0	26·0	20 45	+ 10 60	+ 0 424	0 528	0 849
1925–26	27	.....	5·0	59·0	50·5	36·0	18 39	+ 29 36	+ 1 087	0 242	0 164
1926–27	27	.....	.....	48·0	41·5	25·5	17 37	+ 16 28	+ 0 603	0 348	0 263
1927–28	27	43·5	.....	50·0	30·5	44·0	17 15	+ 11 80	+ 0 635	0 473	0 337
Average for 4 years..	26	10 87	6 12	65·25	45·87	32·87	18 33	+ 17 04	+ 0 655	0 365	0 265

It is seen that the lots receiving the dry mash did better practically right through; they gained more weight, laid more eggs and consumed less feed. It may not apply in this case, but the trouble with wet mash is that too much is generally given, which deprives the birds of the much needed exercise and gets them too fat to lay well.

BEST DATE FOR INCUBATION

In a district where spring is generally late and snow covers the ground in March and sometimes well on into April, it is not always easy to let the breeders out in early spring, which tells on the fertility and hatchability of the eggs, as may be seen from the following figures:—

BEST DATE FOR INCUBATION

Year	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for one chick hatched	Total fertile eggs for one chick hatched	Total eggs required for one chick when wing banded
					March						
1919	248	185	74·6	61	24·6	33·0	24	39·3	4·1	3·0	10·3
1920	302	265	87·7	91	30·1	34·3	19	20·9	3·3	2·9	15·9
1921	437	380	87·0	192	43·9	50·5	141	73·4	2·3	2·0	3·1
1922	262	202	77·1	113	43·1	55·9	95	84·1	2·3	1·8	2·8
1923	1,068	823	77·1	325	30·4	39·5	293	90·1	3·3	2·5	3·6
1924	1,582	1,454	91·9	484	30·6	33·3	380	78·5	3·3	3·0	4·2
1926	1,167	1,062	91·0	465	39·8	43·8	432	92·9	2·5	2·3	2·7
1927	1,384	1,267	91·5	290	20·9	22·9	260	89·7	4·8	4·4	5·3
Average for 8 years..	806	705	87·5	253	31·4	35·9	205	81·0	3·2	2·8	3·9
					April						
1919	226	189	83·6	84	37·2	44·4	50	59·5	2·7	2·2	4·5
1920	160	132	82·5	56	35·0	42·4	17	30·4	2·9	2·4	9·4
1921	563	499	88·6	218	38·7	43·7	173	79·4	2·6	2·3	3·2
1922	282	214	75·9	90	31·9	42·1	74	82·2	3·1	2·4	3·8
1923	1,229	1,065	86·7	450	36·6	42·2	369	82·0	2·7	2·4	3·3
1924	1,291	1,216	94·2	599	46·4	49·3	453	75·6	2·2	2·0	2·8
1926	2,186	2,018	92·3	1,034	47,3	51·2	994	96·1	2·1	1·9	2·2
1927	1,444	1,321	91·5	586	40·6	44·4	532	90·8	2·5	2·2	2·7
Average for 8 years..	923	832	90·1	390	42·2	46·9	333	85·4	2·4	2·1	2·8
					May						
1919	82	70	85·4	53	64·6	75·7	31	58·5	1·5	1·3	2·6
1920	135	122	90·4	48	35·6	39·3	17	35·4	2·8	2·5	7·9
1921	262	237	95·0	78	29·8	32·9	58	74·4	3·4	3·0	4·5
1922	161	148	91·9	75	46·6	50·7	51	68·0	2·1	2·0	3·2
1923	484	435	89·9	148	30·6	34·0	106	71·6	3·3	2·9	4·6
1924	226	198	87·6	73	32·3	36·9	51	69·9	3·1	2·7	4·4
1926	255	234	91·8	108	42·3	46·1	97	89·3	2·4	2·2	2·6
1927	907	836	92·2	424	46·7	50·7	400	94·3	2·1	2·0	2·3
Average for 8 years..	314	285	90·8	126	40·1	44·2	101	80·2	2·5	2·3	3·1

Since 1921, snow was shovelled away from part of the yards and strawy manure spread. The birds were thus induced to go out and work in the litter where some grain was thrown out. This has had a good effect, as it is seen that if 1919 and 1920 are taken out, the total number of eggs required for one chick when wing banded is respectively 3·6 during March, 3·0 during April, and 3·6 during May. From practically every point of view, April seems to be the best month to hatch chicks in this district.

EFFECT OF MALE IN PEN ON EGG PRODUCTION

The object is to determine whether the presence of a male bird in the pen affects egg production. As the experiment has just been conducted two seasons, this may be considered only a progress report. Forty-four Barred Rocks were

used in 1926-27 and in 1927-28; the birds gained about seven ounces more each in weight when a male bird was kept in the pen, but the average pen of 21 pullets laid a total of 31 eggs less. The feed consumed was practically the same so was the cost of one dozen of eggs, 24·6 cents where the male was present and 24 cents where the females were alone.

COLD VERSUS HEATED COLONY FOR WINTER EGG PRODUCTION

The cold poultry house has the advantage of not costing too much to build or operate, and of generally having pure air for the fowls to breathe. But will hens lay as well in a cold house as in a warm one? It was to help throw light on this question that an experiment was commenced in the autumn of 1926, with forty Barred Rock pullets equally divided in each kind of building. As there are results for two winters only, they should by no means be taken as conclusive but only as a progress report.

In the cold colony, the average of two seasons, from November to February inclusive, shows the maximum temperature to have been 32·7° F. and the minimum 21·2, whilst figures were respectively 44·4 and 31·5 in the heated one. The pullets laid 730 eggs per winter in the cold colony and 897 in the heated one, and as food consumption was practically alike for the two lots, a dozen of eggs cost 26·3 cents in the cold place and 22 cents in the warm one.

To offset this, the fuel, and time to attend to the stove, also fire hazards should be taken into consideration.

BEST HATCHING DATE FOR EGG PRODUCTION

Does the date of first egg determine the annual production? The greatest annual production comes from birds commencing to lay in what month? These are two questions often asked, and about which Kempster, Jull and Maw have furnished interesting figures. In general, it is thought that the early layers make the best annual records, but the figures in the following table do not prove this to have been the case at Cap Rouge:—

Month laying commenced	1918		1919		1920		1921		1922		1923		1924		1925		1926		1927		Average	
	Number of birds commencing to lay	Average annual production as pullets	Number of birds commencing to lay	Average annual production as pullets	Number of birds commencing to lay	Average annual production as pullets	Number of birds commencing to lay	Average annual production as pullets	Number of birds commencing to lay	Average annual production as pullets	Number of birds commencing to lay	Average annual production as pullets	Number of birds commencing to lay	Average annual production as pullets	Number of birds commencing to lay	Average annual production as pullets	Number of birds commencing to lay	Average annual production as pullets	Number of birds commencing to lay	Average annual production as pullets	Number of birds commencing to lay	Average annual production as pullets
September	.....	.....	.....	.....	1	169	1	195	5	179	5	185	20	204	31	201	23	181	9	184	95	193
October	.....	.....	.....	.....	.....	.....	.....	.....	3	181	3	188	13	211	10	195	11	193	13	193	53	197
November	4	171	1	182	1	188	3	208	8	172	6	202	9	203	27	203	4	181	19	195	82	195
December	2	135	.....	.....	.....	.....	2	203	3	188	.....	.....	1	210	2	191	.....	.....	12	194	22	189
January	.....	.....	5	185	4	172	12	200	4	184	.....	.....	.....	.....	1	203	.....	.....	1	183	27	19

According to the above figures, there is not much difference, in total annual production, if a pullet is hatched any month from September to January inclusive. In this case, there was no relation between annual production and the month when laying commenced.

However, it is clear that the pullets which commenced to lay early produced eggs which sold for more money, so that they were the most profitable.

COSTS OF EGG PRODUCTION DURING WINTER MONTHS ONLY

An accurate record was kept of all feed given to 3169 birds during an average of 109 days from the beginning of November to the middle of February, 1915 to 1928 inclusive. They gained a little more than one pound each and laid a total of 59,134 eggs. Valuing at 30 cents a pound the 3,224 pounds of increase in weight, there is an amount of $967.20 to be deducted from the total cost of feed, $2,132.30, leaving $1,165.10 to be debited against the eggs laid, which brings the cost of these to 23·64 or 24 cents per dozen. The following table gives details:—

Number of seasons during which data were gathered	12
Average number of days during which data were gathered	109
Total number of birds	3,169
Total weight gained—pounds	3,224
Total eggs laid	59,134

Feed consumed	Pounds	Amount	
Home mixed grain	65,875	$1,094 05	
Commercial grain	3,143	94 29	
Home mixed meal	14,895	368 29	
Commercial meal	3,880	13 97	
Screenings	2,725	37 40	
Skim-milk	32,401	81 00	
Powdered skim-milk	406	60 90	
Meat meal	2,128	106 41	
Raw meat	1,963	98 17	
Green bones	430	21 50	
Sprouted oats	3,973	81 81	
Clover leaves	1,168	8 76	
Grit and shells	3,530	49 43	
Epsom salts	157	1 26	
Roots	7,528	15 06	
Total cost of feed			$2,132 30
Less, 3,224 pounds increase in weight of birds, at 30 cents			967 20
Total cost of feed to be debited to eggs			1,165 10
Total number of eggs			59,134
Cost of feed per dozen of eggs			24 cents

COST OF PRODUCING BROILERS

The object of this experiment is to determine full costs of producing broilers from hatching to marketing date. Ninety Barred Rock cockerels were sold as broilers when weighing an average of 1·73 pound each, at 46·5 cents per pound, on July 12. They brought a total of $72.30 and cost $34.68 for eggs, incubating, brooding and feed, leaving a profit of $37.62 or of nearly 42 cents each. It looks easy to multiply this figure by a few thousand and make a big pile of money—on paper. But it should be remembered that nothing is entered for interest and depreciation on the plant nor for the poultryman's time. In this district, for the present at least, broilers pay when attractively put on the proper market before the middle of July. If hatched too early, the cost of eggs and the number raised per hundred eggs cut down profits, while the late ones will have to be sold at a relatively low price.

COST OF PRODUCING 90 BROILERS

360 eggs—4 per chick, at 3 cents	$ 10 80
Incubating—50 cents per 100 eggs, or 2 cents per chick	1 80
Brooding—75 cents per 100 eggs, or 3 cents per chick	2 70
Feed (See table below)	19 38
Total	$ 34,68

Cost per chick, 38·53 cents.

FEED EATEN BY 90 BROILERS UP TO THE TIME WHEN THEY AVERAGED 1·73 POUNDS

Feed	Pounds	Price per 100 pounds	Amount
		$	$
Cracked corn	178·8	2 28	4 08
Sprouted oats	156·0	1 85	2 89
Wheat	179·4	2 34	4 20
Blachford grain	43·2	3 33	1 44
Bran	39·6	1 52	0 60
Shorts	39·6	2 12	0 84
Ground oats	39·6	2 27	0 90
Rolled oats	13·8	3 90	0 54
Corn meal	39·6	2 27	0 90
Meat meal	11·4	3 75	0 43
Skim-milk	1,002·0	1 25	2 50
Shells	6·6	0 91	0 06
Total	1,749·60	.....	19 38

COMPARISON OF THREE METHODS OF DISPOSING OF COCKERELS

The object of this experiment is to determine whether it is preferable to sell surplus cockerels as broilers, or to hold them longer for fryers or roasters. During six seasons, a total of 270 cockerels of broiler size were put aside for this experiment. Ninety of them were sold as broilers, when they averaged about $1\frac{3}{4}$ pound each, an equal number were kept over until they weighed around $3\frac{3}{4}$ pounds each, and the rest were only disposed of by the middle of November, when they tipped the scales at 6·35 pounds per bird. The following table gives details:—

COMPARISON OF THREE METHODS OF DISPOSING OF COCKERELS

Year	I—Broilers. Sold when weighing about 1¼ lb.					II—Fryers. Sold when weighing about 3¼ lbs.										
	Date when birds were marketed	Number of birds sold	Total weight of birds sold—	Price per pound	Value of birds marketed	Number of birds when lot I was marketed	Weight of birds when lot I was marketed	Price per pound when lot I was marketed	Value of lot II when lot I was marketed	Date when birds were marketed	Number of birds sold	Total weight of birds—	Price per pound—Cents	Value of birds marketed	Value of feed eaten since lot I was marketed	Profit or loss due to postponing sale of birds
			lb.	$	$			$	$			lb.	$	$	$	$
1923	July 11	15	29·5	0·50	14 75	15	30·0	0 50	15 00	Aug. 23	15	53·0	0 35	18 55	3 42	+0 13
1924	" 11	15	26·0	0·60	15 60	15	27·5	0 60	16 50	" 27	15	63·5	0 30	19 05	3 44	−0 89
1925	" 15	15	26·0	0·35	9 10	15	26·5	0 35	9 27	Sept. 1	15	58·0	0 30	17 40	3 82	+4 31
1926	" 22	15	31·0	0·40	12 40	15	24·0	0 40	9 60	" 11	15	54·5	0 35	19 08	4 21	+5 27
1927	" 4	15	22·0	0·50	11 00	15	25·0	0 50	12 50	Aug. 8	15	52·0	0 30	15 60	4 09	−0 99
1928	" 9	15	21·0	0·45	9 45	15	23·0	0 45	10 30	Sept. 9	15	56·0	0 30	16 80	3 93	+2 57
Average for 6 years	July 12	15	25·9	0·465	12 05	15	26·0	0 468	12 19	Aug. 29	15	56·2	0 316	17 74	3 80	+1 75

Year	III—Roasters. Sold about the middle of November										
	Number of birds when lot I was marketed	Weight of birds when lot I was marketed	Price per pound when lot I was marketed	Value of lot III when lot I was marketed	Date when birds were marketed	Number of birds sold	Total weight of birds—Pounds	Price per pound	Value of birds marketed	Value of feed eaten since lot I was marketed	Profit or loss due to postponing sale of birds
			$	$				$	$	$	$
1923	15	30·0	0 50	15 00	Nov. 16	15	93·0	0 28	26 04	9 09	+ 1 95
1924	15	27·5	0 60	16 50	" 15	15	95·0	0 25	23 75	9 40	− 2 15
1925	15	26·5	0 35	9 27	" 15	15	95·0	0 25	23 75	10 01	+ 4 47
1926	15	24·0	0 40	9 60	" 15	15	97·0	0 25	24 25	10 93	+ 3 67
1927	15	25·0	0 50	12 50	" 15	15	93·0	0 25	23 25	10 01	+ 0 74
1928	15	23·0	0 45	10 30	" 15	15	98·0	0 30	29 40	8 64	+ 10 46
Average for 6 years	15	26·0	0 468	12 19	Nov. 15	15	95·2	0 263	25 07	9 69	+ 3 19

Contrary to expectations, it paid better to keep the birds until late in the fall, but it should not be forgotten that the ordinary poultryman is apt to neglect some important part of his work, such as getting pullets in shape to lay early, keeping houses disinfected, furnishing an ample supply of easily gathered green feed, if he has too much stock on hand.

BEST DATE FOR MARKETING SURPLUS HENS

The object of this experiment is to determine the most profitable date for marketing surplus hens. Three lots were used each year during five years: the first was sold immediately after the hatching season, the second about the middle of June, and the third around the middle of July, the last two for the Jewish trade. A record was kept of feed consumed, also of value of eggs laid and of birds sold. Details are herewith given:—

BEST DATE FOR MARKETING SURPLUS HENS

——	1923	1925	1926	1927	1928	Average
Lot I—						
Date when birds were marketed	May 14	May 18	May 14	May 13	May 24	May 17
Number of birds sold	6	3	3	3	3	4
Total weight of birds sold lb.	31·50	17·00	16·00	16·50	14·00	19·00
Price per pound $	0 30	0 30	0 32	0 32	0 30	0 31
Value of birds marketed $	9 45	5 10	5 12	5 28	4 20	5 83
Lot II—						
Number of birds when Lot I was marketed	6	3	3	3	3	4
Weight of birds when lot I was marketed lb.	31	16·50	15·50	16·00	14·00	18·60
Price per pound when lot I was marketed $	0 30	0 30	0 32	0 32	0 30	0 31
Value of lot II when lot I was marketed $	9 30	4 95	4 96	5 12	4 20	5 71
Date when birds were marketed	June 14	June 18	June 14	June 13	June 24	June 17
Number of birds sold	6	3	3	3	3	4
Total weight of birds sold lb.	28 50	15 75	15 00	15 50	13 00	17 35
Price per pound $	0 32	0 30	0 35	0 32	0 30	0 32
Value of birds marketed $	9 12	4 72	5 25	4 96	3 90	5 59
Number of eggs laid since lot I was marketed	84	46	37	49	50	53·2
Price of eggs per dozen $	0 36	0 36	0 36	0 36	0 36	0 36
Value of eggs layed since lot I was marketed $	2 52	1 38	1 11	1 47	1 50	1 60
Value of feed eaten since lot I was marketed $	1 42	0 70	0 91	0 75	0 82	0 92
Profit due to postponing sale of birds $	0 92	0 45	0 49	0 56	0 38	0 56
Lot III—						
Number of birds when lot I was marketed	6	3	3	3	3	4
Weight of birds when lot I was marketed lb.	30	16·50	15·50	16·00	14·00	18·40
Price per pound when lot I was marketed $	0 30	0 30	0 32	0 32	0 30	0 31
Value of lot III when lot I was marketed $	9 00	4 95	4 96	5 12	4 20	5 65
Date when birds were marketed	July 19	July 18	July 14	July 13	July 24	July 18
Number of birds sold	6	3	3	3	3	4
Total weight of birds sold lb.	27·5	15·50	15·75	14·50	17·00	18·05
Price per pound $	0 32	0 30	0 32	0 32	0 26	0 31
Value of birds marketed $	8 80	4 65	5 04	4 64	4 42	5 51
Number of eggs laid since lot I was marketed	174	99	112	93	122	120
Price of eggs per dozen $	0 36	0 38	0 36	0 36	0 36	0 36
Value of eggs laid since lot I was marketed $	5 22	3 14	3 36	2 79	3 66	3 64
Value of feed eaten since lot I was marketed $	2 62	1 43	1 79	1 94	2 01	1 96
Profit due to postponing sale of birds $	2 40	1 41	1 65	0 37	1 87	1 54

It is interesting to note that there was an average profit of about 6 cents per bird when kept until the middle of June and 25 cents when held till around July 15. As prices obtained for meat were practically alike, the profit came

mostly from the value of eggs laid over the cost of feed. But it should be remembered that keeping hens for a couple of months may cause neglect of the chicks, due to an overpeak load of work at that season, and that no account was taken of housing room nor of the poultryman's time in the above figures.

PREVENTION OF FROZEN COMBS

The object of the experiment is to prevent the combs of male birds from freezing during extreme weather. Two methods were used during four winters, dropping cotton fronts before roosts at night and painting combs with collodion. The following figures give details:—

PREVENTION OF FROZEN COMBS

Protection	Injured			Not injured
	Point of comb	All comb	Total	
	%	%	%	%
Cotton front	13	7	20	80
Collodion	16	16	32	68
None	11	22	33	67

This table shows that the lots protected with collodion were not much better than the ones which were not protected at all. The best way was to pull the cotton curtains down in front of the roosts on cold nights. It is possible that for valuable breeders, a combination of the two ways of protecting them, that is painting combs and wattles with collodion for protection during the day, and using the cotton curtains at night, would do very well.

TIME TAKEN FOR TRAPNESTING

Though farmers will probably never find it convenient to trapnest their flocks, an increasingly larger number of specialists will do so. To find out how long it takes to do the work, the present project was started in the autumn of 1924 and has been continued every winter since. The following table gives details:—

TIME TAKEN FOR TRAPNESTING

Season	Number of birds	Number of eggs	Dates		Number of days	Number of minutes		
			Beginning	Ending		Total	Per day per 100 hens	Per day per hen
1924–25	100	2,805	Nov. 17	Feb. 14	90	912	10·1	0·10
1925–26	100	3,710	" 1	" 8	99	967	9·8	0·10
1926–27	100	3,180	" 1	" 10	102	805	7·9	0·08
1927–28	100	2,415	" 1	" 13	105	679	6·5	0·06
Average for 4 years	100	3,027	" 5	" 11	99	841	8·5	0·08

It is seen that for a 30 per cent egg yield, with 100 birds kept in a 32 foot by 16 foot house, it took an average of eight and a half minutes per day. No account was taken of the time to come to the poultry house, but simply of what

was spent in actual trapnesting. Allowing that the poultryman, for a long while used to this kind of work, was quicker than the average person, it nevertheless seems evident that the time taken to trapnest should not stop anybody desirous of improving his flock by this method.

EGG PRESERVATIVES

Eggs are scarce from October to January inclusive, and prices high. A good plan would be to preserve all which is required for most cooking purposes, and it is to throw light on the value of different preservatives that this project was started in 1916. Amongst the methods tested were: 1—Wrapping in paper and leaving alone; 2—Wrapping in paper and turning daily; 3—Putting away in oats; 4—Putting away in sawdust; 5—Composé Gaulin; 6—Armstrong Paste; 7—Barral Combine; 8—Columbus Preservative; 9—Waterglass; 10—Lime water. Practically every year, eggs are sent to the Dominion Chemist and to the Dominion Poultry Husbandman, to be tested, and an examination is also made by the Superintendent of the Cap Rouge Station.

Results of thirteen years show that lime water and waterglass are the best preservatives, with the former showing a decided superiority. A good way to prepare it is to use one pound of good freshly burnt quicklime to five gallons of water; slake this with a small quantity of water, just about enough to cover it, and then stir the milk thus formed into the five gallons of water. Keep well stirred for a few hours, allow to settle, and pour the saturated water over the eggs.

Barral Combine has not been used long enough to recommend it, but is certainly very promising.

GENERAL NOTES

More interest is taken in the Cap Rouge Experimental Station each year, if the increasing number of visitors is a safe guide. Not many years ago, people came just to look around, but now they seem eager to have information which is always gladly furnished, either by some member of the Station staff or by the man in charge of the special work about which the enquiry is made.

Correspondence is getting very heavy, but, fortunately, can oftentimes be answered by referring to a bulletin which is sent with the answer. Articles were also prepared for the press and for Seasonable Hints.

During 1928, members of the C.S.T.A., who came to Quebec for the annual meeting, favoured the Cap Rouge Station with a visit which was certainly very much appreciated.

The Field Day of the French Canadian Cattle Breeders' Association was held at Cap Rouge during September, and other excursions were received in the earlier part of the season. Members of the Quebec Seed Board spent part of a day examining plots of cereals.

The Superintendent attended twenty-two meetings during the year, of Breeders' Associations, of the Seed Board, and of the Provincial Exhibition Commission.

A hay barn was built at St. Joachim and the Horse Barn was completed.

OTTAWA: Printed by F. A. ACLAND, Printer to the King's Most Excellent Majesty. 1929.