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 1927

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DOMINION EXPERIMENTAL STATION, CAP ROUGE, P.Q.

REPORT OF THE SUPERINTENDENT, G. A. LANGELIER

THE SEASON

The growing season, from May to October inclusive, was somewhat colder, drier and much duller than the average of the last fifteen years, the figures being respectively 55·64 and 56·23 degrees Fahrenheit for mean temperature, 22·20 and 24·05 inches for precipitation, 976·4 and 1,083·5 hours for sunshine. The frost free season extended 158 days, from May 4 to October 9 inclusive, which is 23 days more than usual.

METEOROLOGICAL RECORDS AT CAP ROUGE, QUEBEC, 1927

Month	Temperature						Precipitation				Sunshine	
	Highest	Date	Lowest	Date	Mean	Average 16 years	Rainfall	Snow-fall	Total	Average 16 years	Total	Average 16 years
	° F.		° F.		° F.	° F.	inch.	inch.	inch.		hours	hours
January	45·0	20	−21·0	8	16·19	9·66	0·75	25·00	3·25	3·77	44·3	62·0
February	33·0	18	−15·0	6	15·06	10·67	.....	25·00	2·50	2·80	73·6	86·0
March	44·0	31	− 2·0	23	26·27	22·03	1·31	4·50	1·76	2·85	125·8	136·8
April	78·0	19	11·0	8	38·93	36·56	1·34	.....	1·34	2·90	245·5	173·3
May	70·0	30	30·0	1–4	48·03	50·43	3·81	.....	3·81	3·52	121·8	198·3
June	83·0	30	33·0	3	57·37	58·96	3·29	.....	3·29	4·07	174·6	198·1
July	85·0	1	42·0	21	64·40	65·89	6·65	.....	6·65	3·97	192·9	227·4
August	80·0	8	36·0	26–27	60·85	63·10	2·03	.....	2·03	3·83	227·3	212·7
September	77·0	2–7	34·0	14–16 27–28	55·08	55·19	2·27	.....	2·27	4·41	174·2	152·9
October	71·0	12	28·0	31	48·11	44·91	4·15	.....	4·15	4·38	85·6	105·9
November	68·0	2	11·0	24	34·17	30·59	9·86	7·75	10·63	3·64	47·3	59·8
December	49·0	30	− 5·0	16	20·98	16·53	1·73	40·00	5·73	3·18	50·5	50·3
Total	.....	.....	.....	.....	.....	.....	37·19	102·25	47·41	43·32	1,563·4	1,663·5
Average	.....	.....	.....	.....	40·45	38·70	3·10	8·52	3·95	3·61	130·3	138·6

THE CROPS

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

ANIMAL HUSBANDRY

DAIRY CATTLE

BREEDING, FRENCH-CANADIAN CATTLE

At the end of 1927, there were 63 head of registered French-Canadian cattle at the Cap Rouge Station: 4 herd bulls, 7 bull calves, 33 cows, 9 heifers, and 10 heifer calves. The herd has been accredited since 1922, and contains more R.O.P. animals than any other of the breed, every female with over two periods of lactation having qualified. It has won more prizes at the Quebec Provincial Exhibition during the last four years than any other herd. This success is due to a strict process of weeding, especially in regard to strength and vitality, to fairly close breeding, and to reasonable feeding, care and management.

DAIRY CATTLE BREEDING METHODS

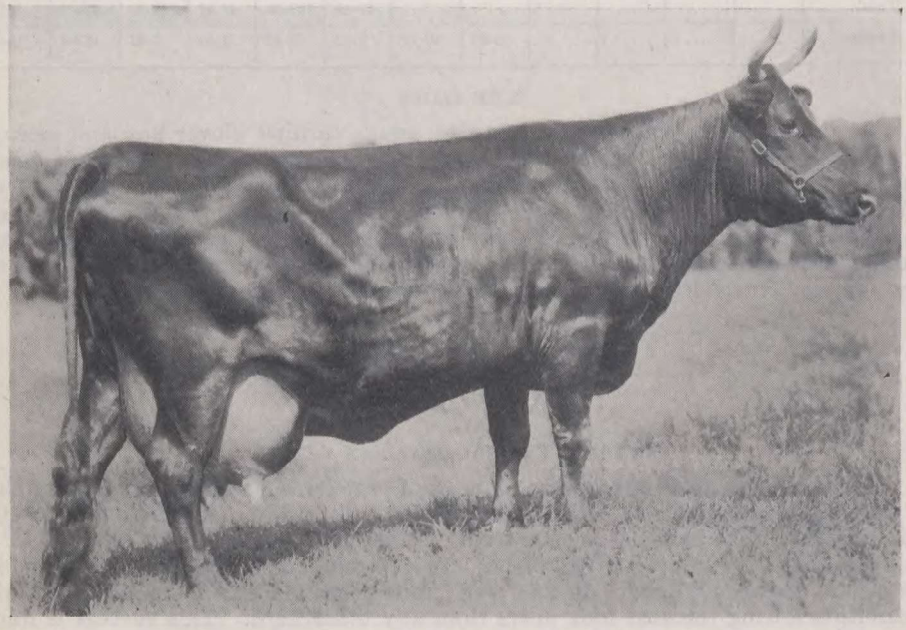
The object of this work is to compare in-breeding, line breeding, and out-crossing. Out of twenty-five two-year-old French-Canadian heifers bred at Cap Rouge, and which qualified for the Record of Performance, the six which were in-bred averaged 318 pounds fat per year, the line-bred ones 314, and the out-crossed 307. A sane view of this question is that there should be no fear of close breeding as long as the sire and the dam have not the same defects, and if animals of poor constitution or of low vitality are rigidly culled.

INFLUENCE OF A PROVEN SIRE ON A DAIRY HERD

Many years ago, one of the best looking French-Canadian bulls was placed at the head of the Cap Rouge herd, though nothing was known about the milking qualities of his ancestors. All his heifers, over twenty-five in number, had to be sent to the butcher because they were low producers. When bulls which qualified for R.O.P. were used, an equal number of heifers by them, with the same feed, housing, and care, and in many cases from the same cows, averaged over 2,000 pounds more milk per year. This is a clear case showing that great care should be taken in choosing a herd-header.

VALUE OF THE PURE-BRED DAIRY BULL IN THE GRADE HERD

The object of this project was to compare heifers with their grade mothers for milk production, the heifers being sired by a pure-bred bull about whose dam nothing was known as to milk production. The heifers produced 73 per cent of the milk required to about equal the milk-yield of their dams at the same age. The conclusion is that if a farmer wishes to improve a nondescript or a grade herd of dairy cattle he must get a bull with other qualifications besides the registration certificate.



Canoberte—5289—Champion at the Quebec Provincial Exhibition in 1923, 1924 and 1925. A good example of the French Canadian breed of cattle.

INFLUENCE OF FEEDING CONCENTRATES AT DIFFERENT RATES TO MILCH COWS

The results of an experiment conducted with 27 cows, during five winters, showed that heavy meal feeding is profitable for the one who sells raw milk or cream at a high figure, while for the average farmer who gets a comparatively low price at the factory, it is better to be more sparing with meal. In the first instance, it will pay to give the right mixture of meals in large quantities, as long as none is wasted, while in the latter case, an average of 1 pound of meal per 4 pounds of 4 per cent milk will probably be best. The final judge must be the dairyman who will decide according to his own peculiar circumstances.

WHOLE MILK VS SKIM-MILK AND ROYAL PURPLE MEAL, VS SKIM-MILK AND HOME-MIXED MEAL FOR DAIRY-BRED CALVES

Three lots of French-Canadian calves were fed differently until they were 24 weeks old: one group received whole milk; the second, skim-milk and Royal Purple meal; the last, skim-milk and a home-mixed calf meal consisting of 6 parts corn, 3 parts oats, 1½ part flax seed, by weight, all ground together. Besides these feeds the calves had clover hay and corn silage, as much as they would eat. The results showed that whole milk is too expensive a feed on which to raise calves, after they are about one month old, and that it is cheaper to use a home-mixed meal, as described, than to buy a commercial article such as Royal Purple meal.

SKIM-MILK VS POWDERED SKIM-MILK VS WHOLE MILK WITH BONE MEAL FOR DAIRY-BRED CALVES

This project was conducted to find substitutes for skim-milk in raising calves. The same ration was fed in all cases, with the exception that lot I received skim-milk from the separator, and oilcake; lot II, one pound of powdered skim-milk per gallon of water; lot III, one quart whole milk to three quarts of water and one ounce of bone meal. The feed valuations were as follows: whole milk, $2 per 100 pounds; skim-milk, 20 cents; powdered skim-milk, $14; bone meal, $4; meal mixture fed dry, $1.88; oilcake, $2.65; hay, $9 per ton; silage, $3 per ton. The average gain per calf, during 24 weeks was about the same for each lot, but when the important point of cost is looked into it is found that the average feed cost per pound of gain was 7·9 cents for lot I; 20·9 cents for lot II; 10·2 for lot III, while it was 20·7 for whole milk alone. The conclusion to be drawn is that skim-milk is the cheapest feed for raising calves, when a suitable substitute is added to replace the cream taken out, followed by whole milk with water and bone meal. The powdered skim-milk is out of question until it can be bought at a much lower figure.

PERIODIC COSTS OF REARING DAIRY-BRED FEMALES

The results of an experiment conducted with eight French-Canadian heifers showed that it requires 536 pounds of whole milk, 5,668 pounds of skim-milk, 830 pounds of meal, 3,164 pounds of hay, 5,521 pounds of corn silage, 4,235 pounds of swede turnips, 377 pounds of green feed, and 96 days of pasture, to rear a dairy-bred female until of calving age, which averaged, in this case, 27 months and 9 days. The average weight was 813 pounds. At the actual cost price of feeds, with the addition of labour, bedding, housing, service fee of sire, interest, risks, and crediting manure, the total cost can be placed at $100, more or less, according to value of feeds. Thus only good sires and dams should be used, as a cull heifer means quite a loss.

WINTERING DAIRY CATTLE IN SINGLE-BOARDED OPEN FRONT SHEDS

Eleven bulls and ninety-eight heifers have been wintered under single-boarded open-front sheds since 1915, and have done well. There are, however, a few points which it is well to remember. The sheds should face south so as to get all the sun possible, and the three closed sides should not have any opening through which a draught might enter; no cow in milk, no weak, emaciated animal should be wintered in this manner; no calf dropped after May first will be old enough to withstand the cold weather; all stock must be turned out before the weather gets very cold, and then left out, instead of being brought in and out.

MILK PRODUCTION

The accompanying table gives details on the cows and heifers which finished a lactation period during the year ending December 31, 1927:—

Herd Record for animals finishing a lacation period during the year ending December 31, 1927—

HERD RECORD FOR ANIMALS FINISHING A LACTATION PERIOD DURING THE YEAR ENDING DECEMBER, 31 1927

Name of cow	Registration Number.	Age at beginning of lactation period	Date of dropping calf	Number of days in lactation period	Total production milk for lactation period	Daily average yield of milk	Average per cent fat in milk	Butter produced during lactation period
					lb.	lb.	%	lb.
Colombelle	1775	15	Mar. 24, 1925	754	16,831·25	22·32	4·9	955·85
Ginette de Cap Rouge	4801	7	Aug. 19, 1926	375	6,641·75	17·71	4·6	354·22
Hébé de Cap Rouge	5298	7	Nov. 2, 1926	401	4,310·00	10·75	4·7	238·90
Herodiade de Cap Rouge	5299	6	Apr. 8, 1926	335	8,839·25	26·39	4·9	511·28
Ida de Cap Rouge	5596	5	Aug. 19, 1926	383	5,886·00	15·37	4·9	337·27
Indienne de Cap Rouge	5584	5	Mar. 24, 1926	349	7,993·00	22·90	4·7	439·52
Iolande de Cap Rouge	5587	6	May 11, 1926	273	8,884·50	32·54	4·8	503·57
Isabelle de Cap Rouge	5591	6	Aug. 19, 1926	401	6,780·00	16·91	4·9	387·80
Ismène de Cap Rouge	5586	5	Jan. 10, 1927	269	6,001·50	22·31	4·9	351·78
Jacotte de Cap Rouge	6200	5	Feb. 12, 1926	365	4,916·00	13·47	4·7	263·31
Jacqueline de Cap Rouge	6031	4	Oct. 16, 1926	267	5,798·75	21·72	5·5	375·79
Julia de Cap Rouge	6029	4	Apr. 18, 1926	297	6,442·50	21·69	4·9	372·77
Kaffa de Cap Rouge	6195	4	Nov. 1, 1926	339	6,227·25	18·37	5·2	379·75
Kynancie de Cap Rouge	6381	4	Sept. 4, 1926	344	5,367·25	15·02	4·7	283·85
Leonie de Cap Rouge	6964	2	June 2, 1926	401	7,269·50	18·13	4·9	434·00
Loretta de Cap Rouge	6732	3	Oct. 14, 1926	301	5,054·00	16·79	4·5	265·09
Lucette de Cap Rouge	6888	2	Dec. 4, 1925	417	7,553·50	18·11	5·2	467·13
Mandora de Cap Rouge	7426	2	Sept. 17, 1926	372	4,260·50	11·45	5·4	272·78
Mariette de Cap Rouge	7101	2	July 27, 1926	379	8,856·50	23·37	4·8	505·99
Mathilda de Cap Rouge	7377	2	Aug. 14, 1926	391	4,702·50	12·03	5·1	283·75
Mignonne de Cap Rouge	7408	2	Sept. 18, 1926	384	5,509·50	14·35	5·1	327·92
Pauline 3	2482	13	Dec. 24, 1924	990	18,785·25	18·97	4·7	1,059·72
Sylvestre D	2859	13	Sept. 17, 1926	389	9,698·00	24·93	4·4	506·15
Average for 23 head	.....	5	.....	398	7,504·70	18·93	5·72	429·48

Out of the 23 head entered in the preceding table, 20 were bred at Cap Rouge. As the age averaged but five years, the 7,504·70 pounds of milk with a 5·72 per cent of fat, giving 429·48 pounds of butter, is very good indeed, even if the lactation period was about 45 days longer than the ordinary one of twelve months.

HORSES

At the beginning of January, 1928, there were 62 registered French-Canadian horses at the St. Joachim Station, which is under the management of the Cap Rouge Superintendent: 4 stud horses, 6 young stallions, 8 weanling colts, 24 mares, 13 fillies, one to three years of age, and 7 weanling fillies. This stud has won more first prizes and diplomas during the last six years than all the other studs of the breeds combined. Though the main object of the Station is to do experimental breeding work, there are also quite a number of projects under way in regard to feeding, housing, and management.

The reader is referred to Bulletin 87 (New Series), written by the Superintendent of the Cap Rouge Station "The French-Canadian Horse" in which detailed results are given regarding experiments in breeding, feeding, housing, and management of horses.

SWINE

At the end of 1927, there were 30 head of registered Yorkshires: 4 aged boars, 2 young boars, 9 brood sows, 5 gilts, and 10 fall pigs. These Yorkshires are used especially for experimental breeding; however, some projects are conducted in regard to feeding, housing and management. As this herd was started only a few years ago it is too early to give results of the experiment. Eighty pigs were raised during this year and most of them were sold for breeding purposes.

FIELD HUSBANDRY

COST OF PRODUCING FARM CROPS

The main point for a farmer or dairyman is not to grow the crop which will produce the largest quantity of dry matter per acre, but rather to grow the one which will produce a ton of dry matter at the lowest cost. To get at this, manual and horse labour, cost of manure, seed, and twine, besides interest on the land and depreciation of machinery are recorded every year for each crop, all ready to feed, and all the crop is weighed so as to get reliable figures for yield per acre.

The following tables give details about the cost of the five main crops of central Quebec, for 1927:—

COST PER ACRE OF PRODUCING CORN FOR SILAGE AT CAP ROUGE, 1927

Item	Statement	Amount
		$
Rent and taxes	Rent or interest on value of land plus taxes	4 80
Manure	Proportion of manure chargeable to crop, at $2 per ton	14 03
Seed	23·6 pounds at 6 cents	1 42
Machinery	Depreciation, interest, repairs and housing	2 85
Manual labour	75·37 hours at 30 cents	22 61
Horse labour	72·64 hours at 10 cents	7 26
	Total cost per acre	52 97

According to data compiled during the last sixteen years, the average yield of silage corn per acre at Cap Rouge was 18,635 pounds (18,732 in 1927), and the average total cost of producing the crop, per acre, was $66.45, which means $7.13 per ton of raw material and $49.96 per ton of digestible nutrients if the proportional value for silage corn, swede turnips and hay is taken as determined by feeding experiments at the Central Experimental Farm.

COST PER ACRE OF PRODUCING SWEDE TURNIPS AT CAP ROUGE, 1927

Item	Statement	Amount
		$
Rent and taxes	Rent or interest on value of land plus taxes	4 80
Manure	Proportion of manure chargeable to crop, at $2 per ton	14 03
Seed	3 pounds at 60 cents	1 80
Machinery	Depreciation, interest, repairs and housing	2 85
Manual labour	169 hours at 30 cents	50 70
Horse labour	78·59 hours at 10 cents	7 86
	Total cost per acre	82 04

The average yield of swede turnips per acre for sixteen years was 27,380 pounds (23,263 in 1927) and the average total cost, per acre, was $80.77; thus a ton of raw material and of digestible nutrients will cost respectively $5.90 and $62.61.

COST PER ACRE OF PRODUCING OATS AT CAP ROUGE, 1927

Item	Statement	Amount
		$
Rent and taxes	Rent or interest on value of land plus taxes	4 80
Manure	Proportion of manure chargeable to crop, at $2 per ton	10 56
Seed	2·5 bushels at 71 cents	1 77
Machinery	Depreciation, interest, repairs and housing	2 85
Twine	3·1 pounds at 17 cents	0 53
Threshing	58·01 bush. at 0·04 cents	2 32
Manual labour	17·83 hours at 30 cents	5 35
Horse labour	30·28 hours at 10 cents	3 03
	Total cost per acre	31 21

From 1912 to 1927 inclusive, oats yielded at an average of 1,659 pounds (1925 in 1927) per acre, with an average total cost of producing the crop, per acre, of $35.68, which means $43.04 per ton of raw material and $61.09 per ton of digestible nutrients.

COST PER ACRE OF PRODUCING CLOVER HAY AT CAP ROUGE, 1927

Item	Statement	Amount
		$
Rent and taxes	Rent or interest on value of land plus taxes	4 80
Manure	Proportion of manure chargeable to crop, at $2 per ton	9 00
Seed	Actual value	2 72
Machinery	Depreciation, interest, repairs and housing	2 85
Manual labour	6·86 hours at 30 cents	2 06
Horse labour	13·70 hours at 10 cents	1 37
	Total cost per acre	22 80

According to data compiled during the last sixteen years, the average yield of clover hay per acre was 4,410 pounds (4,996 in 1927) and the average total cost of crop, per acre, was $23.68 per acre, or $10.76 and $21.14 respectively per ton of raw material and digestible nutrients, according to the proportional value for different crops as determined at the Central Experimental Farm.

COST PER ACRE OF PRODUCING TIMOTHY HAY AT CAP ROUGE, 1927

Item	Statement	Amount
		$
Rent and taxes	Rent or interest on value of land plus taxes	4 80
Manure	Proportion of manure chargeable to crop, at $2 per ton	2 70
Seed	Actual value	2 72
Machinery	Depreciation, interest, repairs and housing	2 85
Manual labour	6·96 hours at 30 cents	2 09
Horse labour	13·80 hours at 10 cents	1 38
	Total cost per acre	16 54

The average yield of timothy hay, per acre, from 1912 to 1927 inclusive, was 3,833 pounds (5,807 in 1927) while the average total cost of producing the crop was $18.48 per acre, which means $9.62 per ton of raw material and $19.89 per ton of digestible nutrients, that is if the proportional value for crops is taken as determined by feeding experiments at the Central Experimental Farm.

The conclusion is that hay will produce digestible nutrients at a much lower cost than oats, corn, or swedes, and, as already mentioned, the choice of the right crop depends a great deal on the price at which the product is sold.

PREPARATION OF LAND FOR SILAGE CROPS

This experiment was started to find out which, summer ploughing followed by fall ploughing, fall ploughing only, or spring ploughing only, will produce silage corn at the lowest price per ton. The results of nine years show an average yield of 9·16 tons of green corn per acre and a cost of $2.96 per ton for fall ploughing, while the figures were respectively 9·51 tons and $2.99 for spring ploughing. The five years, during which summer and fall ploughing were compared, gave the following results: summer ploughing, 11·97 tons of green corn per acre at a cost of $2.09 per ton; fall ploughing, 9·99 tons at a cost of $2.52. In the last case the cost was increased on account of the great number of weeds. According to this experiment it seems that for a district like central Quebec, where the growing season is short and springs are comparatively late, it is better to plough in the autumn for ensilage, on clean land, but on weedy land summer ploughing would be preferable.

RATES OF SEEDING OATS

The object of this experiment is to find out the best rate at which to seed Banner oats on a well tilled sandy loam of good fertility. Thirteen different densities were compared, from 1 to 4 bushels per acre, going up by quarter bushels, during eight years. The results show that, after deducting the quantity of seed used, the rate of 2½ bushels per acre gave the highest yield of grain per acre. If another variety is used, or the soil is different, this density may not be the best.

KIND OF NURSE CROP

An experiment was conducted during eight years with 440 plots of $\frac{1}{60}$ acre each, on a sandy loam of good fertility and in high tilth, to find out which of the ordinary grains would be followed by the largest crop of clover hay. The results show that for each 100 pounds of clover hay after barley, there were only 97 after spring wheat, 93 after oats, and 76 after field peas. The conclusion is that, while barley and wheat are better nurse crops than oats for clover, the farmer should decide for himself what nurse crops to use, according to the relative yielding power and value of barley, wheat, and oats on his own farm.

RATES OF SEEDING TIMOTHY AND CLOVER

For nine years, 160 plots of 1/60 acre each have been used for this experiment. The results show that after what was called the thick seeding (8 pounds timothy, 12 pounds medium red clover, 2 pounds alsike per acre) the average yield was at the rate of 4,410 pounds of hay per acre, while it was 4,096 pounds when half these quantities of seed was used. At prices paid, the extra seed cost $2.81, so that the extra 314 pounds of hay would have had to sell at the rate of $17.90 per ton, at the farm, to pay for it. The conclusions are that on well tilled and manured soil, it is not necessary to sow as much seed as is generally advocated, but that on badly worked or poor land, the cost of an extra quantity of seed is probably a low premium to pay for the assurance of a better crop of hay.

COMPARISON OF CORN, SUNFLOWERS, PEAS AND OATS FOR SILAGE

The object of this experiment is to find out which of the three crops will produce dry matter, and possibly digestible nutrients, at the lowest cost per ton. An accurate record of all expenses also of weight of raw material is kept, and samples sent to the Dominion Chemist for analysis. To date, the results show that sunflowers, and the peas and oats mixture, produce dry matter and digestible nutrients at a lower cost per ton than corn. However, it will be advisable to await further data before coming to definite conclusions on this project.

HORTICULTURE

FRUITS

APPLES—VARIETY EXPERIMENT

From 1911 to date, 209 varieties of apples have been tested and 101 of them have been pulled out and many of the rest will be submitted to the same destiny, as they do not suit on account of climatical conditions, productiveness or market requirements. Details are given in the following table regarding 52 varieties tested for at least twelve years:—

Variety	Season	Source	Year planted	Year when first fruit was picked	Total production				Commercial value	Remarks
					Twelve years		Seventeen years			
					Best tree	Average per tree	Best tree	Average per tree		
					gal.	gal.	gal.	gal.		
Rupert	Early summer	C.E.F.	1911	1915	38·00	37·87	156·25	136·00	High	Very good and early summer variety, soft.
Red Astrachan	Summer	Commercial	1911	1917	16·75	5·08	142·50	102·47	"	
Yellow Transparsnt	"	"	1911	1912	24·00	18·30	172·00	144·45	"	Soft.
Duchess	Early autumn	"	1911	1914	32·00	16·55	223·50	151·10	"	
Dudley	"	"	1913	1919	59·50	50·36			"	
Galetta	"	C.E.F.	1913	1919	73·75	49·85			"	
Linton	"	"	1913	1919	46·25	35·62			"	
Lowland Raspberry	"	Commercial	1911	1917	15·75	9·00	177·50	132·39	"	Soft.
Lubsk Queen	"	"	1913	1920	1·25	0·75			"	Low yielder.
Medford	"	C.E.F.	1911	1917	36·00	30·87	193·75	181·37	Medium	Rather small.
Petrel	"	"	1911	1915	20·75	20·75	89·25	89·25	High	Lacks somewhat in colour.
Alexander	Autumn	Commercial	1913	1919	33·00	22·10			"	Cooker.
Cora	"	C.E.F.	1911	1919	51·75	29·37	155·75	155·75	Medium	Lacks colour.
Estaline	"	Commercial	1911	1916	78·00	78·00	163·75	163·75	Low	Small.
Florence	"	"	1914	1917	16·00	16·00			High	Crab-apple.
Joyce	"	C.E.F.	1915	1922	69·75	56·75			"	
Langford Beauty	"	Commercial	1913	1919	48·25	22·14			"	
Okabena	"	"	1911	1914	48·75	33·25	160·75	160·75	"	
Patten Duchess	"	"	1911	1914	29·25	26·25	125·25	104·50	Medium	Medium quality.
Peach of Montreal	"	"	1911	1914	43·00	21·44	247·00	157·79	"	Lacks colour; too soft to keep or ship far.
Percival	"	C.E.F.	1911	1915	12·25	6·37	48·25	28·87	High	Low yielder.
Rochelle	"	Commercial	1913	1919	60·25	46·80			"	
Severn	"	C.E.F.	1914	1922	12·00	12·00			Medium	Medium quality, low yielder.
St. Lawrence	"	Commercial	1911	1922	2·25	2·25	120·25	120·25	High	Rather low yielder.
Trenton	"	"	1913	1919	56·25	41·31			Medium	Medium quality, too soft.
Walter	"	C.E.F.	1911	1919	4·25	4·25	70·75	70·75	"	Lacks colour, low yielder.
Pedro	Early winter	"	1915	1919	76·75	60·40			High	
Perfect	"	"	1911	1919	5·00	3·25	98·00	83·75	Low	Medium quality.
Renaud	"	"	1911	1922	3·00	2·37	88·75	73·50	"	Small, medium quality.
Rome Beauty	"	Commercial	1914	1920	65·50	53·87			Medium	Medium quality, cooker.
Scarlet Pippin	"	"	1911	1917	17·75	12·75	143·25	117·75	"	Small.
Shiawassee Beauty	"	"	1911	1923	4·25	4·25	75·25	75·25	"	Medium quality, low yielder.
Wealthy	"	"	1911	1914	26·50	16·61	112·00	81·21	High	
Adonis	Winter	C.E.F.	1911	1916	32·50	22·25	156·50	122·75	Low	Small, lacks colour.
Baxter	"	Commercial	1913	1919	5·50	2·22			High	Cooker.
Edgehill	"	C.E.F.	1911	1916	3·75	3·75	73·75	73·75	Low	Small.
Fameuse	"	Commercial	1911	1916	14·75	5·50	66·25	46·67	High	
Granby	"	C.E.F.	1911	1915	10·75	10·75	87·75	87·75	Low	Rather small, medium quality.
Lobo	"	"	1915	1922	50·75	38·40			High	
McIntosh Red	"	Commercial	1913	1919	47·75	12·25			"	
Milwaukee	"	"	1911	1914	22·50	10·97	143·00	109·25	Medium	Medium quality, cooker.
Noel	"	C.E.F.	1911	1916	3·50	2·75	128·00	122·00	"	Medium quality.
Pewaukee	"	Commercial	1916	1923	49·50	18·39			Low	Poor quality, cooker.
Rouleau	"	C.E.F.	1913	1919	105·25	105·25			Medium	Often lacks colour, cooker.
Sorel	"	"	1913	1927					Low	Poor yielder, lacks colour.
Stone	"	"	1911	1919	7·25	7·25	101·25	101·25	Medium	Medium quality, cooker.
Thurso	"	"	1911	1919	4·75	4·75			Low	Small.
Wolf River	"	Commercial	1911	1919	22·75	10·45	106·75	79·87	High	Low yielder, cooker.
Bethel	Late winter	"	1913	1922	8·00	2·58			"	" "
Calumet	"	"	1914	1922	21·00	11·75			Medium	Cooker.
Cromer	"	C.E.F.	1911	1914	10·75	10·25	42·25	40·25	Low	Lacks colour and quality.
Walton	"	"	1911	1914	35·75	30·00			High	

Most of the above varieties have been or will be discarded, on account of their low commercial value, this value being based on size, colour and quality of fruit. The following varieties are recommended for central Quebec: Summer; Rupert, yellow, a C.E.F. seedling, the earliest of all; Yellow Transparent, yellow; Lowland Raspberry, red. Autumn: Melba, one of the finest C.E.F. seedlings of McIntosh, is the earliest, followed by Duchess; Okabena, which is a very heavy yielder, and Petrel, a C.E.F. seedling of the very highest quality, but of poor colour. Early winter: Wealthy is hard to beat, but Pedro, a C.E.F. seedling, may successfully challenge it some day. Winter: Fameuse and McIntosh cannot be surpassed, while Walton, another C.E.F. seedling, would come later. As a general rule, 5 per cent of summer, 10 per cent of autumn, 35 per cent of early winter, and 50 per cent of winter is a good proportion. This would, of course, vary according to local conditions, the man near a city wishing to have more early fruit, and the one far from large centres desiring less.

The following table is a comparison between Wealthy, an early bearing variety, and McIntosh, a late bearing one, planted alongside each other in 1914:

COMPARISON OF YIELD OF MCINTOSH AND WEALTHY ELEVEN YEARS AFTER PLANTING

Variety	Number of trees in test	Year planted	Year when first fruit was picked	Production per tree					
				Eleven years after planted	Twelve years after planted	Thirteen years after planted	Fourteen years after planted	Total production for fourteen years	Average for fourteen years
				gal.	gal.	gal.	gal.	gal.	gal.
McIntosh	33	1914	1922	8·44	20·93	1·82	15·68	51·82	3·70
Wealthy	69	1914	1919	7·66	21·07	5·44	17·19	60·44	4·32

The above table shows that McIntosh, though having produced its first fruit three years later than the Wealthy, has given but nine gallons less than this early bearing sort fourteen years after plantation. It is expected that in a few years more the former will produce as much fruit as the latter and, as the McIntosh commands a higher price on the market, this late bearing variety will bring back more money to the grower.

APPLES—FERTILIZATION OF TREES

The object of this experiment is to determine the effect of different fertilizers on the tree and the crops. This work was started in 1924 on two plots and notes were taken on 7 varieties containing 47 trees planted in 1911. In the first plot, 5 pounds of nitrate of soda and 6 pounds of superphosphate were applied to each tree, each year, whilst nitrate was applied alone in the second plot.

The following table gives details on this experiment, the four year period during which apple trees received fertilizers being compared to a period of same length preceding the treatment:—

Variety	Season	Year planted	Year of first treatment with fertilizers	5 pounds nitrate of soda and 6 pounds superphosphate per tree					5 pounds nitrate of soda per tree				
				Number of trees in test	Total production per tree		Increase in four years		Number of trees in test	Total production per tree		Increase in four years	
					For four years preceding treatment	For four years under treatment	Total	Per cent		For four years preceding treatment	For four years under treatment	Total	Per cent
					gal.	gal.	gal.			gal.	gal.	gal.	
Duchess	Early autumn	1911	1924	3	53·50	138·17	84·67	158	1	55·75	168·50	112·75	202
Fameuse	Winter	"	"	1	4·50	28·00	23·50	522	2	8·87	47·25	38·38	436
Lowland Raspberry	Summer	"	"	2	9·75	130·00	120·25	1,233	5	10·10	134·05	123·95	1,227
Milwaukee	Winter	"	"	2	19·50	49·00	29·50	151	4	35·06	90·06	55·00	157
Montreal Peach	Autumn	"	"	6	16·58	110·83	94·25	568	6	26·62	158·83	132·21	497
Red Astrachan	Summer	"	"	4	5·00	90·81	85·81	1,716	4	6·06	84·50	78·44	1,294
Wealthy	Winter	"	"	2	23·25	60·25	37·00	159	5	19·15	60·90	41·75	218
Average					18·87	86·72	67·85	360		23·09	106·30	83·21	360

This experiment has not been conducted long enough to draw conclusions; but, to date, it seems that the average increase is practically the same in each case, though there are variations from variety to variety. This must be experimented longer, so that more light may be thrown on the subject.

APPLES—COVER CROP EXPERIMENT

An orchard of over 350 trees, McIntosh, with Wealthy as fillers, was planted in 1913 and 1914. Since that time, six different cover crops have been compared: red clover sown every year, vetches sown every year, rape sown every year, clover followed by rape in a two-year rotation, permanent sod (hay taken away), and permanent sod (hay used as a mulch around trees). Details are given in the following table for apple trees planted in 1914 and which were living in 1927:—

APPLES—RESULTS OF COVER CROP EXPERIMENT

Cover crop	McIntosh					Wealthy				
	Number of trees in experiment	Average circumference of trees, two feet from the ground, in 1922	Average circumference of trees, two feet from the ground, in 1927	Average increase of circumference in 6 years	Average yield per tree, 13 years after planting, in 1927	Number of trees in experiment	Average circumference of trees, two feet from the ground, in 1922	Average circumference of trees, two feet from the ground, in 1927	Average increase of circumference in 6 years	Average yield per tree, 13 years after planting, in 1927
		in.	in.	in.	gal.		in.	in.	in.	gal.
Red clover, sown every year	3	10·00	16·58	6·58	27·08	4	8·06	11·19	3·13	38·50
Vetches, sown every year	6	10·12	17·33	7·21	62·29	9	9·53	14·33	4·80	83·22
Rape, sown every year	8	9·44	15·72	6·28	63·25	11	9·66	13·64	3·98	71·05
Clover followed by rape in a two year rotation	7	10·53	16·46	5·93	64·50	10	9·15	13·52	4·37	83·90
Permanent sod, hay taken away	5	7·64	14·05	6·41	34·35	3	6·25	10·42	4·17	52·50
Permanent sod, hay used as a mulch around trees	4	7·62	13·62	6·00	32·00	4	6·35	10·75	4·40	40·19

To date, it seems that trees make a stronger growth and produce more fruit with some kind of cover crop, except red clover alone, than with sod. Clover followed by rape in a two year rotation has given the best all around results, but a few years more are necessary before reliable conclusions can be reached.

APPLES—COST OF ESTABLISHING AN ORCHARD

In 1913 and 1914, 378 trees, McIntosh with Wealthy as fillers, were planted 17½ feet apart in all directions. Record was kept of all expense, such as trees, seeds for cover-crops, fertilizers, materials for production, manual, horse and tractor labour, rent of land, and use of machinery. Unfortunately, these records were destroyed by fire in the autumn of 1921; but figures are available since 1922. In order to determine the expenses from 1913 to 1921 inclusive, figures were taken from Bulletin No. 86, "The Apple in Canada" by Mr. W. T. Macoun, Dominion Horticulturist.

The following table gives details in regard to the expenditure and revenue since this orchard was planted:—

EXPENDITURE ON AND REVENUE FROM AN ORCHARD OF 378 WEALTHY AND McINTOSH APPLE-TREES PLANTED IN 1913–1914, FOR THE FIFTEEN YEARS 1913 TO 1927 INCLUSIVE

—	1913 to 1921	1922	1923	1924	1925	1926	1927	Total
	$	$	$	$	$	$	$	$
Rent of land (2·94 acres)	.....	17 64	17 64	17 64	17 64	17 64	17 64	
Use of machinery	.....	1 18	1 18	1 18	1 18	1 18	1 18	
All labour	.....	83 20	108 70	105 70	123 70	41 80	120 60	
Trees to replace	.....	1 00	.....	.....	17 50	.....	23 50	
All cover crops	.....	7 78	9 63	8 25	10 59	7 60	9 25	
All fertilizers	.....	.....	.....	37 80	46 05	55 65	52 38	
All materials for protection	.....	7 81	12 51	7 38	13 54	17 27	23 02	
Total expenditure	741 14	118 61	149 66	177 95	230 20	141 14	247 57	1,806 27
Total revenue	245 00	73 07	284 30	371 75	985 46	166 75	708 26	2,834 59
Expenditure per acre	.....	.....	.....	.....	.....	.....	.....	614 38
Revenue per acre	.....	.....	.....	.....	.....	.....	.....	964 15
Profit or loss per acre	.....	.....	.....	.....	.....	.....	.....	+ 349 77
Profit or loss per acre per year	.....	.....	.....	.....	.....	.....	.....	+ 23 32
Expenditure per tree	.....	.....	.....	.....	.....	.....	.....	4 78
Revenue per tree	.....	.....	.....	.....	.....	.....	.....	7 50
Profit or loss per tree	.....	.....	.....	.....	.....	.....	.....	+ 2 72
Expenditure per barrel of apples	.....	.....	.....	.....	.....	.....	.....	2 27
Revenue per barrel of apples	.....	.....	.....	.....	.....	.....	.....	3 56
Profit or loss per barrel of apples	.....	.....	.....	.....	.....	.....	.....	+ 1 29

This means that if, after site and soil are chosen, varieties of apples required by the market are planted and needful care given, apple tree culture is a paying proposition. Vegetables or small fruits cultivated as intercalar plants during the first years of plantation will give revenue before the trees start to fruit.

CHERRIES—VARIETY EXPERIMENT

From 1911 to date, 174 cherry trees, of 19 varieties, have been tested, and none of the following had a single tree living in the autumn of 1927: Bruseller Braun, Empress Eugénie, Griotte Morello, Herzformige Weichsel, Homer, Koslov Morello, Minnesota Ostheim, Susse Fruche Weichsel. Only twenty-five per cent of the trees planted withstood the rigors of winter. For quality of fruit, Vladimir is the best of all those tried, but its fruit is small and dark, and only one tree out of thirteen planted between 1911 and 1916 is living in 1927. Cerise d'Ostheim, Fouche Morello, and Ostheim, though slightly above the general average for hardiness and yield, have fruit of such low quality that they may be left out of consideration. Cerise de France, Griotte d'Ostheim, and Orel 25 are not hardy enough for Central Quebec and no risk should be taken with them. Chase, planted in 1922, produced a few good dark red fruits in 1927. This leaves only Early Richmond, Montmorency Large, and Montmorency Ordinaire which can be recommended for this district, with possibly a preference for the last two mentioned.

BLACK CURRANTS—VARIETY EXPERIMENT

Sixteen varieties of black currants have been tested since 1911, and the lowest yielders were gradually eliminated until, at the end of 1923, only four were left, which are compared for fifteen years in the following table:—

VARIETY AND STRAIN TEST OF BLACK CURRANTS

Variety	Source	Size of fruit	Year planted	Number of bushes	Average yield per bush	Yield of fruit per acre															
						1912	1913	1914	1915	1916	1917	1918	1919	1920	1922	*1923	1924	1925	1926	1927	Average fifteen year
					lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Climax	C.E.F. Seedling	Medium to large	1911	6	5·08	786	1,301	11,011	17,424	11,918	8,409	7,683	5,989	8,530	15,185	5,021	4,356	5,899	2,904	4,265	7,379
Saunders	"	Large	1911	6	4·22	272	605	7,018	10,164	10,406	9,801	7,623	9,559	13,794	8,409	2,420	2,723	3,358	2,178	3,630	6,131
Buddenborg	Commercial	Large	1911	6	3·77	181	575	7,320	7,925	10,406	7,260	6,534	11,495	7,502	3,932	3,569	3,539	4,810	3,630	3,539	5,481
Boskoop Giant	"	Large	1911	6	3·31	620	1,542	8,349	9,801	7,018	4,416	5,082	11,495	8,107	2,995	3,206	2,360	3,630	2,450	998	4,805
Average					4·10	465	1,006	8,425	11,329	9,937	7,472	6,731	9,635	9,483	7,630	3,554	3,245	4,424	2,791	3,108	5,949

*From 1923 to 1927 the yields were taken from a new plantation made in 1922, with four bushes.

The above table shows that Climax is the highest yielder producing 1,248 pounds or about 23 gallons per acre more than Saunders, the second on the list. The average dates when the fruit was ready to pick were July 15 to 18, there being only three days difference between the earliest and the latest. At the above rates, Climax yielded about a gallon per bush. This is quite high, though, and requires favourable conditions. As a commercial proposition, in central Quebec, black currants are not recommended until a better market can be found for them.

BLACK CURRANTS—BREEDING

The object of this breeding work is to produce superior strains by selection from old sorts. After variety tests had shown that Climax was the heaviest yielder, 360 cuttings and seedlings of this variety were grown and the less promising strains were discarded so that, at the end of 1922, only six were left to be tested with the commercial sorts. The following table gives details for the five years during which Climax strains were compared to leading varieties offered by nurserymen:—

BLACK CURRANTS—RESULTS OF BREEDING EXPERIMENT

Variety or strain	Year planted	Number of bushes	Average yield per bush.	Yield of fruit per acre					
				1923	1924	1925	1926	1927	Average five years
			lb.	lb.	lb.	lb.	lb.	lb.	lb.
Climax No. 1	1922	4	2·56	1,180	4,356	5,899	2,904	4,265	3,721
Buddenborg	1922	4	2·29	1,089	3,539	4,810	3,630	3,539	3,321
Climax No. 35	1922	4	1·96	817	2,360	5,082	1,996	3,993	2,850
Climax No. 2	1922	4	1·83	454	2,450	3,811	2,178	4,356	2,650
Saunders	1922	4	1·70	454	2,723	3,358	2,178	3,630	2,469
Climax No. 6	1922	4	1·64	187	4,084	2,178	2,359	2,450	2,378
Boskoop Giant	1922	4	1·42	907	2,360	3,630	2,450	998	2,069
Climax No. 4	1922	4	1·20	272	1,815	1,996	1,724	2,904	1,742
Climax No. 5	1922	4	1·16	454	3,086	1,180	1,543	2,178	1,688
Average	.....	.....	1·75	716	2,975	3,549	2,329	3,146	2,543

The above table shows that strain Climax No. 1, for an average of five years, has yielded respectively 400 and 1,252 pounds more per acre than Buddenborg, and Saunders. This Cap Rouge strain of Climax is propagated, and a limited number of bushes is offered at one dollar for three, delivered anywhere in the province of Quebec, or at the same price, with postage added, when sent elsewhere.

RED CURRANTS—VARIETY EXPERIMENT

Results of careful testing of twelve varieties of red currants since 1911, have shown that the two outstanding ones are Perfection, for yield, and Cherry, for size and appearance of fruit, though the latter is a poor producer. The following varieties have been discarded because they were inferior in some respect or other to others which were kept: Cumberland, Greenfield, Pomona,

Rankin Red, Red Dutch, Red Grape, Victoria, and Wilder. The following table gives details for three varieties tested together during fourteen years:—

RED CURRANTS—RESULTS OF VARIETY EXPERIMENT

Variety	Source	Average yield for fourteen years		Size of fruit	Quality of fruit
		Yield per bush.	Yield per acre		
		lb.	lb.		
Perfection*	Commercial	7·92	11,506	Large	Good.
Red Cross	"	6·43	9,334	Medium	Good.
Cherry	"	2·01	2,920	Very large	Medium

* Fay Prolific planted in 1911 was thought true to name, but the Dominion Horticulturist, after examination, ascertained that it was Perfection. So that all that was entered under the name of Fay, previously, is really Perfection.

There is practically no demand for red currants and they should be planted in very limited quantities unless one is certain of a good market for them. If grown for commerce, Perfection is the one to get, though bushes should be bought locally or in a locality not too far south, because some strains are not hardy enough for very cold winters. For the home garden, nothing will beat Cherry.

RED CURRANTS—BREEDING

Out of eighty cuttings and seedings of Perfection, erroneously entered under the name of Fay, previously, the one which has yielded more than any of the varieties tested at Cap Rouge, only five were left for further consideration at the end of 1922. In the following table they are compared with the mother variety and with Red Cross for five years:—

RED CURRANTS—RESULTS OF BREEDING EXPERIMENT

Variety of Strain	Average yield for five years	
	Yield per bush.	Yield per acre
	lb.	lb.
Perfection No. 4	6·13	8,894
Perfection No. 3	4·68	6,798
Perfection	4·54	6,595
Perfection No. 5	4·21	6,116
Perfection No. 1	4·19	6,080
Perfection No. 2	4·04	5,862
Red Cross	3·86	5,608

The above table shows that the strain No. 4 produced about 2,300 pounds more per acre than the mother variety. Bushes of this selection are for sale at $1 per 3, delivered anywhere in the province of Quebec, with postage added when sent outside.

WHITE CURRANTS—VARIETY EXPERIMENT

From 1912 to 1920 inclusive, three varieties of white currants were tested, with the result that Large White was discontinued because it was below the other two either for yield or for quality. The results to date are given in the following table:—

WHITE CURRANTS—RESULTS OF VARIETY EXPERIMENT

Variety	Source	Year planted	Number of bushes	Size of fruit	Average yields				Remarks
					For nine years		For twelve years		
					Per bush.	Per acre	Per bush.	Per acre	
					lb.	lb.	lb.	lb.	
White Cherry	Commercial	1911	6	Large	3·56	5,163	4·02	5,843	The best yielder.
White Grape	"	1911	6	"	3·38	4,905	3·88	5,632	The best for the table.
Large White	"	1911	6	"	3·06	4,450	.....	.....	Not recommended.

White Cherry was the heaviest yielder, for an average of twelve years, but is not of as high quality as White Grape, so that the latter should be grown for home use. There is very little demand for white currants and nobody in central Quebec should go in heavily for them unless assured of a profitable market.

GOOSEBERRIES—VARIETY EXPERIMENT

In 1911 and in 1912, twelve varieties of gooseberries were put in the trial plots, and by 1924, the following had been discarded: Houghton because the fruit is too small and the bush has too many thorns; Josselyn because it is the same as Red Jacket which was kept; Queen Anne because the fruit is somewhat small and of a poor colour, yellow; Gibb, Industry, Rideau, Saunders because they are poor yielders. The following table gives details of the varieties kept, to which were added two new ones in 1922: Charles and Poorman.

GOOSEBERRY—RESULTS OF VARIETY EXPERIMENT

Variety	Source	Year planted	Resistant to disease	Thorns on bushes	Size of fruit	Colour of fruit	Average yield for five years 1923-1927		
							Per bush.	Per acre	
							lb.	lb.	quarts
Silvia	C.E.F. Seedling	1922	Strong	Not many	Large	Red	4·39	6,380	4,253
Downing	Commerical	"	"	"	Medium	Green	3·77	5,481	3,654
Josselyn (Red Jacket)	"	"	"	Many	Large	Red	3·41	4,955	3,303
Mabel	C.E.F. Seedling	"	"	Not many	Medium	Green	2·77	4,029	2,686
Charles	"	"	"	"	"	"	2·64	3,830	2,553
Poorman	Geneva Exp. Station	"	"	"	Large	Red	2·47	3,582	2,388
Pearl	Commercial	"	"	"	Medium	Green	2·18	3,170	2,113

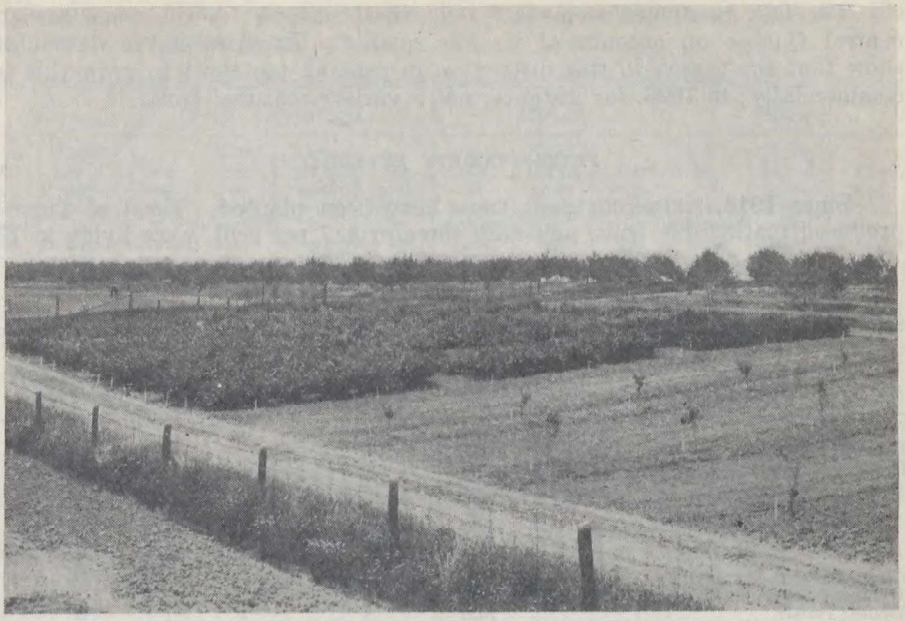
Silvia, which had been the heaviest yielder in the old plantation, is yet at the top in the new one and is strongly recommended. There is generally not much demand for gooseberries, so that it is not advisable for anybody to start on a big scale with them, unless one is assured in advance of a good market.

GOOSEBERRIES—BREEDING

After Silvia was shown to be superior to others tested at Cap Rouge, about 300 seedlings and cuttings were grown. Out of all these, only five were good enough to be compared with the best varieties obtainable, and details are given in the following table:—

GOOSEBERRY —RESULTS OF BREEDING EXPERIMENT

Variety or strain	Source	Thorns on bush	Size of fruit	Colour of fruit	Yield per acre						
					1923	1924	1925	1926	1927	Average for 5 years	
					lb.	lb.	lb.	lb.	lb.	lb.	quarts
Silvia No. 2	Cape Rouge selection	Not many	Large	Red	544	9,257	7,260	16,789	4,810	7,732	5,155
Silvia No. 4	" "	"	"	"	2,632	8,168	6,352	15,427	2,904	7,097	4,731
Silvia No. 3	" "	"	"	"	363	3,539	7,441	16,426	4,628	6,479	4,319
Silvia No. 6	" "	"	"	"	1,633	4,447	7,441	14,883	2,995	6,280	4,187
Downing	Commercial	"	Medium	Green	2,541	1,634	5,082	14,520	3,630	5,481	3,654
Josselyn (Red Jacket)	"	Many	Large	Red	1,270	635	5,989	14,520	2,359	4,955	3,303
Silvia No. 1	Cap Rouge selection	Not many	"	"	817	7,895	272	8,258	4,356	4,320	2,880
Mabel	C.E.F. Seedling	"	Medium	Green	1,724	4,538	1,180	10,799	1,906	4,029	2,686
Charles	C.E.F. Seedling	"	"	"	1,633	908	6,625	7,804	2,178	3,830	2,553
Poorman	Geneva Exp. Station	"	Large	Red	1,210	7,986	4,961	2,299	1,452	3,582	2,388
Pearl	Commercial	"	Medium	Green	3,267	2,178	4,356	2,539	3,509	3,170	2,113



Variety tests of bush fruits in the foreground. In the background part of the apple orchard.

For an average of five years, four of our five selections of Silvia outyielded the best commercial varieties, strain No. 2 producing 2,251 pounds more per acre than Downing, the heaviest yielder amongst the commercial varieties, for this period. In another year or two, the most valuable of the Cap Rouge strains of Silvia will be kept and the others discarded, but, in the meantime, bushes of Nos. 2, 3, 4, 6 are offered at 3 for $1, postpaid, in Quebec, with the price of postage added, when sent out of the province.

GRAPES—VARIETY EXPERIMENT

Out of the thirty-three varieties of grapes which have been tested since 1912, the following twenty-five have been discarded either because they were too late or the quality was not good enough: Beta, Brant, Brighton, Campbell Early, Canada, Champion, Colverain, Cottage, Delaware, Early Victor, Florence x Potter, Hartford, Jamesville, Lindley, Manito, McTavish, Merrimac, Moore Early, Moyer, Pattison, Peabody, Starr Early, Telegraph, Wilkins, Worden. Of the eight which are still in the trial plots, five have not been in long enough to warrant giving an opinion about them. Details are given in the following table in regard to the three varieties which have done best:—

THREE GOOD VARIETIES OF GRAPES FOR CENTRAL QUEBEC

Variety	Year planted	Year when it first produced fruit which ripened	Average pounds of ripe fruit per vine per year for ten years	Size	Colour	Remarks
			lb.			
Early Daisy.....	1916	1918	3·67	Medium..	Black.....	One of the earliest; quality good.
Wyoming Red....	1916	1918	1·83	" ..	Red.....	The earliest of the reds; quality good.
Winchell*.....	1916	1920	1·13	" ..	Green....	The earliest of the greens; quality very good.

*Sometimes called Green Mountain.

The last mentioned seems to be the most suitable for the home garden in central Quebec on account of its fine quality. Experiments to date clearly show that the season in this district is, in general, too short to grow this fruit commercially; in 1925, for instance, not a variety matured fruit.

PEARS—VARIETY EXPERIMENT

Since 1913, sixty-four pear trees have been planted. None of them has produced marketable fruit, and only three or 4·7 per cent, were living in 1927.

VARIETY TESTS WITH PEARS

Variety	Year when planted	Number planted	Number living 1927	Number fruits formed	Remarks
Bessemianka	1919	3			Have not produced one marketable fruit.
Clapp Favorite	1911	2			
"	1915	6			
"	1917	1			
"	1918	1			
"	1920	2			
"	1923	7	1		
Clapp Favorite Dwarf	1923	7	2		
Dempsey Dwarf	1920	1			
Doucet Dwarf	1920	5			
Duchess Dwarf	1920	5			
Duchess d'Angouleme	1911	2			
" "	1914	2			
Flemish Beauty	1911	6		2	
"	1914	2			
"	1915	5			
Seckel	1911	2			
"	1914	2			
"	1920	2			
Winter Nells	1911	1			

It seems evident that, until varieties are found which are more suitable to conditions such as exist at Cap Rouge, pear culture cannot be recommended in Central Quebec, even for the home garden.

PLUMS—VARIETY EXPERIMENT

During the last seventeen years, 275 plum trees of 48 varieties were tested for hardiness and yield, also for colour, size, appearance, and quality of fruit. None of the following were living in the autumn of 1925:—

Americana	European	Hybrid	Nigra
Admiral Schley	Coe Golden Drop	Climax	Aitkin
Bixby Seedling	Grand Duke	Togo	Odegard
Cottrell	Imperial Epineuse	Waneta	
Don	Imperial Gage		
Fitzroy	Lombard		
Gloria	Niagara		
Hawkeye	Reine Claude de Bavay		
Lester	Washington		
Swift			
Wolf			
Yellow Egg			

Details regarding the percentages living in the autumn of 1925 for the main classes, are given hereafter:—

European			Americana			Hybrid			Nigra		
Number of trees planted since 1911	Number of trees living in autumn 1925	Per cent living in autumn 1925	Number of trees planted since 1911	Number of trees living in autumn 1925	Per cent living in autumn 1925	Number of trees planted since 1911	Number of trees living in fall 1925	Per cent living in fall 1925	Number of trees planted since 1911	Number of trees living in autumn 1925	Per cent living in autumn 1925
174	84	48	65	14	22	17	3	18	14	1	7

There seems no doubt that the Europeans will do better wherever there is an abundance of moisture in the air, such as in localities near a large body of water, whilst the Americans may succeed well in places further inland. According to the tests conducted at this Station, three European varieties will give satisfaction where conditions are about the same as at Cap Rouge: Bonne Ste Anne, Montmorency, Quackenboss. For the inland localities, probably Aitkin, Bixby, Brackett, Cheney, Mankato, and Omaha would do well.

The following table gives details for the three best varieties grown at Cap Rouge:—

VARIETIES OF PLUMS WHICH HAVE DONE BEST AT CAP ROUGE

Variety	Year planted	Number of trees planted	Number of trees living 1925	Yield		Fruit			
				Average per tree	Best producing tree	Average date ready to pick	Size	Colour	Quality
				gal.	gal.				
Bonne Ste. Anne....	1911	2	2	19·50	21·50	Sept. 17..	Large.....	Blue.....	Very good.
Montmorency.....	1911	12	6	14·87	24·25	" 18..	Medium....	Yellow...	Good.
Quackenboss.....	1911	2	2	38·00	39·00	Oct. 2..	Very large.	Blue.....	Good.

The above table shows that, of the three varieties, which, according to our experiments, have shown their superiority over others, Quackenboss was the heaviest yielder, while Bonne Ste. Anne produced a very good fruit. Montmorency is not as hardy as the two other varieties.

RASPBERRIES—VARIETY EXPERIMENT

During the last sixteen years, seventeen varieties of raspberries have been tested, and the following are decidedly inferior in some point or other to the ones still in the trial plots: Eaton, Golden Queen, Heebner, Loudon, Marlboro, Sarah. Though Columbian is probably the heaviest bearer of all, it is of the purple cane family, very dark, and only recommended for canning. The following table gives details in regard to the varieties tested together during the last five years:—

RASPBERRIES—RESULTS OF VARIETY EXPERIMENT

Variety	Year planted	Resistance to disease	Fruit				Yield per acre					
			Size	Colour	Quality	Average date first ripe fruit	1923	1924	1925	1926	1927	Average
							lb.	lb.	lb.	lb.	lb.	lb.
Brighton	1922	Good	Medium to large	Red	Very good	July 16	3,206	3,282	5,324	4,211	2,299	3,664
Newman Sdlg. No. 23	"	Medium	Large	Bright red	Best	" 19	4,040	4,412	4,941	2,541	959	3,379
Count	"	Good	Medium to large	"	Good	" 16	3,905	1,994	3,795	2,508	1,925	2,825
Latham	"	Medium	Very large	"	"	" 23	2,530	2,585	3,520	3,234	1,925	2,759
Herbert	"	"	Large	"	"	" 18	2,722	2,741	3,554	1,997	1,210	2,445
Ontario	"	Poor	Medium	"	"	" 17	1,870	1,884	3,190	2,662	935	2,108
Cuthbert	"	Medium	Large	"	Very good	" 21	2,487	1,966	2,958	1,129	740	1,856
June	"	Poor	Medium	"	Good	" 17	2,168	668	1,865	2,239	1,010	1,590
King	"	"	"	"	Medium	" 16	1,452	1,028	2,299	1,597	968	1,469
St. Regis	"	"	"	Bright crimson	Good	" 16	1,760	1,155	2,035	1,320	660	1,386

To date Brighton has proven to be the heaviest yielder, followed by Newman seedling No. 23, which is the best for table use as well as for canning, amongst the varieties tested at this Station. Count and Latham are good varieties but cannot compete as yielders with the two already named varieties. Ontario, Cuthbert, June, King, St. Regis did not produce enough to be profitable.

An important point is to begin with canes absolutely free from disease procured from a place where it is certain that there is no disease. When disease, anthracnose especially, appears in a plantation it is just as well, and probably better, to abandon the whole thing and go to another piece of ground.

RASPBERRIES—BREEDING

The object of this experiment is the production of superior strains by selection from old sorts. Out of about five hundred seedlings of Herbert and King made during five seasons, from 1914 to 1918 inclusively, only one of Herbert was found good enough to be propagated and placed alongside of other varieties, in 1925. If, after five or six crops, it outyields the mother variety, it will be propagated and offered for sale.

STRAWBERRIES—VARIETY EXPERIMENT

Since 1914, 43 varieties and strains of strawberries have been tested, but only 14 were deemed good enough to remain in the trial plots after 1924. Amongst these there are nine sorts which were tested in the same seasons during thirteen years, and details are given in the following table:—

There is no doubt that Dunlap (also called Senator Dunlap) is the best all around variety and it is strongly recommended for a very early berry, Excelsior fills the bill, though it is of poor quality, and for a large luscious fruit, Uncle Jim is hard to beat. Wm. Belt, which was the best for table use, was discarded because it is low coloured and poor yielder. There are now a great many perfect varieties, so that the planting of imperfect ones should be discouraged. A few total failures and many poor results are due to having only an imperfect variety which needs another one for pollenization.

The demand for strawberries is increasing all the time and it is a paying crop for those who can have cheap manual labour, and especially for those who are near a good market.

COMPARISON OF NINE VARIETIES OF STRAWBERRIES TRIED AT CAP ROUGE DURING THIRTEEN YEARS, 1915-1927

Variety	Perfect or imperfect	Source	Season	Shipping qualities	Size	Colour	Eating qualities
Dunlap	Perfect	Commercial	Early to midseason	Medium	Medium to large	Deep red	Sub-acid.
Bisel	Imperfect	"	Midseason	"	"	"	"
Cassandra	"	C.E.F.	Midseason to late	"	"	"	"
Sample	"	Commercial	"	Firm	Large	Red	"
Greenville	"	"	Midseason	Medium	Medium to large	Deep red	"
Glen Mary	Perfect	"	Midseason to late	"	Large	"	"
Portia	Imperfect	C.E.F.	Late	Firm	Medium to large	Deep rose	"
Excelsior	Perfect	Commercial	Early	"	Small to medium	Deep red	Acid.
Uncle Jim	"	"	Midseason to late	Medium	Large	Deep rose	Sweet.

Variety	Resistance to disease	Plant producing qualities	Notes for 1927			Average for thirteen years	
			First bloom	First ripe fruit	First picking	Yield per acre	First ripe fruit
						lb.	
Dunlap	Medium	Strong	May 31	July 3	July 9	8,035	June 28
Bisel	"	"	June 8	July 5	" 11	7,207	July 1
Cassandra	Good	"	" 2	June 29	" 5	7,067	" 1
Sample	"	"	" 6	July 5	" 11	6,744	" 3
Greenville	Medium	"	" 7	" 4	" 9	6,636	" 2
Glen Mary	Good	"	" 6	" 3	" 5	6,287	" 2
Portia	"	"	" 6	" 6	" 11	6,058	" 3
Excelsior	Medium	"	May 31	June 28	" 5	5,483	June 24
Uncle Jim	Good	Medium	June 9	July 6	" 11	4,784	July 3

Since a few years, over 600 runners and seedlings were grown to find out if special strains would be an improvement on the parents. Of those, only thirty looked promising at first, but later just five were found good enough to place in the trial plots in 1920. The following table compares these five seedlings with the parent varieties:—

FIVE STRAWBERRY SEEDLINGS COMPARED WITH PARENT VARIETIES

Variety or Strain	Perfect or imperfect	Source	Season	Shipping qualities	Size	Colour	Eating qualities	Resistance to disease	Plant producing qualities	Average for seven years	
										Yield per acre	First ripe fruit
										lb.	
Dunlap	Perfect	Commercial	Early to midseason	Medium	Medium to large	Deep red	Sub-acid	Medium	Strong	8,369	June 28
No. 419	"	Dunlap	Midseason to late	Good	"	Bright red	"	"	"	4,515	" 30
No. 420	"	"	"	"	"	"	"	"	"	4,972	" 30
No. 421	"	"	"	"	"	"	Sweet	"	"	5,191	July 1
Glen Mary	"	Commercial	Midseason to early	Medium	Large	Deep red	Sub-acid	Good	"	5,640	June 30
No. 408	"	Glen Mary	Early to midseason	Poor	Large	Pale red	"	Medium	Medium	6,224	" 29
No. 410	"	"	"	Good	Medium to large	Deep red	"	"	"	6,540	" 29

The three seedlings from Dunlap are lower producers than the parent variety, but one of them, No. 421, is of such superior quality that it offers great promise for the home garden. A limited number of plants are offered each year at $1 per 24, delivered in the Province of Quebec, with the price of postage added when shipped outside. The seedlings of Glen Mary are heavier yielders than the parent variety, but are not quite up to it in some respects.

STRAWBERRIES—HILL SYSTEM VERSUS MATTED ROWS

The object of this experiment is to compare different methods of planting strawberries. The variety used was Dunlap, on a well fertilized sandy loam. The results are only for three cropping seasons and should only be considered as a progress report. The average shows a yield of 0·55 pound per plant for the first and 0·67 for the second. But as the plants were set 30 by 12 inches for the hill system and 42 by 12 inches for the matted rows, the yield was at the rate of 9,550 pounds per acre in the first instance and 8,348 in the second. There was a tendency for the fruit to mature a little earlier in the hills, the average difference being two days.

ORNAMENTAL PLANTS

ANNUALS.—Out of the hundreds of varieties and strains of annuals tested since 1911, the following will suit the ordinary farmer's flower garden: *Ageratum* and *Centaurea gymnocarpa* as border plants; *Antirrhinum* Aster, Ten-week Stock, *Reseda, Centaurea cyanus* and Poppy will give long-stemmed flowers; *Dimorphotheca, Petunia, Schizanthus* and Nasturtium are good for ornamentation; Balsam, Cosmos, Kochia and Zinnia do well for bedding; and Nicotiana is very sweet-scented. Most of the annuals will do much better if started inside and pricked out at least twice before being planted outside.

EVERLASTING FLOWERS.—Amongst the annual ones, the following have succeeded well at this Station: *Acroclinium,* in mixtures of rose and white; *Helichrysum,* in yellow, orange, or brown (flowers must be cut as soon as they come); *Rhodanthe,* single and double; Statices of many varieties; *Xeranthemum,* in a delicate mauve colour. *Gypsophila paniculata, latifolia,* perennial statice fill the bill for perennial sorts.

WILD FLOWERS.—Some of our ferns, Christmas, Cinnamon, Holly, and wild flowers such as *Hepaticas, Trillium erectum, Sanguinaria canadensis, Cornus canadensis, Corydalis, Mentha, Asarum,* Violas are very pretty indeed if transplanted and care taken to give them conditions somewhat similar to those to which they are accustomed.

HERBACEOUS PERENNIALS.—A border planted with the following perennials will give flowers continually, or practically so, from April to November: April, Crocus and Pansy; May, Narcissus and early Tulip; June, Darwin tulip, Iris and Paeony; July, Delphinium, Digitalis and Madonna lily; August, Hollyhock; September, Phlox; October, *Rudbeckia purpurea;* November, Pansy.

TREES AND SHRUBS, ORNAMENTAL AND SHELTER.—Out of the 124 varieties and strains tested since 1911, the following may be considered as the best: deciduous trees—Cornelian Cherry, Cut-leaved Maple (Wier), False Indigo, Norway Maple, Rose Acadia (Robinia), Western Catalpa, White Birch—Conifers—Colorado Blue Spruce, Plume Japan Cypress, Pyramidal Arborvitae —Shrubs—Honeysuckle, Tatarian, Hydrangea, large flowered, *Mahonia aquifolium* (Barberry), Lilac (Charles X), Lilac (Michel Buchner), Mock Orange (Bouquet blanc), *Neillia opufolia aurea,* Virburnum (*lantana*), *Potentilla fruticosa, Spirea van houttei.* The above are given in alphabetical order rather than by merit.

HEDGES.—Since 1913, eighteen kinds of shrubs and trees have been tested for hedges. Among the conifers, the following can be recommended: American Arborvitae and Colorado Blue Spruce. In deciduous kinds, the following are good: Siberian Pea Tree, Thunberg Barberry, and Wayfaring Tree.

LAWN, WEED CONTROL.—From an experiment started in 1925, it seems that practically all dandelions on a lawn may be killed by six sprayings of a 25 per cent solution of iron sulphate. The first application was made around the middle of June and five others repeated about every fifteen days.

ANTIRRHINUM.—The prettiest varieties tested are Old Gold, old rose and old gold; Cooper King, dark red; The Rose, old rose; Canary Bird, pure yellow. To succeed, seed should be sown inside, pricked out at least twice and planted out when there is no more danger of frost. Care should be taken, when watering the young plants, that they are not wetted, as they will soon damp out.

CROCUS.—It produces the earliest bloom in the spring and the length of duration is between 2 and 3 weeks, according to the season and variety. *Purpurea grandiflora,* purple; Sir Walter Scott, white with purple stripes; and Cloth of Gold, yellow, were the best of those tested.

GLADIOLUS.—Out of the 162 varieties tested since 1912, the following are pretty and may be purchased at a reasonable price. Prince of Wales (salmon), Maréchal Foch (pink), Herada (mauve), Niagara (cream), Schwaben (yellow), America (lavender), Dominion (Red Emperor) (red), Peace (white), Baron J. Hulot (violet). For the amateur, there is nothing prettier than Pink Wonder (pink), whilst others are very fine, such as Mrs. Dr. Norton (pink and cream), Byron L. Smith (lavender, cream throat), Anna Eberius (violet), Maine (white), Groff Majestic (red), Golden Measure (yellow), American Beauty (american beauty), Glendale (purple), Rose Ash (ashes of roses).

The results to date show that it is not a paying proposition to grow gladiolus for cut flowers from year old corms, but it must be remarked that blooms may be had about four years from the initial corms, and that bulblets can, in the meantime, be grown to replace at least some of them. At Cap Rouge, for instance, out of 25 varieties used in 1925, only two did not grow in 1926; from the 23 others, nine gave good marketable flowers. A few years are required to throw more light on this proposition

HYACINTH.—The experiment was conducted with Single Dutch sorts. The following have given the best satisfaction, and the average number of days in bloom is given in brackets: La Grandesse, white, late (16); King of the Yellows, yellow (10); Gigantea, shell pink (21); La Victoire, carmine (15); Grand Lilas, light blue (21); Lord Balfour, mauve (14).

IRIS.—Of the thirty-eight varieties of German iris, the outstanding ones are Queen of May (Coquette); Kharput, ultramarine; Courcy (Lord Seymour), lilac blue; Madame Chereau, white and blue; Darius, yellow, orange and lilac; Duc de Nemours, white and blue.

LILY.—During eleven years, fifteen varieties have been tested and the following are adapted to conditions such as exist at Cap Rouge: *Auratum, Regale, Speciosum rubrum, Tigrinum and Elegans.* It is important that lilies be placed where they will not be always wet and to cover them up well in the autumn.

NARCISSUS.—Amongst the single "large trumpets," the following are the best: Emperor, King Alfred, Victoria and Empress; the two last named are bicolors. For those who have a market for cut flowers it may be paying to grow narcissus commercially. At Cap Rouge, 100 bulbs of Emperor planted in the autumn of 1920, left, at the end of 1926, a total profit of $58.15, or an average yearly profit of $9.69 for a piece of ground about 15 feet square.

PAEONY.—Of the forty-seven varieties tested the following were found the best: *Officinalis rubraplena,* semi-double, dark crimson, early; Madame Geisler, double, dark pink, large bloom; *Festiva maxima,* double, the prettiest white; La Tulipe, semi-double, pink, long stem; Felix Crousse, semi-double, pink, late; Gerard, flesh pink to creamy white; Livingstone, soft rose pink with silvery tips, and Philomele, old rose with amber centre.

PHLOX.—Perennial. Since 1917, thirty-seven varieties were tested and of these the following are recommended: Flocons de Neige, white, early; Snowdon, white, early; Jeanne d'Arc, white, late; Selma, light pink and purple-crimson eye; Rynstorm, rose pink; Le Printemps, carmine-rose; Viking, rose; Admiral Jaure, white and carmine; Nuée, violet purple and dark red.

ROSES.—During the last sixteen years, sixty-one varieties have been tested. The best ones are: Frau Karl Druschki, white; Gruss an Teplitz, bright crimson; Hugh Dickson, crimson; La France, bright pink; Mrs. Aaron Ward, Indian yellow; Madame Edouard Herriot, coral red.

ROSES, CLIMBING.—Out of eleven varieties tested since 1912, the following, given by order of merit, have done best at Cap Rouge: Dorothy Perkins, double, shell pink; Crimson Rambler, double, crimson; Tausendchön, double, pink to rosy carmine; and Trier, single, white.

SWEET PEAS.—Since 1911, over two hundred varieties and strains of sweet peas have been tested. Of these, the twelve prettiest ones are the following, which are practically all of the same value: Bacchus, (maroon), Celeste(light blue), Charity (red), Chevalier (rose), Commander Godsell (dark blue), Daisybird (light pink), Elegance (blush), Fordhook Orange (orange), King White (white), Matchless (cream), Royal Scot (light red), and Sapphire (blue). In Quebec city, not enough can be had for sweet peas to make them profitable commercially, but if one wishes to grow them for sale, note should be taken that the darker colours are, generally, not wanted.

SYRINGA.—Of the seventeen varieties tested during the last fifteen years, two "Vulgaris," Charles X, single, and Michel Buchner, double, are the best low ones. The two singles, *Amurensis* and *Villosa,* may be planted by those who wish to have earlier bloom and taller shrubs.

TULIPS.—Over one hundred varieties, from six groups have been tested since 1916: Single Earlies and Double Earlies, generally used for bedding; Cottages, Darwins, and Breeders for cut flowers, and the Parrots for ornamenting. Amongst the Single Earlies, Pottebakker Scarlet (scarlet), Duchesse de Parma, and Couleur Cardinal (bronze-scarlet) are probably the best; whilst, of the Double Earlies, Couronne d'Or (yellow and orange), and Salvator Rosea (dark pink), are the prettiest. Picotée (white-carmine), and La Merveille (salmon-scarlet) stand at the head of the Cottages. The Darwins are justly the most popular in Central Quebec. Of these, the best are: Pride of Haarlem (rosy-carmine), Clara Butt (clear pink), and Rvd. Ewbank (lavender-violet). Cramoisie Brillant (carmine-red, striped black) is a very good Parrot. To date, the results of an experiment show that, in this district, there is too much risk in commercial growing of tulips out-of-doors.

VEGETABLES

ASPARAGUS.—During the last fourteen years, eleven varieties and strains have been tested, with the result that Donald Elmira from Dreer has been the heaviest yielder. A Cap Rouge selection of this has now been grown four years alongside best varieties and is the most productive of all. A limited quantity of seed and plants is offered for sale each year at a reasonable price.

BEANS, GARDEN.—Seventy-one varieties and strains have been tested since 1911, and out of these only seven have been found worthy of further trial. Hodson was the highest yielder of all, and was ready in seventy-eight days, whilst, Pencil Pod, a wax-podded kind, produced a little less but was eleven days earlier and was the best liked of all by the dealers and consumers. A selection of the last named was made at Cap Rouge and seed is available each year.

BEETS, GARDEN.—Of the twenty-four varieties and strains tested since 1911, Eclipse was found the most productive; however, it would probably have brought less money on the Quebec market, as it is not popular there on account of its comparatively large size and rather dull colour. As the biggest demand is for a dark-fleshed beet, Black Red Ball is about what is wanted, especially if sold when about two inches in diameter. Selection of the latter was started at Cap Rouge in 1915, and a small quantity of seed of a strain which has outyielded the mother variety is offered each season at a reasonable price.

CABBAGE.—Since 1911, twenty-six varieties and strains have been tested with the results showing that Jersey Wakefield is the earliest, being ready for use about three days earlier than Copenhagen market, which is a much better yielder. Between the summer and winter sorts Succession does very well. Danish Roundhead is hard to beat as a heavy producer and a good keeper, and seed of a good Cap Rouge selection may be had at a reasonable price each year.

CARROTS, GARDEN.—During the last sixteen years, twenty-five varieties and strains have been compared with the result that Guérande, or Oxheart, has proved to be the earliest, whilst Hutchinson is the heaviest yielder, but it is a long carrot and not so popular on the Quebec market as the intermediates. Amongst these, Chantenay is probably the best, due to its fair production, good appearance and smooth shape, and seed is offered of a good Cap Rouge strain.

CAULIFLOWER.—By experience, it was ascertained that a lack of moisture and high temperatures cause cauliflower heads to "bolt" or "button"; thus, the strains must be either very early or late, so as to escape the heat of mid-summer. In the first case Snowball, started under glass, gives good results, whilst, amongst the late varieties Algiers is the best, producing more and larger heads than early sorts. Monarch, tested a few years, is promising.

CELERY.—Of the thirteen varieties of celery tested since 1911, White Plume, very early; Golden Self Blanching, somewhat later; Giant Pascal, green, and the best keeper, would be a good combination.

CORN.—Over eighty varieties and strains of sweet corn have been tested during the past sixteen years. Early Malakoff, the earliest, being ready for use in 91 days after sowing, produced much more ears per acre than Golden Bantam and Country Gentleman, the latter doing well for a late variety; Golden Bantam comes 12 days after Malakoff and Country Gentleman nearly three weeks after Golden Bantam. Seed of a strain of Early Malakoff selected at Cap Rouge is now available.

CUCUMBERS.—Out of thirty-six varieties and strains tested, White Spine, Fordhook Famous, and Davis Perfect are the best for table use, and Chicago is very good for pickling.

MUSKMELONS.—It is not safe to grow muskmelons in the Cap Rouge district for commercial purposes on account of the shortness of the season. However, Early Green Citron, suitable for the home garden, and Hackensack and Montreal Market, commercial varieties, may ripen good fruits if started under individual cold frames.

ONIONS.—Prizetaker sown in hot beds, this method producing a much more profitable crop than when sown directly outside, is a good yielder; but, for ordinary treatment, Red Wethersfield, which is a very good keeper during winter, is the best of all. For pickling, Barletta is the right sort.

PEAS, GARDEN.—Since 1921, more than seventy varieties and strains have been tested, including the different colours of pea, the smooth and wrinkled, the various classes of climbing, semi-dwarf, dwarf, as well as the early, midseason, and late. Commercially, it costs too much to grow the tall pea. Amongst the very early, Gregory Surprise is recommended. For the main crop, Juno has been the heaviest yielder and was ready in seventy-three days. Seed of a very good Cap Rouge strain of the latter is available at a reasonable price.

POTATOES.—Irish Cobbler, early, and Green Mountain, late, are certainly the best sorts for central Quebec. It is very important to plant certified seed, for if diseased tubers are used, this crop will not be as profitable as it should be. Besides standard varieties, Dooley has given very good results at Cap Rouge.

PUMPKINS.—Small Sugar averaged thirteen tons per acre, or about half of Large Field, Jumbo, and Mammoth, but there is a larger demand for them and they will pay more, acre for acre, than the larger ones.

RHUBARB.—Since 1911, six varieties have been tested, and St. Martin is by far the heaviest yielder, with much the largest stalks, and less propensity to come to seed early. Roots of this variety are offered for sale each year. Ruby, a highly coloured selection from the Central Experimental Farm, will be compared with St. Martin for revenue per acre.

SQUASH.—As results of tests during thirteen seasons, Long Vegetable Marrow has proved the heaviest yielder, Hubbard is the best of all, Bush Marrows require less room. Crooknecks and Scalloped were left aside, because they are low yielders, and have only a small proportion which is edible.

TOMATOES.—Out if the eighty varieties and strains tested since 1911, a Cap Rouge selection of Earliana, the variety which suits the short season of the district, called Capiana, gave the larger proportion of ripe fruit early in the season. It does not produce as smooth a fruit as one would like to see, but there is nothing known at the present time which can compare with it for a profitable tomato where the season is short. Seed of this is for sale each year.

TURNIPS, GARDEN.—The regular garden turnip, such as Purple Top Milan, the best in its class, is not as well liked as swede turnips on the Quebec market. Of these, Skirving is well liked, but either Good Luck or Bangholm would do very well, if care be taken to sell them before they get too large.

WATERMELON.—The culture of watermelon is not recommended in central Quebec because the season is too short. For the home garden, Red Citron, Cole Early, Ice Cream, Florida Favourite are recommended, in the order named.

NOTE.—Details regarding the following experiments were given in the 1925 report of the Cap Rouge Station: protection of cabbage and cauliflower from root-maggots; protection of cauliflower from weather; blanching celery; seed compared to sets for early onion production; best size of onion sets to plant; sowing a variety of beans or peas at different dates compared with sowing varieties of different seasons at the same time; potato seed-pieces treated or not treated with plaster; different sizes of potato sets. forcing rhubarb; transplanting tomatoes one or more times; methods of pruning and of training tomatoes; also of artificially ripening the fruit; thinning beets, carrots, onions, parsnips and turnips at different distances.

CEREALS

As a general proposition, it does not pay to grow cereals in central Quebec, either for sale or for live stock feeding, at the present prices of grains and milling by-products. But some of them will always be required as a cover crop for grass and clover seedlings and, for this purpose, everything considered, oats will continue to be the best choice. They should, however, only be sown to precede hay and practically never twice in succession. For fifteen years Banner oats, Arthur peas, Manchurian barley and Huron wheat were compared in trial plots at Cap Rouge with the following results:—

OATS, PEAS, BARLEY, SPRING WHEAT COMPARED FOR DIGESTIBLE NUTRIENTS

Crop	Yield of grain per acre	Digestible nutrients							
		Crude protein		Carbohydrates		Fat		Total	
		In 100 pounds	Per acre	In 100 pounds	Per acre	In 100 pounds	Per acre	In 100 pounds	Per acre
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Banner oats	2,322	9·7	225	52·1	1,210	3·8	88	70·4	1,635
Arthur peas	2,124	19·0	403	55·8	1,185	0·6	12	76·2	1,618
Manchurian barley	1,572	9·0	141	66·8	1,050	1·6	25	79·4	1,248
Huron wheat	1,545	8·7	134	67·5	1,043	1·4	22	79·4	1,227

A careful study of the above figures shows that in comparing the four varieties of oats, field peas, barley and spring wheat which have done the best at Cap Rouge, the two last mentioned cereals, from the standpoint of producing feed for live stock, do not yield enough digestible nutrients, especially crude protein, per acre.

The conclusion of all this is, that under conditions as they exist at Cap Rouge, ordinary bread-making varieties of spring wheat cannot profitably be grown for live stock feed; that the varieties of barley tried to date could only profitably be grown for special purposes such as for malting or pearling or for sale of seed, as they do not produce as much protein, carbohydrates or fat per acre as do the best varieties of oats; that oats should continue to be the main cereal of central Quebec, because it produces, by far, more digestible nutrients per acre than either barley or wheat, and that field peas should be grown very much more extensively on account of their high yield of crude protein per acre and of their ability to secure nitrogen from the air.

BARLEY

VARIETY AND STRAIN TESTS

From 1911 to 1927, inclusive, twenty-six varieties and strains of barley were tried. The results of ninety-nine tests show that the six-rowed kinds yielded at the rate of 1,555 pounds per acre and matured in eighty-seven days, while the figures for the two-rowed ones are respectively 1,446 pounds and ninety-four days for forty-eight tests. This shows that, in general, the six-rowed varieties have not only given more grain, but have been earlier.

Ten varieties (the figures in brackets indicate whether the variety is two-rowed or six-rowed) were discarded because they were found inferior to the others for conditions of central Quebec: Albert Ott.54 (6), Beaver (2), Black Japan (6), Escourgeon (6), Gold (2), Odessa (6), Stella (6), Success (6), Swan's Neck (2), Swedish Chevalier (2).

In the following table are tabulated the only three varieties or strains which were compared in the same seasons:—

COMPARISON OF THREE VARIETIES OR STRAINS OF BARLEY GROWN FOR FIFTEEN YEARS

Name of variety or strain	Number of rows	1911		1912		1915		1916		1917		1918		1919		1920		1921	
		Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature
Early Chevalier Ott. 51	2	1,920	74	1,380	100	1,905	90	900	84	1,770	88	1,740	83	1,290	88	2,010	77	1,650	78
Manchurian (A) Ott. 50	6	1,290	79	1,020	100	1,942	81	780	89	1,440	87	1,890	84	1,860	86	2,370	84	1,550	79
O. A. C. 21	6	660	80	900	97	1,717	80	1,260	85	1,440	90	1,710	86	990	88	2,160	79	2,000	78
Bearer Ottawa 475	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Charlottetown 80	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Velvet Minn. 447	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Chinese Ottawa 60	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hannchen (Sv)	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Himalayan Ott. 59 (Hulless)	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Mensury 3207 M. C	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Star (Sv)	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Duckbill 207 M. C	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Duckbill Ottawa 57	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Name of variety or strain	Days to mature	1922		1923		1924		1925		1926		1926		Average		Other details regarding varieties or strains tested in 1927			
		Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Pounds per acre	Days to mature	Average length of straw including head	Average length of head	Weight per measured bushel	Weight per 1,000 kernels
																in.	in.	lb.	grms.
Early Chevalier Ott. 51	2	2,525	84	1,800	91	1,475	108	2,064	91	2,175	81	1,260	90	1,724	86	33	6·00	53·0	35·5
Manchurian (A) Ott. 50	6	2,400	87	1,550	94	1,725	110	1,968	94	2,430	84	1,102	101	1,688	89	30	6·00	55·1	35·7
O. A. C. 21	6	2,400	88	1,775	93	1,775	108	1,932	91	2,208	83	1,281	97	1,614	88	28	6·25	51·0	30·7
Bearer Ottawa 475	6	–	–	–	–	–	–	–	–	–	–	1,410	106	–	–	25	7·00	52·6	31·2
Charlottetown 80	2	–	–	–	–	–	–	–	–	–	–	1,365	106	–	–	24	7·00	56·9	37·5
Velvet Minn. 447	6	–	–	–	–	–	–	–	–	–	–	1,357	97	–	–	29	5·25	51·0	29·6
Chinese Ottawa 60	6	–	–	–	–	–	–	–	–	–	–	1,350	97	–	–	33	6·00	51·0	30·4
Hannchen (Sv)	2	–	–	–	–	–	–	–	–	–	–	1,260	106	–	–	25	8·00	56·9	38·0
Himalayan Ott. 59 (Hulless)	6	–	–	–	–	–	–	–	–	–	–	1,140	92	–	–	17	5·50	63·0	37·6
Mensury 3207 M. C	6	–	–	–	–	–	–	–	–	–	–	1,095	97	–	–	31	6·00	53·0	32·2
Star (Sv)	6	–	–	–	–	–	–	–	–	–	–	1,080	96	–	–	18	6·00	54·5	29·0
Duckbill 207 M. C	2	–	–	–	–	–	–	–	–	–	–	1,065	106	–	–	25	8·00	52·7	42·5
Duckbill Ottawa 57	2	–	–	–	–	–	–	–	–	–	–	892	106	–	–	27	7·00	55·5	38·8

(A) Manchurian Cap Rouge since 1919, except 1922 when all seed grain burned except one pound sample.

The results to date with variety and strain tests of barley show that the six-rowed varieties, generally, are better adapted to central Quebec than the two-rowed ones, the exception to the rule being Early Chevalier which has been the heaviest yielder of all those tried for a number of years, although it will be seen under the next project that a Cap Rouge selection of Manchurian heads the list, for an average of nine years, and is the variety which is recommended for central Quebec.

BARLEY—PRODUCTION OF SUPERIOR VARIETIES OR STRAINS BY SELECTION

Selection was started with Manchurian, in 1913 when ninety average heads, each from a separate plant were chosen in a field, care being taken not to pick out anything which might have had some advantage of environment.

In 1914, thirty-one kernels were sown from each head, two inches apart, in rows five feet long and a foot apart, with checks, and in such a way that no row would have the advantage over the others.

In 1915, ninety-one kernels of each of the thirty best strains of the preceding year were sown, two inches apart, in rows fifteen feet long and two feet apart, with checks, without giving any advantage to any row.

In 1916, 271 kernels were sown of each of the ten highest yielding strains of 1915, two inches apart in rows forty-five feet long and two feet apart, with checks. In the following table are found the yields of these ten strains for 1914, 1915 and 1916:—

YIELD OF TEN STRAINS OF MANCHURIAN BARLEY IN ROWS—1914, 1915, 1916

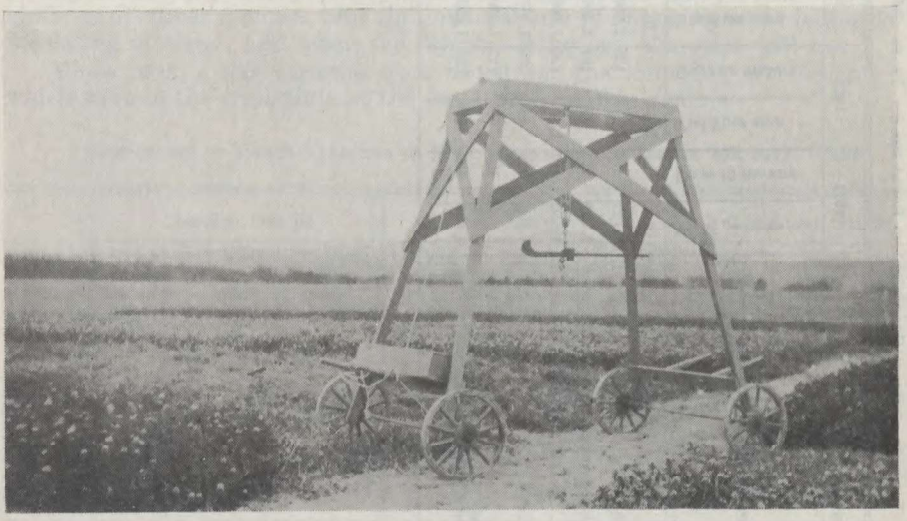
Strain No.	1914		1915		1916		Average comparative yields
	Yield for 5-foot row 12 inches apart	Comparative yields Average=100	Yield for 15-foot row 24 inches apart	Comparative yields Average=100	Yield for 45-foot row 24 inches apart	Comparative yields Average=100	
	oz.		oz.		oz.		
5	5·25	129·6	24·75	112·2	54·0	91·1	111·0
14	4·25	104·9	21·75	98·6	67·0	113·0	105·5
17	4·00	98·8	21·00	95·2	61·0	102·9	99·9
19	3·75	92·6	24·00	108·8	62·0	104·6	102·0
36	4·00	98·8	20·25	91·8	61·0	102·9	97·8
38	4·00	98·8	25·50	115·7	51·0	86·0	100·2
49	4·75	117·3	21·75	98·6	53·0	89·4	101·9
63	3·75	92·6	20·25	91·8	60·0	101·2	95·2
77	3·75	92·6	21·00	95·2	66·0	111·3	99·7
85	3·00	74·1	20·25	91·8	58·0	97·8	87·9
Average	4·05	100·0	22·05	100·0	59·30	100·0	100·0

In 1917, half of the grain of strain 14, the heaviest yielder of 1916, was sown with a garden drill in rows one foot apart, to multiply it. The rest of the grain was kept, in order not to lose the work of years in case what was in the ground would be destroyed.

Since 1918 this selection was sown in the trial plots, alongside of leading varieties. During the winter of 1921, the building in which the seed grain was stored burned down but, fortunately, a one pound sample of our selection was obtained from Ottawa. This loss explains why the year 1922 does not appear in the following table where are tabulated the only three varieties or strains which were compared in the same seasons:—

WELL KNOWN VARIETIES OF BARLEY COMPARED WITH A CAP ROUGE SELECTION

Year	Manchurian Cap Rouge 14		O. A. C. No. 21		Early Chevalier Ott. 51	
	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature
	lb.		lb.		lb.	
1918	1,890	84	1,710	86	1,740	83
1919	1,860	86	990	88	1,290	88
1920	2,370	84	2,160	79	2,010	77
1921	1,550	79	2,000	78	1,650	78
1923	1,550	94	1,775	93	1,800	91
1924	1,725	110	1,775	108	1,475	108
1925	1,968	94	1,932	91	2,064	91
1926	2,430	84	2,208	83	2,175	81
1927	1,102	101	1,281	97	1,260	90
Average	1,827	91	1,759	89	1,718	87



Device to weigh crops from small test plots.

For those whose special conditions of soil or of market make it profitable to grow barley, Manchurian Cap Rouge 14 is recommended for trial and is offered for sale each year in sealed bags, at a reasonable price.

BEANS

VARIETY AND STRAIN TESTS

For live stock feeding, beans did not produce, at Cap Rouge, as much digestive nutrients or protein per acre as peas, so that they may only be considered as a crop for human consumption. Importations at rather low prices from foreign countries have pulled down profits until every farmer must now decide for himself whether he should grow them or not. The following table gives details about six varieties which have been grown together the same seasons for the past six years:—

VARIETIES OF BEANS GROWN AT CAP ROUGE FOR SIX YEARS—1922-1927

Variety name	Varietal characters					1922		1923		1924		1925		1926		1927		Average	
	Length of plant	Length of pod	Colour of flowers	Colour of bean	Size of bean	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature
	in.	in.				lb.		lb.		lb.		lb.		lb.		lb.		lb.	
Norwegian 0·710	13·9	5·1	Pale pink	Yellowish brown	Medium	1,750	109	850	128	2,200	123	3,381	121	1,380	101	1,950	96	1,918	118
Quebec	13·8	5·1	White and pink	Pink with red spots	Medium to large	1,900	110	650	131	2,200	126	3,234	127	1,803	107	1,361	96	1,858	116
Navy A 0·711	14·2	4·2	White	White	Medium to small	1,550	113	1,080	128	1,600	123	2,969	127	1,582	104	2,060	110	1,807	117
Large White 0·713	14·0	4·4	White	White	Large	1,200	118	480	124	1,475	126	2,705	127	1,619	107	1,840	110	1,553	119
Carleton 0·718	10·9	4·2	White	Greenish brown white markings	Medium to large	1,075	109	600	117	1,250	121	3,381	113	1,325	101	1,214	96	1,474	109
Beauty 0·712	10·5	3·8	White	White and yellow spots	Medium to large	1,050	109	450	125	1,625	125	2,558	123	1,269	101	662	100	1,269	114

The above table shows that the heaviest yielder has been Norwegian, Ottawa 710, but its colour is a disadvantage in the district, while there is a fairly good demand for Quebec which produced a bushel less than the former. These two strains are practically free from anthracnose. It has been found that freedom from disease plays an important part in increasing yield and it is recommended that beans to be used for seed should not only themselves be free of blotches, but that none be taken from pods showing the least sign of disease.

FLAX

VARIETY AND STRAIN TESTS

Repeated trials have shown that conditions of climate and soil are favourable to the production of flax for fibre in Central Quebec, but until machines are used to cut down manual labour in the production of flax, it is believed that this crop cannot compete for profit with others now generally grown in central Quebec. It is possible that the fibre may in future be used for many other things than cloth, as it already enters into the manufacture of thread, yarn, binding twine, insulating material, and when the demand is keener, the price will rise.

Since 1915, a few varieties were tested and the following are the only ones which were in the trial plots at the same time for five years:—

COMPARISON OF THREE VARIETIES OF FLAX GROWN AT CAP ROUGE FOR FIVE YEARS

Year	Novelty, Ott. 53			Premost			Longstem, Ott. 52		
	Yield of seed per acre	Length of plant	Days to mature seed	Yield of seed per acre	Length of plant	Days to mature seed	Yield of seed per acre	Length of plant	Days to mature seed
	lb.	in.		lb.	in.		lb.	in.	
1920.....	1,230	26	99	990	25	101	1,012	33	104
1924.....	1,175	27	114	1,050	27	105	1,000	41	116
1925.....	1,565	26	100	1,224	28	97	1,022	32	102
1926.....	600	22	115	618	25	113	492	36	120
1927.....	1,344	22	117	1,056	30	111	984	36	113
Average..	1,183	24·6	109	986	27·0	105	902	35·6	111

The preceding table shows that Longstem, which is much longer than others, is the most suitable to sow for fibre production in Central Quebec, whilst Novelty is at the head for seed production.

OATS

VARIETY AND STRAIN TESTS

Twenty-five varieties and strains of oats have been tested during the past sixteeen years. Of these, the very early and early sorts tested could not compete for yield with later ones, neither were side-headed oats able to equal the ordinary open-headed varieties. The following are the varieties which did not produce enough to warrant keeping them: Abundance, Clydesdale, Eighty Day, Ligowo, O.A.C. 72, Siberian, Thousand Dollar, Twentieth Century.

Banner and Victory are varieties which have consistently been at the top. Comparison of results of six varieties or strains tested the same seasons is given in the following table:—

COMPARISON OF SIX VARIETIES OR STRAINS OF OATS GROWN FOR FIVE YEARS

Name of variety or strain	Type	Season	1923		1924		1925		1926		1927		Average		Other details regarding varieties or strains tested in 1927			
			Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Average length of straw including panicle	Average length of panicle	Weight per measured bushel	Weight per 1,000 kernels
			lb.		lb.		lb.		lb.		lb.		lb.		in.	in.	lb.	grms.
Banner C. R. 31	Spreading	Late	2,150	107	2,850	110	2,207	104	2,415	96	2,414	113	2,407	106	37	9·0	35·5	33·6
Banner Ottawa 49	"	"	1,800	107	2,550	110	2,208	104	2,415	95	2,326	114	2,260	106	36	6·0	37·7	33·8
Victory	"	"	1,975	104	2,675	111	2,184	103	2,370	96	2,040	114	2,249	106	35	7·0	39·6	35·3
Gold Rain	"	"	1,650	105	2,675	106	2,112	104	1,950	92	1,875	112	2,052	104	35	6·0	40·4	32·2
Longfellow Ott. 478	Side	"	1,375	100	2,475	102	1,968	107	1,920	91	1,862	103	1,920	101	35	9·50	35·6	38·2
Alaska	Spreading	Early	1,875	90	1,875	92	1,704	92	1,950	84	1,608	98	1,802	91	29	6·50	37·5	34·3
O. A. C. 144 M. C	"	Late	.....	.....	.....	.....	.....	.....	.....	.....	2,394	114	.....	.....	36	10·0	33·6	34·6
Banner 44 M. C	"	"	.....	.....	.....	.....	.....	.....	.....	.....	2,194	112	.....	.....	36	8·0	37·1	34·9

The above table shows that Banner oats is decidedly superior to other varieties, whilst Alaska, the earliest, is last on the list and Longfellow (side-headed) produced nearly ten bushels less than the average of late spreading varieties or strains. It is interesting to note the correlation existing between late maturity and highest yields.

Liberty, a hulless variety, is not listed in this table not being tested during same seasons but was compared with Banner during a five year period with the result that Liberty yielded at the rate of 1,119 pounds per acre whilst the hulled variety (Banner) gave 2,264, since Banner contains about 28·5 per cent hull it is clear that it was superior to it.

It would be a mistake indeed, now that efforts seem to be towards the limitation of the number of varieties, to recommend anything except Banner for central Quebec until another variety has conclusively proven, after many years of carefully conducted experiments, that it is quite superior to it.

More detailed results regarding this experiment are given in Bulletin 91 (New Series) written by the Superintendent of the Cap Rouge Station, "Banner Oats."

OATS—PRODUCTION OF SUPERIOR VARIETIES OR STRAINS BY SELECTION

This was started in 1916, with Banner, when ninety average heads from different mother plants were chosen in a large field, leaving aside any extra good ones which had advantages of environment. In 1917, thirty-one kernels were sown from each head, two inches apart, in rows five feet long and a foot apart, with checks, so that none of the rows would have an advantage over the others.

In 1918, ninety-one kernels were sown from each of the thirty highest-yielding strains of the preceding year, two inches apart, in rows fifteen feet long and two feet apart, with check, to prevent any row having an advantage over the others.

In 1919, 271 kernels were sown from each of the ten highest-yielding strains of 1918, two inches apart, in rows forty-five feet long and two feet apart, with checks. The following table gives the number of each strain, with its yield and position in 1917, 1918 and 1919:—

YIELD OF TEN STRAINS OF BANNER OATS IN HEAD TO ROW PLOTS 1917-1918-1919

Strain No.	1917		1918		1919		Average comparative yields
	Yield for 5-foot row	Comparative yields average = 100	Yield for 15-foot row	Comparative yields average = 100	Yield for 5-foot row	Comparative yields average = 100	
	oz.		oz.		oz.		
3	5·75	91·3	26·5	102·6	60·0	126·1	106·7
31	6·25	99·2	26·5	102·6	76·0	159·7	120·5
32	7·25	115·1	26·0	100·6	52·0	109·2	108·3
33	6·50	103·2	25·0	96·7	58·0	121·8	107·2
38	6·75	107·1	27·0	104·4	54·0	113·4	108·3
43	5·50	87·3	24·0	92·8	20·0	42·0	74·0
62	6·75	107·1	24·5	94·8	40·0	84·0	95·3
66	6·50	103·2	24·5	94·8	68·0	142·9	113·6
80	6·00	95·2	27·0	104·4	28·0	58·8	86·1
90	5·75	91·3	27·5	106·4	20·0	42·0	79·9
Average	6·30	100·0	25·85	100·0	47·60	100·0	100·0

In 1920, half of the grain of strain 31, the highest yielder of the preceding year, was sown with a garden drill in rows one foot apart, so as to multiply it. The other half of the grain was kept, in case something should happen to the crop, so that the work of years would not be lost.

From 1921 to 1927 inclusively, except in 1922, when all our seed grain burned, less a one-pound sample, this selection was sown in the trial plots, alongside of other varieties and strains, and gave the following results:—

VARIETIES AND STRAINS OF OATS COMPARED WITH A CAP ROUGE SELECTION

Year	Banner Cap Rouge 31		Victory		Banner Ottawa 49		Gold Rain		Longfellow Ottawa 478	
	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature
	lb.		lb.		lb.		lb.		lb.	
1921	2,425	94	1,625	93	1,450	94	1,400	91	1,400	91
1923	2,150	107	1,975	104	1,800	107	1,650	105	1,375	100
1924	2,850	110	2,675	111	2,550	110	2,675	106	2,475	102
1925	2,207	104	2,184	103	2,208	104	2,112	104	1,968	107
1926	2,415	96	2,370	96	2,415	95	1,950	92	1,920	91
1927	2,414	113	2,040	114	2,326	114	1,875	112	1,862	103
Average	2,410	104	2,148	103	2,125	104	1,944	102	1,833	99

The above table shows that the Cap Rouge selection has shown a decided superiority over the best sorts tested with it for six years. Seed is now on the market, in sealed bags, at a reasonable price.

OATS—DETERMINATION OF PERCENTAGE OF HULL

A few years ago yields were given in bulk but now everybody seems to be looking for the production of digestible nutrients per acre. This is why it is important to find the proportion of hull to kernel in oats, as it may vary from twenty to forty-five per cent, this proportion depending both upon the variety and upon the conditions of growth. It is admitted that there is no necessary correlation between weight per bushel or shape of grain and the per cent of kernel, as the varieties or strains most suited to the environment develop their kernels best, which may be long, slender ones in certain cases, and short plump ones in others, so that experiments must be conducted in different districts.

From 1922 to 1927 inclusively, a test was made at this station with five varieties, Longfellow, a side oats, Alaska, an early one, and the three which have proven to be the heaviest yielders of grain for many years, with the following results:—

AVERAGE YIELD OF GRAIN AND KERNEL OF FIVE VARIETIES OF OATS FOR SIX YEARS—1922 TO 1927

Variety	1922			1923			1924			1925		
	Yield of grain per acre	Per cent of kernel	Yield of kernels per acre	Yield of grain per acre	Per cent of kernel	Yield of kernels per acre	Yield of grain per acre	Per cent of kernel	Yield of kernels per acre	Yield of grain per acre	Per cent of kernel	Yield of kernels per acre
	lb.		lb.	lb.		lb.	lb.		lb.	lb.		lb.
Banner, Ottawa 49	3,247	67·60	2,195	1,800	71·62	1,289	2,550	71·85	1,832	2,230	72·00	1,606
Victory	2,750	68·30	1,878	1,975	71·24	1,407	2,675	72·82	1,948	2,206	74·00	1,632
Gold Rain	3,000	71·80	2,154	1,650	74·03	1,221	2,675	74·76	2,000	2,133	73·50	1,568
Alaska	2,100	74·80	1,571	1,875	80·11	1,502	1,875	76·70	1,438	1,704	79·50	1,355
Longfellow Ottawa 478	2,423	67·40	1,633	1,375	71·29	980	2,475	67·00	1,658	1,968	72·50	1,427

AVERAGE YIELD OF GRAIN, ETC.—*Concluded*

Variety	1926			1927			Average		
	Yield of grain per acre	Per cent of kernel	Yield of kernels per acre	Yield of grain per acre	Per cent of kernel	Yield of kernels per acre	Yield of grain per acre	Per cent of kernel	Yield of kernels per acre
	lb.		lb.	lb.		lb.	lb.		lb.
Banner, Ottawa 49	2,415	71·00	1,715	2,326	75·11	1,747	2,428	71·53	(1,737)
Victory	2,370	69·00	1,635	2,040	74·47	1,519	2,336	71·64	(1,673)
Gold Rain	1,950	70·50	1,375	1,875	76·68	1,438	2,214	73·56	(1,629)
Alaska	1,950	76·50	1,492	1,608	81·71	1,314	1,852	78·22	(1,448)
Longfellow, Ottawa 478	1,920	66·50	1,277	1,862	70·16	1,306	2,004	69·14	(1,385)

The above table shows that Alaska, though having a low percentage of hull, did not yield enough grain per acre to show up well; that Longfellow, like all side varieties, is not profitable to grow under these conditions; and that of the three best spreading varieties, Banner, Gold Rain and Victory, the first mentioned produced the most "meat" per acre and should be recommended for central Quebec.

A glance at the following figures will readily show that, for an average of three years, the percentage of hull was practically the same for selections of Banner oats made at three different localities; Central Experimental Farm, Ottawa, Macdonald College, and Experimental Station, Cap Rouge:—

PROPORTION OF HULL TO KERNEL OF THREE STRAINS OF BANNER OATS COMPARED FOR 3 YEARS, 1925 TO 1927

Year	Per cent of hull		
	Banner 44 M. C.	Banner Cap Rouge 31	Banner Ottawa 49
1925	25·00	26·50	28·00
1926	30·50	29·00	29·00
1927	24·64	24·84	24·89
Average	26·71	26·78	27·30

FIELD PEAS

VARIETY AND STRAIN TESTS

The field pea is one of the most valuable crops for Central Quebec, as it may be used for so many different purposes: human consumption, and live stock feeding in the form of dried seed, soiling, silage and hay. Peas give nearly as many pounds of digestible nutrients per acre as oats, but it has the great advantage of furnishing more protein, which is the costly part of most rations, also of taking a great deal of its nitrogen from the air.

Since 1911 thirty-five varieties or strains were tested and many of these, which proved their inferiority to others, were discarded. For human consumption, the field pea has a good market in Central Quebec, but only white varieties are acceptable, and of these Arthur has been the highest yielder. For live stock feeding, Mackay and Solo are two heavy producers.

The following varieties are the only ones which were in the trial plots for the same seasons since 1921:—

VARIETIES OF PEAS GROWN AT CAP ROUGE FOR SEVEN YEARS, 1921-1927

Variety	Size and colour of seed	1921		1922		1923		1924	
		Yield per acre	Days to maturity	Yield per acre	Days to maturity	Yield per acre	Days to maturity	Yield per acre	Days to maturity
		lb.		lb.		lb.		lb.	
Mackay, Ottawa 25	Medium yellowish, black hylum.	2,376	104	3,000	108	3,720	119	2,275	122
Arthur, Ottawa 18	Medium white	1,936	94	2,900	101	3,330	113	2,875	110
Chancellor, Ottawa 26	Small white	1,958	91	2,100	95	2,520	107	2,350	106

Variety	Size and colour of seed	1925		1926		1927		Average	
		Yield per acre	Days to maturity	Yield per acre	Days to maturity	Yield per acre	Days to maturity	Yield per acre	Days to maturity
		lb.		lb.		lb.		lb.	
Mackay, Ottawa 25	Medium yellowish, black hylum.	2,131	111	2,112	108	1,668	117	2,469	113
Arthur, Ottawa 18	Medium white	2,310	104	2,208	98	1,601	114	2,451	105
Chancellor, Ottawa 26	Small white	1,823	103	1,696	95	1,752	108	2,028	101

Solo, which was grown only for four years alongside of the above varieties, produced a few pounds less than Mackay and unless our new selection shows its superiority to this variety, the Mackay will be recommended for live stock feeding purposes.

PEAS, FIELD—PRODUCTION OF SUPERIOR VARIETIES OR STRAINS

This project was started in 1914 with Arthur, but everything was lost in the field in 1919. Work was started again in 1922 when ninety plants were chosen containing each from 12 to 47 peas and one-eighth to three-eighth ounces. In 1923, 23 peas from each of the thirty best plants were sown in rows five feet long and three feet apart, with a check every fifth row, so that no row would have the advantage over the others. The following table gives details about the production of these thirty strains:—

YIELD OF THIRTY STRAINS OF ARTHUR PEAS IN FIVE FOOT ROWS, 1923

Strain No.	Ounces	Strain No.	Ounces	Strain No.	Ounces
5	3·12	42	3·31	73	3·50
6	2·75	46	4·12	74	3·69
9	3·31	47	3·56	76	3·62
14	3·87	50	4·56	78	2·50
15	4·12	51	2·37	81	4·62
16	3·81	56	2·25	82	3·19
29	2·87	60	4·87	85	3·50
34	2·31	63	2·81	86	2·25
35	4·12	65	4·50	89	3·12
39	4·56	72	2·81	90	1·19

In 1924, 140 peas were sown of the ten highest yielding strains of 1923, two inches apart, in rows two feet apart, with checks put in such a way that no row would have any undue advantage over the others. Figures are given showing the number of each strain with its yield and position in 1923 and 1924.

YIELD OF TEN STRAINS OF ARTHUR PEAS, 1923 AND 1924

Strain No.	1923		1924		Average comparative yields
	Yield for 5-foot row	Comparative yields average = 100	Yield for 140 peas	Comparative yields average = 100	
	oz.		oz.		
14	3·87	90·0	19	70·9	80·4
15	4·12	95·8	32	119·4	107·6
35	4·12	95·8	32	119·4	107·6
39	4·56	106·0	27	100·7	103·3
46	4·12	95·8	25	93·3	94·5
50	4·56	106·0	24	89·6	97·8
60	4·87	113·3	32	119·4	116·3
65	4·50	104·7	27	100·7	102·7
74	3·69	85·8	21	78·4	82·1
81	4·62	107·4	29	108·2	107·8
Average	4·30	100·0	26·80	100·0	100·0

The strain 60 was the heaviest yielder whilst 46 was the best as to type. In 1925 and 1926 these strains were multiplied and they were tested together in 1927, when strain 60 did not produce more than the other and was discarded because not as uniform as strain 46. This last strain has been compared for two years with other varieties and if, after two or three more tests, it shows decided superiority over other sorts it will be placed on the market; in the meantime small quantities are offered for sale at a reasonable price.

SOLO PEAS

A selection of Solo peas was started in 1923, when a hundred average plants were chosen in a field, taking care not to pick up anything which might have had some advantage due to environment.

In 1924, thirty-one peas were sown from each plant, two inches apart, in rows five feet long and three feet apart, with checks, without giving any advantage to any row.

In 1925, ninety-one peas of each of the thirty best strains of the preceding year were sown, two inches apart, in rows fifteen feet long and three feet apart, with a check every fifth row.

In 1926, 271 peas were sown of the ten highest yielding strains of 1925, two inches apart in rows forty-five feet long and three feet apart, with checks so that no row would have any advantage over the others. In the following table are found the yields of these ten strains for 1924, 1925 and 1926:—

YIELD OF TEN STRAINS OF SOLO PEAS, 1924-25-26

Strain No.	1924		1925		1926		Average comparative yields
	Yield for 5-foot row	Comparative yields average = 100	Yield for 15-foot row	Comparative yields average = 100	Yield for 45-foot row	Comparative yields average = 100	
	oz.		oz.		oz.		
5	2·5	84·7	24·37	102·9	58·0	103·1	96·9
7	3·5	118·6	33·00	139·4	48·0	85·5	114·5
17	2·5	84·7	27·81	117·4	44·0	78·4	93·5
24	3·0	101·7	25·75	108·7	56·5	100·6	103·7
31	3·0	101·7	23·25	98·2	60·0	106·9	102·3
33	3·0	101·7	29·06	122·7	64·5	114·9	113·1
60	4·5	152·5	22·12	93·4	55·0	98·0	114·6
70	2·5	84·7	14·56	61·5	51·0	90·8	79·0
85	2·5	84·7	18·62	78·6	65·0	115·8	93·0
100	2·5	84·7	18·31	77·3	59·5	106·0	89·3
Average	2·95	100·0	23·68	100·0	56·15	100·0	100·0

In 1927, the two most uniform amongst the highest yielding strains of 1926, 33 and 85, were tested together with the result that the latter produced about 42 per cent more than the other, therefore strain 33 was discarded. In 1928, half of the seed of strain 85 will be sown with a garden drill in rows three feet apart to multiply it so that it may be placed, in 1929, in the trial plots for five years; after this it will either be discarded or offered for sale, according to its performance in comparison with the mother variety and others.

PEAS, FIELD—COOKING VARIETY TESTS

There are large quantities of field peas sold to make soup in the province of Quebec, and it is a well-known fact that some lots will positively not cook so as to make an edible dish, while others will cook in a rather short time. What is the cause of this? A great many reasons have been advanced, more or less plausible, but the exact cause is not known.

In 1925, an experiment was started at Cap Rouge to find out the difference in cooking qualities of different varieties of peas. Samples of varieties grown in the trial plots after a hoed crop on a light sandy loam, which had been limed lightly a few years before, were tested at two places for two years, and at one place another year. The following table gives the time required to cook peas of nine varieties:—

PEAS, FIELD—COOKING VARIETY TESTS

Variety	Hours to cook		
	1925 (Two tests)	1926 (One test)	1927 (Two tests)
Chancellor, Ottawa 26	1·40	1·45	2·12
Prussian Blue	1·57	2·05	2·27
O. A. C. 181	2·15	2·00	2·15
Mackay, Ottawa 25	2·27	2·45	3·27
Arthur, C. R.	.....	2·10	2·50
No. 348 (Minn.)	.....	.....	2·40
No. 336 (Minn.)	.....	.....	2·57
No. 316 (Minn.)	.....	.....	3·00
Solo	.....	.....	3·02

Although it is too early to give definite conclusions in regard to this matter, the above figures show that varieties do not require the same time to cook and that Chancellor is, for an average of five tests, the one which cooks in the least time at this Station, whilst Mackay is at the other end of the list. This project will be conducted for a few years, so that more light can be thrown on the subject.

COOKING TESTS OF FIELD PEAS GROWN ON DIFFERENT SOILS AND AFTER DIFFERENT CROPS

Field peas are grown in the district of Quebec especially to make soup, but their cooking qualities are not the same. Is there a difference between varieties? Has the preceding crop or fertilizers any influence or does it depend upon the kind of soil on which the crop is grown? It will no doubt take a few years before a reasonable answer is given but an experiment was started in 1917 at Cap Rouge, to throw light on two of the possible reasons.

(*a*) Arthur peas were grown for three seasons both on a clayey and on a sandy loam. Samples were tested at two different places for two years, and at one place for one year, and it took about the same time to cook lots from each kind of soil. (*b*) During three seasons, three lots of Arthur were grown respectively after a hoed crop, after grain, and after hay or pasture. Samples were tested at different places and the average results show that if the time required to cook peas grown after grain is 100, it would be represented by 155 for peas grown after a hoed crop, and by 203 for peas grown after grass. This experiment will be conducted a few years longer to gather more conclusive data.

SPRING WHEAT

VARIETY AND STRAIN TESTS

Wheat cannot be grown profitably in central Quebec for feeding live stock and whether one should have it on his farm or not depends principally on the price it can command for milling purposes. Of course, there may be places where oats would lodge and a short, strong variety of wheat would be preferable as a cover crop for clover and timothy; and there may be a chance to grow this cereal to be sold as seed, but these are rather exceptions to the general rule.

From 1911 to 1927, inclusive, twenty-one varieties and strains of spring wheat were tested at Cap Rouge. The results of forty-five tests show that the bearded kinds yielded at the rate of 1,328 pounds per acre and matured in 102 days, whilst the beardless ones produced 1,206 pounds and matured one day earlier, with eighty-nine tests. This shows that, in general, the bearded varieties yielded more grain per acre.

Fifteen varieties were discarded because they were found inferior to the others for conditions of central Quebec, four of bearded kinds: Pioneer, Prelude, Preston and Yellow Cross; and eleven of beardless ones: Alpha Selected, Bishop, Bobs, Chelsea, Early Russian, Prospect, Ruby, White Fife, 86 D, 129 D and 197 C.

COMPARISON OF THREE VARIETIES OR STRAINS OF WHEAT GROWN FOR FOURTEEN YEARS

Name of variety or strain	Awn	1911		1912		1914		1915		1916		1917		1918		1919	
		Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature
		lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.	
Huron Ottawa 3	Bearded	2,340	87	540	112	1,640	99	1,488	93	1,129	95	1,500	105	1,170	101	690	98
Marquis Ottawa 15	Beardless	1,725	87	660	112	480	96	1,332	100	649	98	1,050	106	1,260	101	960	97
Early Red Fife Ottawa 16	"	765	85	360	112	1,180	99	1,485	97	1,219	96	1,320	103	1,020	10.	690	98
Pringle's Champlain 307 M. C	Bearded																
Red Fife Ottawa 17	Beardless																
Huron C. R. 7	Bearded																

Name of variety or strain	Awn	1920		1921		1922		1925		1926		1927		Average		Other details regarding varieties or strains tested in 1927		
		Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Average lenght of straw including head	Average length of head	Weight per measured bushel
		lb.		lb.		lb.		lb.		lb.		lb.		lb.		in.	in.	lb.
Huron Ottawa 3	Bearded	1,770	100	1,525	93	1,950	108	1,600	111	1,644	106	1,177	114	1,440	102	34	6·5	63·5
Marquis Ottawa 15	Beardless	1,560	100	1,600	92	1,650	104	1,500	109	795	103	1,190	112	1,172	101	30	3·5	64·2
Early Red Fife Ottawa 16	"	1,530	98	1,350	94	1,625	106	1,296	108	560	103	1,080	113	1,106	101	32	3·5	63·9
Pringle's Champlain 307 M. C	Bearded											1,223	114			32	9·0	63·5
Red Fife Ottawa 17	Beardless											1,223	114			34	3·0	62·4
Huron C. R. 7	Bearded											1,177	114			33	5·0	63·7

The results to date with variety and strain tests of spring wheat show that Huron is the best adapted of the three varieties compared together for fourteen years, for Central Quebec and it is strongly recommended, especially that Cap Rouge selection which, with us, yields more than the parent variety from Ottawa. Very early sorts, such as Pioneer and Prelude, have never yielded as much as later ones and should only be grown in parts of the country where the season is short. Marquis cannot compare with Huron in this district and most of the farmers who have tried both have stuck to the latter, which, though not producing the quality that Marquis will give, yields a slightly higher per cent of flour.

WHEAT—PRODUCTION OF SUPERIOR VARIETIES OR STRAINS BY SELECTION

In 1913, ninety average heads from different mother plants were chosen in a field of Huron wheat, taking care to leave aside everything which seemed to have had advantages of environment.

In 1914, thirty one kernels were sown from each head, two inches apart, in rows five feet long and a foot apart, with checks, so that none of the rows have an advantage over the others. According to all outward appearances, the soil was uniform.

In 1915 ninety-one kernels were sown of each of the thirty highest yielding strains of the preceding year, two inches apart, in rows fifteen feet long and two feet apart, with checks.

In 1916, 271 kernels were sown of each of the ten highest yielding strains of 1915, two inches apart, in rows forty-five feet long and two feet apart, with checks, so that no row would have any undue advantage over any of the others. Figures are herewith given showing the respective yield and position of these ten strains in 1914, 1915 and 1916:—

YIELD OF TEN STRAINS OF HURON WHEAT IN ROWS, 1914-1915-1916

Strain No.	1914		1915		1916		Average comparative yields
	Yield for 5 foot row	Comparative yields average = 100	Yield for 15-foot row	Comparative yields average = 100	Yield for 45-foot row	Comparative yields average = 100	
	oz.		oz.		oz.		
1	5·00	75·6	24·0	93·6	30·0	61·9	77·0
4	5·75	85·2	24·5	95·5	36·0	74·2	85·0
7	7·75	114·8	30·5	118·9	74·0	152·6	128·8
14	7·00	103·7	25·0	97·5	69·0	142·3	114·5
16	7·50	111·1	22·5	87·7	32·0	66·0	88·3
20	7·25	107·4	27·0	105·3	42·0	86·6	99·8
34	6·50	96·3	27·5	107·2	40·0	82·5	95·3
49	6·00	88·9	21·0	81·9	31·0	63·9	78·2
57	8·00	118·5	28·0	109·2	61·0	125·8	117·8
78	6·75	100·0	26·5	103·3	70·0	144·3	115·9
Average	6·75	100·0	25·65	100·0	48·50	100·0	100·0

In 1917, half of the grain of strain 7, the highest yielder of the preceding year, was sown with a garden drill in rows one foot apart so as to multiply it. The balance of the grain was kept in case something should have happened to the crops, so that the selection would not be lost.

For seven years, the selection was sown in the trial plots, alongside the mother variety, Marquis and Early Red Fife, with the following results:—

THREE VARIETIES OF WHEAT COMPARED WITH A CAP ROUGE SELECTION

Year	Huron, C. R. 7		Huron, Ottawa 3		Marquis, Ottawa 15		Early Red Fife, Ottawa 16	
	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature
	lb.		lb.		lb.		lb.	
1918	1,590	104	1,170	101	1,260	101	1,020	104
1919	900	95	690	98	960	97	690	98
1920	1,830	100	1,770	100	1,560	100	1,530	98
1921	1,775	92	1,525	93	1,600	92	1,350	94
1925	1,650	111	1,600	111	1,500	109	1,296	108
1926	1,245	106	1,644	106	795	103	560	103
1927	1,177	114	1,177	114	1,190	112	1,080	113
Average	1,452	103	1,368	103	1,266	102	1,075	103

The above figures show that our selection of Huron which has proven to be the variety best adapted to conditions of Central Quebec, outyielded its parent and well-known varieties in carefully conducted tests during seven years. Seed of Huron Cap Rouge 7 is now for sale each year, in limited quantities, at a reasonable price.

GRAIN MIXTURES

TESTS OF BARLEYS AND OATS IN COMBINATION FOR GRAIN

This project was started to discover if mixtures of barley and oats would give better yields than when each is grown separately. During the same five seasons, a mixture of Daubeney oats and Manchurian barley was compared with Daubeney alone. The mixture averaged 1,368 pounds of grain per acre whilst Daubeney oats alone produced 1,563. During the same five years a mixture of Banner oats and Duckbill barley averaged 1,740 pounds of grain per acre, whilst Banner oats alone produced 2,155. Admitting that barley has more total digestible nutrients than oats, it is still clear that oats alone, in this district at least, will produce the larger number of pounds of digestible nutrients per acre. This is explained by the fact that, at Cap Rouge, for an average of fifteen years, barley has only averaged 1,572 pounds of grain per acre whilst oats gave 2,307, so that the latter necessarily suffers when competing for room with a class of grain which yields much less.

TESTS OF BARLEY, OATS AND WHEAT IN COMBINATION FOR GRAIN

The object is to find out if a mixture of barley, oats and wheat will yield more than when each grain is grown separately. In a test of three years, Daubeney oats and Prelude wheat had averaged 1,100 pounds per acre compared with 1,800 pounds for Banner oats and Huron wheat. For another three seasons, Duckbill barley was added to the two latter mentioned, then the production of this mixture was 1,790 pounds per acre, whilst Banner alone produced 2,110 pounds. The difference is so large that Banner is still much in the lead from the point of view of digestible nutrients. The reason of this is that, at Cap Rouge, for an average of fifteen years, oats produced 777 pounds per acre more than wheat, and 750 more than barley.

TESTS OF PEAS AND OATS IN COMBINATION FOR GRAIN

The object of this experiment was to see if mixtures of peas and oats would give better yields than when each was grown separately. Banner oats and Arthur peas were the leaders for yield in their respective classes and have matured within one day of each other, according to many years' tests, which made them an ideal combination. In a test of four seasons the mixture did not produce as much as either of the components alone, the average in pounds of grain per acre being 1,807 for Arthur peas and Banner oats, 2,122 for Arthur peas alone and 2,167 for Banner oats alone. If, however, a mixture is grown in Central Quebec for grain production, peas and oats, using varieties which will mature nearly at the same time, should be used on account of the comparatively high percentage of protein, the most costly part of the ration, also of their profitable use for soiling, for hay, for green fodder or for ensilage, as desired.

IMPORTATION AND TESTING OF FOREIGN VARIETIES OF CEREALS

The object of the experiment, started in 1923, is to try out, in a preliminary way varieties of strains of cereals which are widely advertised, new, or of probable merit, alongside of the variety of the same class which has shown up the best for the district. Everything with obvious defects is immediately rejected whilst others are kept under careful observation for a year or more before being placed in the trial plots where they must remain at least five years before they are either definitely discarded or recommended.

The following table gives details about the nineteen varieties tried since 1923 in thirty-five different tests:—

PRELIMINARY TESTING OF NEW OR WIDELY ADVERTISED CEREALS 1923 TO 1927

Kind of grain	Name	Source of seed	Remarks
Barley	New White	H. W. Buckbee, Rockford, Ill.	Hulless; low yielder; rejected.
"	Pold	Sweden	Nothing special to recommend it; rejected.
"	Velvet, Minn. 447	University of Minnesota, St. Paul, Minn.	Smooth-awned; kernels uniform; to be tested in 1928.
"	Wisconsin No. 55	H. W. Buckbee, Rockford, Ill.	Mixed sample; did not mature uniformly; rejected.
Field Peas	New Early Snowflake	" "	Did not mature; rejected.
Oats	Bumper	M. Savard, Cap R., and J. Harris, Coldwater, N.Y.	Side oats, large kernels; did not produce as much as Banner; rejected.
"	Cornell	J. Harris, Coldwater, N.Y.	Very productive; kernels uniform in size; to be tested in 1928.
"	Cornellian	" "	Kernels small; mixed sample, rejected.
"	Iowa	" "	Heads light; grain small; rejected.
"	Ithacan	Cornell University, Ithaca, N.Y.	Very productive; to be tested in 1928.
"	Mammoth	K. McDonald, Ottawa, Ont.	Side oats, nothing special to recommend it; rejected.
"	Markton	State College of Wash., Pullman, Wash.	Low yielder; rejected.
"	Quaker	H. W. Buckbee, Rockford, Ill.	Nothing special to recommend it; rejected.
"	White Bonanza	" "	Mixed sample; rejected.
"	Yellow Russian	Steele Briggs, Toronto, Ont.	Nothing special to recommend it; rejected.
Spring Wheat	Aurore	Central Experimental Farm, Ottawa.	Did not produce as much as Huron in 1927; to be tested in 1928.
"	Charlottetown No. 123	Experimental Station, Charlottetown, P.E.I.	Small heads; rejected.
"	Medford	R. A. Kolb, Medford, Wis.	Too late; poor heads; rejected.
"	Velvet Chaff	H. W. Buckbee, Rockford, Ill.	Not uniform; too late; small heads; rejected.

Out of the varieties or strains fifteen were rejected and four will be tested again in 1928.

Variety tests of cereals are very important as they show which are the best for certain districts. But the good work should not stop there, as farmers will derive no direct benefit if they do not grow the ones which are the best yielders. This is why, each year, all the area devoted to grain, which can be put in fine tilth and which is free from weeds, on the Cap Rouge Station is used to grow Manchurian barley, Banner oats, Arthur peas, and Huron wheat, the varieties which have done best in their respective classes. The crop is thoroughly rogued in the field, carefully harvested, and what is offered for sale, always at reasonable prices, is put in sealed bags, after having been inspected officially by a representative of the Dominion Seed Branch.

The number of farmers who consider the possibilities contained in well-bred seed is yet too small. If the seeds be without potential possibilities, a part of the labour and money spent on the preparation of land, the sowing, the harvesting and the threshing is wasted, because there lacks something vital to give a maximum crop. As a general proposition, it can be said that too much labour and money are spent in raising unprofitable crops of grain, and a time is bound to come when farmers will look a great deal more carefully into the breeding of the seeds which they use.

INVESTIGATION OF METHODS OF OBTAINING ACCURATE DATA IN VARIETY TESTING

The object of this experiment is to determine a method of plot testing that will minimize experimental error. In 1923, and since then, the question of border effect was looked into, as it is generally thought that it is not the same for all varieties. The weight of the grain, also that of the straw were taken separately for the two outside rows, the two rows next to the outside ones, and the inside rows of a certain number of plots of varieties of barely, oats, and wheat. The following table gives details for the varieties of grain on which notes were taken in regard to this project.

EFFECT OF BORDER ON THE YIELD OF VARIETIES OR STRAINS OF BARLEY, OATS AND WHEAT—FOUR SEASONS

Variety or Strain	Grain																				
	Taking full width of seeder (11 rows)				Leaving out two outside rows									Leaving out four outside rows							
	Pounds per acre				Pounds per acre				Per cent decrease below full width of seeder					Pounds per acre				Per cent decrease below full width of seeder			
Barley																					
	1924	1925	1926	1927	1924	1925	1926	1927	1924	1925	1926	1927	Average	1924	1925	1926	1927	1924	1925	1926	1927	Average
Early Chevalier, Ottawa 51	1,475	2,352	2,842	1,764	1,253	1,920	2,220	1,500	15·1	18·4	21·9	15·0	17·6	1,257	1,848	2,079	1,309	14·8	21·4	26·8	25·8	22·2
Manchurian C. R. 14	1,725	1,862	2,881	1,401	1,344	1,560	2,424	1,104	22·1	16·2	15·9	21·2	18·8	1,257	1,540	2,479	1,170	27·1	17·3	14·0	16·5	18·7
Oats																					
	1924	1925	1926	1927	1924	1925	1926	1927	1924	1925	1926	1927	Average	1924	1925	1926	1927	1924	1925	1926	1927	Average
Alaska	1,875	2,842	3,087	2,783	1,650	2,160	2,760	1,896	12·0	24·0	10·6	31·9	19·6	1,650	2,002	2,695	1,571	12·0	29·6	12·7	43·6	24·5
Banner, C. R. 31	2,850	3,038	2,950	2,999	2,184	2,280	2,412	2,280	23·4	25·0	18·2	24·0	22·6	2,181	2,310	2,310	2,218	23·5	24·0	21·7	26·0	23·8
Banner, Ottawa 49	2,550	3,234	3,430	3,097	1,925	2,520	2,760	2,328	24·5	22·1	19·5	24·8	22·7	1,925	2,310	2,695	2,264	24·5	28·6	21·4	26·9	25·3
Gold Rain	2,675	3,136	2,891	2,538	1,925	2,280	2,400	1,812	28·0	27·3	17·0	28·6	25·2	1,964	2,156	2,310	1,756	26·6	31·3	20·1	30·8	27·2
Victory	2,675	3,038	3,185	2,666	2,138	2,280	2,640	2,064	20·1	25·0	17·1	22·6	21·2	2,122	2,310	2,541	1,956	20·7	24·0	20·2	26·6	22·9
Wheat																					
	1923	1924	1925	1927	1923	1924	1925	1927	1923	1924	1925	1927	Average	1923	1924	1925	1927	1923	1924	1925	1927	Average
Huron, C. R. 7	2,025	1,775	1,960	1,411	1,742	1,466	1,800	1,176	14·0	17·4	8·2	16·7	14·1	1,611	1,375	1,694	1,170	20·4	22·5	13·6	17·1	18·4
Huron, Ottawa 3	1,900	1,750	2,254	1,470	1,589	1,405	1,920	1,188	16·4	19·7	14·8	19·2	17·5	1,493	1,414	1,848	1,140	21·4	19·2	18·0	22·4	20·2
Marquis, Ottawa 15	2,100	1,325	2,058	1,392	1,742	1,191	1,800	1,200	17·0	10·1	12·5	13·8	13·3	1,650	1,139	1,540	1,079	21·4	14·0	25·2	22·5	20·8

The above table shows that the border effect was neither the same for all varieties nor for the same variety every year. As a general rule, the yield was comparatively much higher for the two outside rows, and higher for the two rows next to the outside ones, than for the inside rows. Further investigations are required to throw more light on the question; however, in leaving out the two outside rows for variety tests of cereals the experimental error will certainly be reduced.

METHODS OF SEEDING EXPERIMENTAL PLOTS

This project was started in 1925 with the object of ascertaining the best and most reliable method of seeding small plots. The experiment was conducted on a well fertilized sandy loan in good tilth, with three different methods: depression made with a Planet Junior, grain sown by hand; depression made with a Planet Junior, grain spaced by hand; grain sown with a Planet Junior. Each method was replicated five times on three rod row plots with barley, oats and wheat. The quantity of seed sown with the Planet Junior was recorded, and exactly the same quantity was sown or spaced by hand.

The average results for three seasons seem to show that the greatest number of kernels harvested for every one put in was in the second method, where seeds were equally spaced by hand in depressions made with a Planet Junior. However, this experiment will be continued for two or three years more before definite conclusions are drawn.

FORAGE PLANTS

A great deal of work has been done with forage plants at Cap Rouge, because it is believed that they are of the greatest importance in a district where live stock is one of the surest sources of revenue. Among the ensilage crops, Indian corn, sunflowers, also peas and oats, have received great attention. The first mentioned, though still holding its ground, is hard pressed by the others when the cost of dry matter per ton is taken into consideration. Nothing has yet been found among sunflowers to produce more than some of the various strains of Russian, while Longfellow, which for a long while reigned supreme amongst the varieties of Indian corn, may have to cede its place in the not distant future.

Experiments which were carefully conducted have conclusively shown that roots require too much costly manual labour to successfully compete with Indian corn, and more especially with hay, in the cheap production of dry matter and of digestible nutrients. But there is no doubt that they have their place where herds are too small to warrant the erection of a silo, or where the manual labour of the family is not calculated. Among roots, carrots have been at the tail end for yield and are only recommended in very special cases, for horses; mangels have not done as well as swedes and should only be grown on the deeper, naturally drained soils of the district; swede turnips have shown decided superiority over the other classes of roots. A glance at the following table will show the comparative yields per acre of raw material also of dry matter of roots at Cap Rouge for a period of thirteen years:—

COMPARATIVE YIELDS OF SWEDE TURNIPS, MANGELS, AND CARROTS AT CAP ROUGE

Crop	Number of years tested	Number of tests	Raw material per acre	Dry matter		
				Number of analyses	Percentage	Yield per acre
			lb.			lb.
Swede turnip	13	237	38,613	57	12·20	4,711
Mangels	13	158	26,164	56	13·43	3,514
Carrots	13	99	24,975	26	11·62	2,902

Among the interesting projects there are experiments with timothy, red clover, alfalfa, mixtures of grain to be used as annual hay crops, when meadows fail, and of these the mixture of peas and oats was found to be the best.

CORN

VARIETY TESTS FOR ENSILAGE PURPOSES

Fifty-six varieties and strains of corn have been tested for silage production during fourteen years. After a few seasons it was found out that, for central Quebec, the early maturing varieties and small ones did not give enough tonnage to bring up to a profitable point the number of pounds of digestible nutrients per acre, and the following were dropped: Canada Yellow, Early Malcolm, Essex Dent, Free Press, Gehu, Howie, King Philipp, Quebec Yellow, Twitchell's Pride, Wisconsin No. 25, Yellow Flint. It is a question if any of these will be profitable anywhere for ensilage purposes, as when they are the only varieties of corn which can be grown in a district, it is better to use either sunflowers or a mixture of oats and peas, or of oats, peas and vetches.

The question is to produce the largest quantity of digestible nutrients per acre, rather than tonnage alone. There are a few controversial opinions about corn. Some contend that a variety which produces ears in the dough or early glazed stage each year yields more dry matter per acre than later and larger varieties, while some others maintain the opposite view. This is why dents are compared with flints and analysis is made of a composite sample of each variety tested each year.

The following table gives information with regard to the fourteen varieties which were tested together during a period of five years:—

VARIETY TESTS OF CORN FOR SILAGE AT CAP ROUGE—FIVE YEARS

Variety	Class	Yield of corn per acre, just before ensiling						Per cent dry matter*	Dry matter per acre
		1923	1924	1925	1926	1927	Average		
		lb.	lb.	lb.	lb.	lb.	lb.		
Longfellow	Flint	36,872	44,784	36,459	33,565	50,570	40,450	16·00	6,472
North Dakota	Flint	34,404	39,034	36,297	32,367	43,977	37,216	16·39	6,100
Eureka	Dent	23,861	49,092	40,427	37,629	54,819	41,166	14·59	6,006
Wisconsin No. 7	Dent	24,279	46,211	38,082	29,567	48,607	37,349	16·05	5,995
Compton's Early	Flint	34,229	41,540	36,785	22,084	48,801	36,688	15·88	5,826
North West. Dent	Dent	16,412	39,676	32,182	29,760	44,188	32,444	17·70	5,743
90 days White Dent	Dent	22,046	39,217	33,566	33,410	42,642	34,176	16·69	5,704
Golden Glow	Dent	28,459	39,881	34,829	23,907	43,381	34,091	16·38	5,584
Bailey	Dent	19,452	40,985	35,380	23,058	44,924	32,760	16·92	5,543
Leaming	Dent	20,749	42,798	39,238	31,334	42,481	35,320	15·67	5,535
Yellow Dent	Dent	25,136	42,028	35,334	21,280	44,867	33,729	16·12	5,437
Cold Resist Corn	Dent	22,053	33,500	35,347	24,050	43,035	31,597	16·37	5,172
White Cap Y. Dent	Dent	20,101	39,382	32,124	24,786	39,908	31,260	16·39	5,124
Stowell's Evergreen	Sweet	19,263	37,257	30,169	29,155	45,527	32,274	15·35	4,954

*Figures of per cent dry matter are available from 1924 to 1927 inclusively.

It will be remarked that the flint varieties are at the top, Longfellow being the first with 466 and 477 more pounds of dry matter per acre than Eureka and Wisconsin No. 7, the most productive varieties among dents for this period.

The following varieties are the only ones which were tested for eleven years:—

VARIETY TESTS OF CORN FOR SILAGE AT CAP ROUGE—ELEVEN YEARS

Variety	Class	Yield of corn per acre, just before ensiling												Per cent dry matter	Dry matter per acre
		1915	1917	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average		
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.		
Wisconsin No. 7	Dent	18,750	33,896	24,900	26,721	55,452	37,857	24,279	46,211	38,082	29,567	48,607	34,938	17·61	6,153
Longfellow	Flint	14,150	20,654	23,325	28,813	50,205	36,579	36,872	44,784	36,459	33,565	50,570	34,180	17·36	5,934
Bailey	Dent	18,300	37,521	26,625	33,382	52,301	35,168	19,452	40,985	35,380	23,058	44,924	33,372	17·68	5,900
Leaming	"	15,250	30,688	21,975	26,130	70,553	33,762	20,749	42,798	39,238	31,334	42,481	34,087	17·04	5,808
North Dakota	Flint	15,750	21,860	25,875	22,322	49,944	33,845	34,404	39,034	36,297	32,367	43,977	32,334	17·77	5,746
White Cap Yellow Dent	Dent	15,300	26,035	21,750	24,436	62,277	36,377	20,101	39,382	32,124	24,786	39,908	31,134	17,77	5,533
Compton's Early	Flint	14,750	22,297	18,075	20,605	50,070	36,612	34,229	41,540	36,785	22,084	48,801	31,440	16·90	5,313

The percentage of dry matter is an average of five years, figures being available only for 1922 and 1924 to 1927 inclusively.

These tables show that the different varieties do not hold the same position for yield of green corn and of dry matter per acre and this is a very important point indeed. A few more years will no doubt bring interesting information, especially if feeding trials show a difference of digestibility in the dry matter between the flints and the dents.

Pending this, it is safer to grow Longfellow in Central Quebec, especially in the northern part, and if a dent variety is to be tried, Wisconsin No. 7 would be a good one.

CORN—VARIETY TESTS FOR THE PRODUCTION OF SEED

An experiment was started to find if corn could profitably be grown for grain in Central Quebec, when, after testing varieties of corn for silage purposes for eight years, it was found out that some of them, though not producing enough bulk, matured grain practically each season.

Since 1922, thirteen varieties or strains were tested yielding an average of 33 bushels of grain per acre, for the whole thing; this means, that in choosing a good variety, the yield may be increased up to 40 bushels or over of shelled corn per acre and, consequently, it may pay to grow corn, in this district, for live stock feeding.

The following table gives information with regard to four varieties tried together during six years:—

VARIETY TESTS OF CORN FOR GRAIN PRODUCTION, 1922 TO 1927

Variety or strain	Yield of grain per acre						
	1922	1923	1924	1925	1926	1927	Average
	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Twitchell's Pride—Fredericton.	3,417	1,452	1,427	1,498	164	2,963	1,820
Quebec 28	2,452	1,010	1,698	1,682	126	3,774	1,790
Twitchell's Pride, C. R.	3,311	1,379	1,561	1,608	208	2,607	1,779
Quebec Yellow	3,004	1,210	1,844	1,023	115	2,695	1,648

Although it may be too early to draw a conclusion in regard to the best variety to grow, it is certain that dent varieties did not produce enough grain to be profitable, while, among flints, Twitchell's Pride and Quebec 28 are the best yielders at this Station, giving around 32 bushels of grain per acre, with a bad season in 1926. Howe's Alberta Flint proved to be the earliest, producing good grain each year, and may be tried where the season is shorter than here. In any case, it is well for farmers to start in a very small way to see if the particular conditions of soil and climate are favourable.

CORN—ACCLIMATIZATION EXPERIMENTS

During the spring of 1923, the Wisconsin Station kindly sent us their cold-resistant Golden Glow corn which had been obtained by germinating in an ice box. This corn is supposed to give a good crop if planted from ten days to two weeks before ordinary corn; it would no doubt be a great advantage to dairymen of central Quebec if they could plant corn for silage two or three weeks earlier than they now do, so that larger and more productive varieties might be used. This cold-resistant corn was sown during four years alongside seed gathered at Cap Rouge, and details are given in the accompanying table:—

Year	Cold resistant corn										Home grown corn									
	First seeding			Second seeding			Third seeding			Average per cent of germination	First seeding			Second seeding			Third seeding			Average per cent of germination
	Date of seeding	Date of germination	Per cent of germination	Date of seeding	Date of germination	Per cent of germination	Date of seeding	Date of germination	Per cent of germination		Date of seeding	Date of germination	Per cent of germination	Date of seeding	Date of germination	Per cent of germination	Date of seeding	Date of germination	Per cent of germination	
1923.....	May 2	May 16	16	May 12	May 23	75	May 19	June 7	78	73	May 2	May 16	94	May 12	May 23	100	May 19	June 7	99	98
1924.....	" 3	" 27	67	" 17	June 7	100	June 4	" 14	100	89	" 3	" 29	83	" 17	June 7	67	June 4	" 14	100	83
1926.....	" 5	" 30	69	" 12	" 1	62	May 20	" 3	69	67	" 5	" 31	81	" 12	" 2	87	May 20	" 4	56	75
1927.....	April 26	" 29	19	" 3	" 1	19	" 10	" 3	69	36	April 26	" 30	56	" 3	" 3	44	" 10	" 4	75	58
Average	May 1	May 25	55	May 11	May 31	64	May 21	June 7	79	66	May 1	May 27	78	May 11	June 1	74	May 21	June 7	82	78

The results for four seasons have not been very encouraging as the average percentages of germination were only 55, 64, and 79 for the first, the second and the third seedings respectively of cold resistant corn compared to 78, 74, and 82 for corn grown at this Station. The averages of these seedings being 66 for the former and 78 for the latter. This experiment, however, will be continued before definite conclusions are drawn.

CORN—BREEDING

According to careful records kept at Cap Rouge it was found that the cost of seed required to produce an acre of silage corn only represents 3 per cent of the total costs. If poor seed is used, a certain proportion of the 97 per cent of all other costs is worthless or lost, and as resowing is out of the question in this district, it is clear that good seed must be produced. Merchants *often* have good seed corn for sale, but the farmer who requires corn for silage for his cattle every year must *always* get good seed, and the best way to reach this object is no doubt for him to grow it.

Since 1917, inclusive, Longfellow corn, which is one of the best yielding varieties for silage, has been selected by the ear-to-row method, and from six strains which at first showed superiority, there are now only two left. From 1924 to 1926, inclusively, these two highest yielding strains were inbred, that is, each ear was enclosed in a paper bag, so that it could not receive pollen from any other plant, and was fertilized by hand, so as to stabilize growth habit. This year, 1927, these two strains have been crossed to regain hybrid vigor, and seed will be sown alongside commercial seed to compare as to yield of grain also of silage. In the meantime, farmers who wish to select corn can do so by the well known ear-to-row method.

SUNFLOWERS

VARIETY TESTS FOR YIELD AND PURITY

Where corn can be grown successfully, sunflowers are not as desirable for ensilage purposes, but there are districts where corn will not yield enough, or in good districts there are pieces of land where sunflowers will do better. This is why the present project was started in 1923. Since the beginning ten varieties or strains were tested, and the following table gives details about those which were tried during four years together:—

VARIETY AND STRAIN TEST OF SUNFLOWERS AT CAP ROUGE 1923-1926

Variety or strain	Source	Average		Yield of green material per acre—dry matter						
		Height	Per cent single stems	1923	1924	1925	1926	Average	Per cent*	Pounds per acre
		in.		lb.	lb.	lb.	lb.	lb.		lb.
Giant Russian	Disco	86	88	27,068	49,166	39,769	24,339	35,085	19·30	6,771
Mammoth Russian	K. McDonald	91	89	28,713	41,785	37,364	31,403	34,816	16·44	5,724
Ottawa 76	C. E. F.	70	93	17,187	34,148	26,418	17,259	23,753	14·86	3,530
Mixed Mennonite	Rosthern	58	79	13,617	27,703	25,290	13,489	20,025	13·68	2,739

*Average analyses of three years 1924 to 1926 inclusively.

The above table shows that the tonnage of the two strains of Russian is about the same; but the Giant Russian is at the head for dry matter, which is important, with a per cent of 2·86 higher than the other strain, at the same stage of maturity at harvest, say 75 per cent of the head in blossom when harvested. For Central Quebec these two strains of Russian are decidedly superior to other varieties or strains. Ottawa 76 and Mixed Mennonite are earlier but as they are low producers, they should not be used for silage purposes.

FIELD CARROTS

VARIETY TESTS FOR YIELD AND PURITY

Experiments at Cap Rouge have shown that field carrots yield less dry matter per acre than mangels or swede turnips, so that they are not recommended except where required for horses, which seem to like them better than other roots. Thirty-two varieties and strains have been tested, since 1911, of different types—long, intermediate, short; and of various colours, white, yellow and orange.

The following table shows the yields from three main types of carrots tested during thirteen years:—

COMPARATIVE YIELD OF DIFFERENT TYPES OF CARROTS AT CAP ROUGE

Type	Number of years tested	Number of varieties and strains tested	Number of plots grown	Raw material per acre	Percentage of dry matter	Dry matter per acre
				lb.		lb.
Long	13	6	32	25,676	11·49	2,950
Intermediate	13	19	50	23,817	10·83	2,579
Short	13	5	24	23,360	11·18	2,612

These figures show that, contrarily to what it was expected on the rather shallow soils on which the tests were conducted, the long type outyielded the intermediate and short ones. The high yield made by the long types has been brought about, no doubt, through the superior yielding ability of the White Belgian variety. Hereafter, this variety is compared with two others of the same type but of different colour:—

COMPARATIVE YIELD OF DIFFERENT VARIETIES OR STRAINS OF LONG CARROTS AT CAP ROUGE

Variety or strain	Raw material per acre	Percentage of dry matter per acre	Dry matter per acre	Raw material per acre	Percentage of dry matter	Dry matter per acre
	lb.		lb.	lb.		lb.
White Belgian	31,036	11·34	3,519	31,439	11·34	3,565
Long Red Surrey	18,108	12·30	2,227	.....	.....	.....
Yellow Belgian	.....	.....	.....	26,005	11·62	3,022

Then if it be thought that field carrots should be grown in Central Quebec the White Belgian will be a good variety. However, a serious lack of uniformity in seed secured may be a cause of disappointment. Tests at Cap Rouge have shown this lack of purity in seed supplied by Canadian seedhouses, a strain often containing a mixture of four or five distinct types.

MANGELS

VARIETY TESTS FOR YIELDS AND PURITY

Mangels do not grow well in central Quebec except on very limited areas of naturally-drained, rich, alluvial soils, and data carefully gathered at Cap Rouge show that a ton of dry matter costs considerably more than in swede turnips. Nevertheless, sixty-five varieties and strains of different types, long, half long, intermediate, tankard, globe, of varying colours, orange, red, reddish-yellow, yellow, have been tested since 1911, and the following table gives details about each type for the ten years during which they were tried alongside of each other:—

VARIETY AND STRAIN TEST OF MANGELS—TEN YEARS

Variety	—	Yield of Mangels per acre											Per cent dry matter	Dry matter per acre
		1913	1914	1915	1920	1921	1922	1923	1925	1926	1927	Average		
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.		lb.
Yellow Intermediate...	Intermediate.....	4,890	24,550	475	40,679	47,522	21,062	25,450	45,571	17,820	37,626	26,559	15·56	4,133
Long Red Mammoth...	Long.....	3,434	18,000	250	44,917	40,432	24,613	28,297	42,922	18,057	34,426	25,535	15·45	3,945
Half Sugar White.....	Half Long (sugar)...	5,894	20,500	100	31,100	44,221	30,254	17,490	40,758	16,988	36,007	24,329	15·66	3,810
Golden Tankard.....	Tankard.....	2,700	12,550	500	29,731	40,332	21,692	24,010	36,153	15,965	34,019	21,765	14·67	3,193
Yellow Globe.....	Globe.....	4,140	7,700	450	35,235	42,126	20,274	21,198	43,238	19,073	38,010	22,644	13·12	2,971

The per cent of dry matter is an average of four-year analysis, 1922-25-26-27, these figures being the only ones that are available for mangels grown at Cap Rouge. There is a wide variation in the dry matter content of Yellow Globe and Yellow Intermediate, which shows that taking tonnage alone is rather misleading from the feeder's point of view.

The farmer who expects to grow mangels must keep in mind also that the tankard and globe types are essentially shallow-soil varieties; the intermediate, and half-long are suitable for average soils; while deep friable land allows the long mangel to reach its fullest development. A glance over the following table will give an idea of the heaviest producing varieties or strains of each type. For a few years a large amount of work was done to find out, by actual measurements and by careful examination, how true to name the different varieties were. This table gives the per cent of purity, also the yield of raw material and dry matter of thirty-eight varieties or strains grown together during three years.

VARIETIES AND STRAINS OF MANGELS TESTED DURING THREE YEARS 1925 to 1927

Variety or strain	Source	Type	1925				1926				1927				Average			
			Yield per acre			Per cent true-ness to type	Yield per acre			Per cent true-ness to type	Yield per acre			Per cent true-ness to type	Yield per acre			Per cent true-ness to type
			Raw material	Dry matter Per cent	Dry matter Total		Raw material	Dry matter Per cent	Dry matter Total		Raw material	Dry matter Per cent	Dry matter Total		Raw material	Dry matter Per cent	Dry matter Total	
			lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.	
Elvetham Mammoth	H. Hartman	Long Red	58,238	14·06	8,188	79·2	14,907	16·69	2,488	89·2	41,077	14·25	5,853	11·6	38,074	14·472	5,510	60·0
Stryno Barres	H. Hartmann	Inter. Orange	58,342	13·18	7,649	85·0	19,800	14·06	2,784	91·3	44,780	13·08	5,857	74·3	40,974	13·252	5,430	83·5
Yellow Inter	C. E. Farm	Inter. Orange	47,284	13·96	6,601	95·9	17,719	15·62	2,768	100·0	37,175	15·13	5,473	100·0	33,726	14·668	4,947	98·6
Mam. Long Red	Dupuy & Ferguson	Long Rose	45,103	14·64	6,603	92·2	18,000	14·55	2,619	96·5	36,139	14·45	5,222	100·0	33,081	14·555	4,815	96·2
Barres Sludstrup	Trifolium	Inter. Orange	45,129	12·50	5,641	94·4	21,698	13·96	3,029	93·1	43,040	12·59	5,419	100·0	36,622	12·823	4,696	97·5
Taaroje Barres	H. Hartmann	Inter. Orange	44,150	12·40	5,475	96·8	20,160	14·35	2,893	100·0	42,450	13·47	5,718	87·5	35,587	13,193	4,695	94·8
Yellow Inter	Steele Briggs	Inter. Orange	43,013	13·28	5,712	93·9	17,922	17·28	3,097	88·0	40,530	12·89	5,224	87·9	33,822	13·831	4,678	89·9
White Red Top Half Sugar	H. Hartmann	Half Long Rose	44,718	14·25	6,372	86·4	12,971	13·28	1,723	89·3	35,864	16·40	5,882	off type	31,184	14·940	4.659	58·6
Barres Stryno	Trifolium	Inter. Orange	43,436	12·79	5,555	90·0	19,958	13·28	2,650	89·3	42,235	13·47	5,689	83·5	35,210	13·153	4,631	87·6
Danish Sludstrup	McDonald	Inter. Orange	44,229	12·10	5,352	97·3	21,877	13·28	2,905	87·9	38,058	14·74	5,610	93·5	34,721	13·312	4,622	92·9
Fjerritslev Barres	H. Hartmann	Inter. Orange	47,600	11·13	5,298	97·8	16,740	13·51	2,272	86·0	44,503	14·06	6,257	76·7	36,281	12·704	4,609	86·8
Barres Oval	Gen. Swedish	Inter. Orange	41,726	13·37	5,579	94·3	18,848	15·52	2,925	97·6	38,333	13·67	5,240	100·0	32,969	13,895	4,581	97·3
White Green Top Half Sugar	H. Hartmann	Half Long White	36,592	14·64	5,357	44·7	16,988	15·42	2,620	88·5	36,007	15·62	5,624	off type	29,862	15·183	4,534	44·4
Barres Half Long	Gen. Swedish	Inter. Orange	42,783	13·08	5,596	81·8	19,476	16·01	3,118	90·9	35,198	13·76	4,843	94·8	32,485	13·911	4,519	89·2
Giant White Feeding Sugar	Steele Briggs	Half Long White	47,724	13·47	6,428	56·7	18,066	13·47	2,433	96·4	34,519	13·47	4,650	80·8	33,436	13·471	4,504	78·0
Eckendorfer Yellow	H. Hartmann	Tankard Yellow	50,474	12·59	6,355	97·6	21,490	12·30	2,643	78·4	34,107	13·08	4,461	97·3	35,357	12·688	4,486	91·1
Rosted Barres	H. Hartmann	Inter. Orange	49,823	11·23	5,595	90·2	18,586	13·67	2,541	88·7	41,715	12·50	5,214	71·6	36,708	12·123	4,450	83·5
Barres Sludstrup	H. Hartmann	Inter. Orange	38,503	12·89	4,963	85·3	20,565	13·60	2,797	98·2	41,890	13·28	5,563	93·2	33,653	13·196	4,441	92·2
Half Sugar Rose	Dupuy & Ferguson	Half Long Rose	40,667	13·47	5,747	85·0	15,840	17·18	2,721	95·6	35,371	13·57	4,800	100·0	27,836	15·889	4,423	93·5
Mam. Long Red	Sutton	Long Red	38,794	13·08	5,074	91·5	20,490	15·03	3,080	90·6	35,761	14·06	5,028	93·6	31,682	13·869	4,394	91·9
Yellow Globe	Sutton	Globe Yellow	48,380	12·89	6,223	87·5	21,296	11·91	2,536	75·0	39,411	11·13	4,386	100·0	36,362	12·051	4,382	87·5
Giant White Sugar	Moore	Half Long White	48,280	9·37	4,533	85·5	22,153	15·62	3,460	1·6	40,740	12·50	5,092	8·5	37,058	11·771	4,362	31·9
Eckendorfer Red	Gen. Swedish	Tankard Red	33,695	12·10	4,077	100·0	14,031	15·62	2,192	98·0	47,916	13·76	6,593	100·0	31,881	13·657	4,354	99·3
Svalof Original Alpha	Gen. Swedish	Half Long White	40,217	11·91	4,790	10·9	15,899	16·21	2,577	79·5	37,860	14·84	5,618	91·2	31,325	13·816	4,328	60·5
Golden Tankard	Dupuy & Ferguson	Tankard Orange	43,471	11·43	4,969	8·8	17,460	14·45	2,523	33·3	39,226	13·86	5,437	90·4	33,386	12·910	4,310	44·2
Giant Half Sugar	K McDonald	Half Long Rose	43,388	13·76	5,970	79·4	18,134	14·55	2,638	86·2	29,751	14·35	4,269	94·0	27,168	15·798	4,292	86·5
Svalof Original Rubra	Gen. Swedish	Half Long Rose	37,567	15·03	5,661	35·4	14,133	14·16	2,001	35·1	32,444	16·01	5,194	95·3	28,048	15·277	4,285	55·3
Yellow Eckendorfer	Gen. Swedish	Tankard Yellow	47,382	10·54	4,994	96·6	21,944	15·52	3,406	97·3	31,732	13·86	4,398	98·4	33,686	12·664	4,266	97·4
Mam. Long Red	Steele Briggs	Long Red	44,868	13·18	5,914	84·5	15,682	14·45	2,266	92·6	31,378	14·64	4,594	92·3	30,643	13·896	4,258	89·8
Yellow Globe	Dupuy & Ferguson	Globe Yellow	40,473	11·13	4,505	81·0	20,260	16·01	3,244	82·2	34,348	14·55	4,998	100·0	31,694	13·406	4,249	87·7
Yellow Vauriac	Vilmorin	Inter. Orange	42,497	12·30	5,227	66·7	20,280	12·10	2,454	82·1	39,973	12·59	5,033	89·9	34,250	12·374	4,238	79·6
Long Yellow	Dupuy & Ferguson	Long Yellow	40,452	14·06	5,688	87·6	12,052	15·82	1,907	93·5	33,212	15·33	5,091	100·0	26,665	15·860	4,229	93·7
Danish Sludstrup	Dupuy & Ferguson	Inter. Orange	39,071	12·69	4,958	94·7	21,024	11·91	2,504	96·1	39,555	12·30	4,865	93·1	33,217	12·370	4,109	94·6
Eckendorfer Red	H. Hartmann	Tankard Red	39,257	11·91	4,675	100·0	19,043	15·23	2,900	98·0	30,069	14·06	4,228	100·0	29,456	13·356	3,934	99·3
Golden Tankard	Sutton	Tankard Orange	30,918	14·45	4,468	83·9	18·818	10·80	2,774	20·9	35,341	12·89	4,555	86·1	28,359	13·865	3,932	63·6
Royal Giant Sugar	Steele Briggs	Half Long Rose	34,000	12·40	4,216	81·2	17,761	16·79	2,982	92·9	28,124	15·03	4,227	44·3	23,957	15·895	3,808	72·8
Giant Yellow Globe	Steele Briggs	Globe Yellow	42,183	11·03	4,653	83·3	15,662	11·13	1,743	90·3	35,484	10·54	4,740	100·0	31,110	11·932	3,712	91·2
Golden Tankard	Wm. Ewing	Tankard Orange	34,459	12·01	4,139	22·5	11,616	15·42	1,791	72·2	32,234	14·25	4,593	88·1	26,103	13·439	3,508	60·9

An examination of the foregoing table emphasizes the wide range that exists in both the yielding capacity and purity of type in the different lots of seed for sale. In this respect there has been a considerable improvement in the past few years but there is still room for a great deal more to be done along the same line.

MANGELS—SEED TREATMENT TO INCREASE GERMINATION

What is called mangel seed is really a hard envelope containing one or more true seeds. Before germination takes place, this hard envelope must break, and this is why germination is so bad, in dry seasons especially, on ridged land, and sometimes farmers have to prepare for swedes or turnips land on which mangel seed failed to germinate.

In 1916, an experiment was undertaken, during the early part of the winter season, in the greenhouse, where nine different methods were compared with a check to promote germination of mangel seed. This experiment was conducted in flats, such as are ordinarily used by gardeners to start plants in the spring, with three tests each year, during five seasons, so that figures give results for fifteen different tests.

The methods used were as follows:—

1. Soaking seed envelope in water, kept at 60° F. for fifteen hours just before sowing.

2. Soaking seed envelope in a mixture of half water and half liquid manure from cattle, kept at 60° F. for fifteen hours just before sowing.

3. Packing the soil, just after sowing, about as would be done with a roller in ordinary farm practice.

4. Packing the soil as in method 3, and about one-tenth inch water at 60° F. applied every day.

5. Watering as in method 4, but soil not packed.

6. Applying a 2-10-3 fertilizer at an approximate rate of 1,000 pounds per acre and mixing with the soil as harrows would probably mix it.

7. Applying the same quantity of fertilizer as in 6 in the drills or depressions, with the seed envelopes.

8. Applying common salt at an approximate rate of 300 pounds per acre and mixing with the soil.

9. Applying the same quantity of salt as in method 8, in the drills or depressions with the seed envelopes.

10. Check—Sowing seed as done in ordinary farm practice.

COMPARISON OF SOME METHODS OF HELPING THE GERMINATION OF MANGEL SEED

Method	Number of plants which grew for each hundred seed envelopes sown																				Average for 5 years or 15 tests	Germination of untreated seed at 100
	1916-17				1917-18				1918-19				1919-20				1920-21					
	First test	Second test	Third test	Average for 1916-17	First test	Second test	Third test	Average for 1917-18	First test	Second test	Third test	Average for 1918-19	First test	Second test	Third test	Average for 1919-20	First test	Second test	Third test	Average for 1920-21		
Soaking seed envelope in water	146	148	140	145	154	148	210	171	124	150	164	146	192	164	192	183	182	170	200	184	165	105
Soaking seed envelope in water and liquid manure	162	162	132	152	144	136	202	161	120	144	160	141	180	160	196	179	178	164	194	179	162	103
Check	152	140	126	139	142	156	210	169	126	112	168	135	174	160	166	167	172	168	194	178	157	100
Packing soil	156	142	120	139	154	124	188	155	122	154	164	147	176	156	170	167	176	170	174	173	156	99
Packing soil and watering	168	128	140	145	138	162	208	169	114	120	150	128	182	158	188	176	150	154	160	155	154	98
Watering unpacked soil	148	140	136	141	120	160	196	159	118	110	150	126	172	160	182	171	174	162	164	167	153	97
Applying fertilisers broadcast	154	114	110	126	112	120	150	127	112	136	134	127	164	130	146	147	148	120	154	141	133	85
Applying fertilisers in seed rows	72	42	12	42	54	80	145	93	104	92	92	96	120	118	118	119	124	112	118	118	93	59
Applying common salt broadcast	124	90	68	94	44	46	54	48	102	60	60	74	88	78	90	85	92	84	98	91	78	50
Applying common salt in seed rows	30	6	6	14	4	12	30	15	48	6	24	26	40	28	46	38	24	22	42	29	24	15

In fact, three different methods were used, with changes in more or less important details, through the seed, the soil, and foreign substances added to the soil. The most efficient method which fortunately happens to be the easiest was to soak the seed envelope just before sowing. On the whole, this experiment would seem to show: 1st that the soil treatment or the addition of substances such as chemical fertilizers or salt have no beneficial effect on the quick germination of mangel seed. These foreign substances seemed to injure the seed just as it germinated, as is shown by the very small percentage of germination above ground when these substances were used in the rows with the seed envelopes; 2nd that the most efficient method, according to this experiment, is to soak the seed envelopes, just before sowing, for about 15 hours, in water kept around 60° F.

SUGAR BEETS

SUGAR BEETS—VARIETY TESTS FOR YIELD AND PURITY

The object of this experiment is to determine the productiveness, the purity, and the factory value of different varieties and strains of sugar beets. Though the soil, a rather dry sandy loam of average fertility and little depth, available for the trial plots of sugar beets at Cap Rouge is not suited to this class of roots, the results of fifteen years show that this crop could be made a paying one if factories were started in the district. Since 1911, fifty tests were made with twenty-two different varieties and, even in taking into consideration the failure of this crop in the two worst seasons of 1913 and 1915, the yield averaged 12,884 pounds of raw material per acre.

The same varieties or strains were not tried together long enough to make a good comparison, therefore, all yields obtained are given with the average yield of each year, in the following table:—

VARIETIES AND STRAINS OF SUGAR BEETS TESTED AT CAP ROUGE FROM 1911 TO 1927

Variety or strain	Yield per acre—Pounds														
	1911	1912	1913	1914	1915	1916	1918	1919	1920	1921	1922	1923	1925	1926	1927
French Very Rich	6,515	—	—	5,500	—	—	—	—	—	—	—	—	—	—	—
Klein Wanzleben	8,365	3,465	T. fail.	10,200	400	—	—	—	—	—	—	—	—	—	—
Vilmorin's Improved	7,594	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Vilmorin's Improved A	—	3,052	T. fail.	10,600	250	—	—	—	—	—	—	—	—	—	—
Vilmorin's Improved B	—	1,155	Y. fail.	10,500	250	—	—	—	—	—	15,903	—	15,937	—	—
German	—	—	—	—	—	22,800	—	—	—	—	—	—	—	—	—
Italian	—	—	—	—	—	20,800	—	—	—	—	—	—	—	—	—
Canadian	—	—	—	—	—	17,900	—	—	—	—	—	—	—	—	—
Russian	—	—	—	—	—	—	10,700	—	—	—	—	—	—	—	—
Wahanks	—	—	—	—	—	—	—	20,475	—	—	—	—	—	—	—
Waterloo	—	—	—	—	—	—	—	17,160	—	19,942	17,134	—	—	—	—
Chatham grown	—	—	—	—	—	—	—	17,745	26,585	21,237	21,102	10,008	—	—	—
British Columbia grown	—	—	—	—	—	—	—	19,110	18,400	21,240	17,389	—	—	—	—
Kitchener grown	—	—	—	—	—	—	—	—	16,900	—	—	8,600	—	—	—
Denmark	—	—	—	—	—	—	—	—	—	—	16,634	—	—	—	—
Hunning and Harving	—	—	—	—	—	—	—	—	—	—	—	8,226	16,560	—	—
Sluice Bros	—	—	—	—	—	—	—	—	—	—	—	10,907	—	—	—
Rabbethge and Gusecke	—	—	—	—	—	—	—	—	—	—	—	—	20,847	—	—
Home Grown	—	—	—	—	—	—	—	—	—	—	—	—	17,869	—	19,022
Dippe	—	—	—	—	—	—	—	—	—	—	—	—	—	8,858	19,313
Horning	—	—	—	—	—	—	—	—	—	—	—	—	—	9,192	20,701
Schreiber & Sons	—	—	—	—	—	—	—	—	—	—	—	—	—	8,588	23,055
Average yields	7,491	2,557	—	9,200	300	20,500	10,700	18,622	20,628	20,806	17,632	9 435	17,803	8,879	20,523

A few roots of each variety are sent every year to the Dominion Chemist for analysis. The following table gives the average yield of roots per acre, the per cent of sugar in the juice, and the coefficient of purity of the varieties tested and analysed since 1920:—

AVERAGE YIELDS OF SUGAR BEETS, 1920 TO 1927

Year	Number of varieties grown	Yield of roots per acre	Percentage of sugar in juice	Coefficient of purity
		lb.		
1920	3	20,628	16·69	87·05
1921	3	20,806	17·04	86·27
1922	5	17,632	21·27	88·79
1923	4	9,435	18·61	84·16
1925	4	17,803	20·17	89·67
1926	3	8,879	19·11	86·11
1927	4	20,523	22·80	90·04
Average		16,529	19·38	87·41

The above table shows, besides an average yield of 16,529 pounds of raw material per acre, a per cent of sugar in juice of 19·38, and a coefficient of purity of 87·41. These figures are decidedly high and show the possibilities of sugar beets as a cash crop in districts where a heavier and deeper soil than that of Cap Rouge would certainly make the growing profitable.

TURNIPS

SWEDE TURNIPS—VARIETY TESTS FOR YIELD AND PURITY

Where there is a herd of cattle large enough to warrant the erection of a silo, and when manual labour is scarce and costly, it will pay better to grow corn for silage than swede turnips, but for dairymen who cannot grow ensilage crops profitably and who sell products at a figure high enough to warrant the great cost of growing digestible nutrients in the form of roots, or who can have manual labour at a very low figure, swede turnips will give better results on the sandy loam of central Quebec, than either mangels or field carrots. At Cap Rouge for an average of thirteen years, in 237 tests, they produced 38,613 pounds of raw material and 4,711 pounds of dry matter per acre. The same seasons, at the same place, mangels averaged 26,164 pounds of raw material and 3,514 pounds of dry matter per acre, in 158 tests; while field carrots produced only 24,975 and 2,905 pounds per acre in 99 tests.

Since 1911, over one hundred varieties and strains have been tested at this Station and details regarding the ones which were grown together the same year are given in the following table:—

VARIETY AND STRAIN TEST OF SWEDE TURNIPS, SEVEN YEARS

Variety or strain	Type	Yield of swedes per acre								Per cent dry matter	Dry matter per acre
		1917	1920	1921	1924	1925	1926	1927	Average		
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.		lb.
Bangholm	Purple top oval	27,000	35,096	58,654	38,845	44,752	27,535	42,807	39,241	13·13	5,152
Perfection	Purple top round	34,100	57,025	35,738	33,315	58,638	30,056	33,210	40,297	12·73	5,130
Good Luck	Purple top oval	27,950	43,344	41,424	43,255	55,570	28,314	49,294	41,307	12·08	4,990
Invicta	Bronze top round	35,600	42,028	36,600	47,843	46,976	23,174	42,967	39,305	12·31	4,838
Sutton's Champion	Purple top round	24,600	43,016	39,979	34,392	46,595	25,524	40,040	36,307	12·94	4,698
Elephant or Monarch or Jumbo	Purple top oval	27,350	45,881	34,527	29,371	42,053	28,283	38,776	35,177	12·20	4,292
Magnum Bonum	Purple top oval	37,800	40,999	38,069	29,247	47,484	23,901	43,997	37,357	11·47	4,285
Mammoth Clyde	Purple top round	31,900	32,428	34,425	27,026	43,803	23,668	43,211	33,780	11·52	3,891

The percentages of dry matter are an average of the last four years, the only figures that are available regarding analysis of roots grown at Cap Rouge.

The above table shows that it is deceptive to judge a variety by tonnage instead of dry matter yield per acre. Good luck, which produced most raw material per acre for an average of seven years, falls to third position for dry matter, leaving its place to Bangholm and Perfection, which are, with Good Luck, the three best varieties of swedes for central Quebec. All strains of a variety did not produce the same amount of dry matter per acre; figures regarding this are given in the following table, besides other details as name, source, type they should be, etc., of each variety or strain tested since 1924:—

VARIETIES AND STRAINS OF SWEDE TURNIPS TESTED DURING FOUR YEARS—1924 TO 1927

Variety or strain	Source	Type	1924				1925				1926				1927				Average			
			Yield per acre			Per cent true-ness to type	Yield per acre			Per cent true-ness to type	Yield per acre			Per cent true-ness to type	Yield per acre			Per cent true-ness to type	Yield per acre			cent true-ness to type
			Raw material	Dry matter Per cent	Dry matter Total		Raw material	Dry matter Per cent	Dry matter Total		Raw material	Dry matter Per cent	Dry matter Total		Raw material	Dry matter Per cent	Dry matter Total		Raw material	Dry matter Per cent	Dry matter Total	
			lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.	
Bangholm	Trifolium	Purple Top Oval	44,176	14·70	6,494	7·7	46,800	12·20	5,710	59·1	32,878	12·69	4,172	14·3	45,477	15·03	6,835	4·4	42,333	13·708	5,803	21·4
Good Luck	Steele Briggs	Purple Top Oval	41,983	11·77	4,941	83·3	56,038	13·57	7,604	88·0	26,773	11·03	2,953	77·0	47,884	14·45	6,919	75·4	43,169	12·982	5,604	80·9
Bangholm	Hjalmar Harthmann.	Purple Top Oval	39,039	12·59	4,915	84·2	52,077	11·43	5,952	96·3	33,936	12·01	4,079	65·4	52,795	13·37	7,059	13·0	44,469	12·370	5,501	64·7
Hall's Westbury	Dupuy & Ferguson	Purple Top Globe	45,012	12·39	5,577	57·9	50,477	12·89	6,506	80·0	25,696	11·71	3,009	87·7	38,611	14·64	5,653	Off type	39,949	12·982	5,186	56·4
Good Luck	Cap Rouge	Purple Top Oval	44,528	10·81	4,813	73·7	55,103	10·83	5,968	94·0	29,856	11·52	3,439	90·0	50,704	12·69	6,434	78·5	45,048	11·461	5,163	84·0
Ditmars	McNutt	Bronze Top Globe	49,247	10·10	4,974	52·6	45,648	12·59	5,747	14·3	19,855	10·15	2,015	24·0	54,261	13·76	7,466	85·2	42,253	11·952	5,050	44·0
Invicta	Wm. Rennie	Bronze Top Globe	47,843	13·40	6,411	62·5	46,976	12·30	5,778	68·7	23,174	11·23	2,602	7·8	42,957	12·30	5,285	Off type	40,240	12·473	5,019	34·7
New Universal	Dupuy & Ferguson	Purple Top Globe	32,041	13·32	4,268	57·9	51,660	13·18	6,809	23·5	25,326	11·43	2,895	34·9	47,265	12·10	5,719	Off type	39,073	12·592	4,920	29·1
Sutton's Champion	Dupuy & Ferguson	Purple Top Globe	32,774	13·24	4,339	15·0	46,800	13·57	6,351	15·0	26,136	13·08	3,419	78·1	38,681	14·25	5,512	Off type	36,097	13·588	4,905	27·0
Perfection	Dupuy & Ferguson	Purple Top Globe	33,315	12·75	4,248	57·9	58·638	12·01	7,042	82·4	30,056	12·30	3,697	88·8	33,210	13·86	4,603	Off type	38,805	12·620	4,897	57·3
Favourite	Dupuy & Ferguson	Purple Top Oval	33,327	12·08	4,026	87·5	53,853	12·89	6,942	94·4	23,232	11·13	2,586	83·0	48,543	12·30	5,971	100·0	39,739	12·283	4,881	91·2
Bangholm	Wm. Ewing	Purple Top Oval	33,477	12·00	4,017	78·0	43,947	13·96	6,135	94·7	30,880	13·28	4,101	85·0	36,939	13·86	5,120	89·3	36,311	13·338	4,843	86·9
Improved Yellow	General Swedish	Green Top Globe	43,560	13·26	5,776	17·6	43,227	12·98	5,611	20·8	26,572	11·71	3,112	100·0	41,713	11·03	4,601	75·0	38,768	12·413	4,775	53·3
Selected Purple Top	Steele Briggs	Purple Top Globe	47,190	12·37	5,837	15·8	44,833	12·98	4,171	76·7	25,763	12·50	3,220	83·3	48,160	12·10	5,827	92·6	41,486	11·483	4,764	67·1
New Century	Wm. Rennie	Purple Top Globe	38,706	14·75	5,709	88·4	39,807	10·83	4,301	58·3	28,168	12·10	3,408	19·3	44,954	12·50	5,619	Off type	37,909	12·554	4,759	36·5
Elephant or Monarch	Dupuy & Ferguson	Purple Top Oval	36,124	12·20	4,407	95·0	45,302	12·50	5,663	87·5	36,795	11·52	4,239	98·0	36,420	12·50	4,552	84·2	38,660	12·196	4,715	91·8
Sutton's Champion	Wm. Ewing	Purple Top Globe	36,010	13·28	4,782	75·0	46,391	9·95	4,621	41·7	24,913	12·10	3,014	14·3	41,399	14·06	5,821	Off type	37,178	12·263	4,559	32·7
Hall's Westbury	Steele Briggs	Purple Top Globe	46,222	10·07	4,655	82·3	43,947	11·71	5,146	78·9	27,548	12·01	3,313	85·1	34,316	13·57	4,657	Off type	38,008	11·682	4,440	61·6
Bangholm	Dupuy & Ferguson	Purple Top Oval	40,195	12·03	4,835	81·8	46,772	11·23	5,252	86·7	21,851	12·10	2,644	94·2	32,888	14·25	4,686	87·0	35,427	12·290	4,354	87·4
Ne Plus Ultra	Dupuy & Ferguson	Bronze Top Globe	30,637	11·57	3,545	55·0	64,699	9·37	6,062	61·5	25,089	11·71	2,938	34·0	37,766	12·69	4,792	Off type	39,548	10·959	4,334	37·6
Early or Perfect Model	Dupuy & Ferguson	Purple Top Oval	31,446	10·35	3,255	58·3	53,081	10·44	5,542	18·9	29,276	10·35	3,030	7·4	52,969	10·15	5,376	Off type	41,693	10·316	4,301	21·1
Jumbo	Steele Briggs	Purple Top Oval	32,598	12·36	4,029	100·0	36,082	13·18	4,756	93·3	29,209	11·03	3,222	78·4	39,274	12·50	4,909	91·8	34,291	12·333	4,229	90·9
Shepherd's	Hjalmar Harthmann.	Green Top Globe	33,396	12·31	4,111	Off type	44,805	12·69	5,686	Off type	21,209	11·52	2,443	62·8	34,604	13·28	4,595	Off type	33,503	12·563	4,209	15·7
Kangaroo	Steele Briggs	Bronze Top Oval	31,847	12·32	3,924	84·2	42,592	12·69	5,405	78·6	24,316	11·13	2,703	93·3	36,869	12·79	4,715	93·2	33,903	12·349	4,187	88·1
Magnum Bonum		Purple Top Oval	29,247	11·16	3,264	.....	47,484	10·54	5,005	.....	23,901	11·27	2,694	.....	43,997	12·91	5,680	.....	35,157	11·508	4,161	.....
Derby	Wm. Rennie	Bronze Top Oval	34,969	10·65	3,724	6·5	48,167	11·62	5,597	35·3	23,094	11·32	2,614	62·5	37,531	12·50	4,691	Off type	35,940	11·534	4,156	26·1
Skirving's	K. McDonald	Purple Top Oval	31,533	12·36	3,897	100·0	40,419	13·57	5,485	81·2	24,394	12·20	2,976	88·3	33,109	12·69	4,201	100·0	32,364	12·792	4,140	92·4
Durham	Steele Briggs	Bronze Top Globe	32,082	12·40	3,978	12·5	38,720	11·62	4,499	23·1	22,651	11·71	2,652	6·8	41,922	12·59	5,278	Off type	33,844	12·120	4,102	10·6
Kangaroo	Dupuy & Ferguson	Bronze Top Oval	27,588	11·26	3,106	84·2	49,916	10·93	5,456	100·0	19,578	11·32	2,216	98·0	40,005	13·28	5,313	92·4	34,272	11·738	4,023	93·6
Mammoth Clyde	Wm. Ewing	Purple Top Globe	27,026	11·53	3,106	47·4	43,803	10·15	4,446	66·7	23,668	12·10	2,864	83·4	43,211	12·30	5,315	88·7	34,427	11·430	3,935	71·5
Hartley's Bronze Top	K. McDonald	Bronze Top Oval	28,975	12·60	3,651	41·2	37,452	12·20	4,569	81·2	20,328	12·40	2,521	94·0	32,513	13·47	4,379	95·3	29,817	12·677	3,780	77·9
Hazard's Improved	Wm. Rennie	Bronze Top Oval	36,860	12·94	4,770	57·9	30,395	11·62	3,532	77·8	22,408	11·52	2,581	78·3	37,556	10·93	4,106	100·0	31,807	11·780	3,747	78·5
Skirving's	Graham	Purple Top Oval	34,485	13·30	4,586	91·7	30,452	13·76	4,190	84·0	23,940	10·93	2,617	76·5	25,319	13·67	3,416	Off type	28,549	12·957	3,702	63·0

The preceding table indicates a lack of purity, practically for each variety, varying to a rather great extent from year to year for a given strain, also for different strains of a variety. The adaptation of type to soil may exert influence on the variation in type but in many cases the seed bought is all off type or a mixture of different types or colours. As there is a large amount of variation in yield of dry matter between different strains it is important to secure the right one from a good seedsman.

SWEDE TURNIPS—BREEDING OF PURE STRAINS

Good Luck is used for this work because it is one of the varieties which have shown, for a large number of years, decided superiority as a heavy yielder of dry matter per acre. As there are different types in Good Luck produced from commercial seed, it was important to find out if the ovoids would outyield the round globes, flat globes and tankards. Since 1924, roots of these from standard types were chosen each year to produce seed the next season. Swedes being very easily crossed, it was necessary to grow each strain under cotton when producing seed. A few ounces of seed of each type have been gathered this year and will be sown in 1928 alongside other varieties and strains in trial plots; this work will be continued during five years, at least, before definite conclusions can be drawn.

TURNIPS, FIELD—VARIETY TESTS FOR YIELD AND PURITY

Since 1917, fifteen varieties of field or fall turnips, as they are commonly called, have been tested and quite satisfactory yields were secured from this crop, although it did not produce as much dry matter as swede turnips and mangels. The fact that they mature early in the season and are poor keepers, on account of their soft and watery flesh, would seem to indicate the desirability for early feeding.

Variety tests have been hard to conduct, as commercial seed is generally badly mixed. Actual measurements and careful examination were used to determine the per cent of trueness to type which is indicated, besides other details, in the following table:—

VARIETIES AND STRAINS OF FALL TURNIPS, 1923-24

Variety	Source	Type	1923		1925		1926		1927		Average			
			Yield per acre	Per cent trueness to type	Yield per acre	Per cent trueness to type	Yield per acre	Per cent trueness to type	Yield per acre	Per cent trueness to type	Yield per acre			Per cent trueness to type
											Raw material	Dry matter		
												Per cent	Total	
			lb.		lb.		lb.		lb.		lb.		lb.	
Green Top Yellow Aberdeen	Wm. Ewing	Globe green top	30,671	11·0	34,990	8·5	19,678	84·4	34,239	Off type	29,869	9·95	2,972	26·0
Aberdeen Purple Top	Steele Briggs	Globe purple top	32,405	78·0	27,412	6·4	19,008	96·3	31,260	Off type	27,521	9·24	2,543	45·2
White Globe	Wm. Ewing	Globe white top	32,922	74·0	44,268	76·5	16,059	78·7	43,806	Off type	34,264	8·49	2,909	57·3
Pomeranian	Steele Briggs	Globe orange top	39,351	2·0	37,969	77·1	17,424	62·5	45,026	Off type	34,942	8·98	3,138	35·4
Early Sixweeks	Sutton	Flat white top	39,073	92·0	30,944	86·8	17,901	93·7	40,670	100·0	32,147	9·24	2,970	93·1
Greystone Devonshire	Steele Briggs	Globe purple top	48,932	16·0	42,884	63·2	23,522	54·5	45,577	Off type	40,229	9·89	3,979	33·4
Hardy Green Round	Sutton	Globe green top	27,920	73·0	33,105	83·7	17,527	Off type	35,373	Off type	28,481	9·27	2,640	39·2
Purple Top Aberdeen	Sutton	Globe purple top	29,787	15·0	28,233	2·9	19,008	85·5	39,090	4·9	29,029	10·31	2,993	27·1
Purple Top Mammoth or Imp. Gr	Steele Briggs	Globe purple top	49,409	19·0	40,933	50·0	20,885	78·2	42,621	Off type	38,462	8·07	3,104	36·8
Purple Top Mammoth	Sutton	Globe purple top	42,251	2·0	37,200	1·1	18,374	85·7	42,942	Off type	35,192	8·72	3,069	22·2
Red Paragon	Sutton	Oval red top	47,125	77·0	39,300	87·5	21,344	96·4	46,629	84·1	38,599	8·56	3,304	86·2

The per cent of dry matter is an average of the three last years' analyses, these figures being the only ones that are available for fall turnips grown at Cap Rouge.

The above table shows a serious lack of purity. Very often the seed secured is not at all what is desired, and sometimes results may be discouraging. This four-year test may not warrant saying which are the best varieties; however, for this period, Greystone, from Steele Briggs, which is at the leader both for raw material and dry matter, produced an average of 675 pounds more dry matter per acre than its nearest competitor, Red Paragon.

ALFALFA

VARIETY TESTS FOR HARDINESS, YIELD AND SUITABILITY

Since 1915, a selection of Grimm has been made for hardiness, being sown on unprotected spots, where the snow did not remain. Seed was gathered in 1916 and sown in 1917 in flats which were placed in hotbeds. In June, 600 plants were set out, leaving enough space between them so that they could easily be examined. Afterwards, seed was gathered from the best plants, from a hay production point of view, of those which were hardy enough to withstand the rigours of winter.

Seed of this selection has been sown this spring to compare, in 1928 and later, with three so-called varieties tested since 1924 on triplicate one-hundredth acre plots protected by a one-foot border. The following table gives hay yields, based on a definite moisture percentage added to the absolute dry weight, for two varieties:—

ALFALFA VARIETY TESTS

Variety	Source	Sown 1924				Sown 1926	Average of three crops	
		Hay (15 p.c. moisture) per acre			Average yield of digestible nutrients of two years, pounds per acre	Hay (15 p.c. moisture), per acre harvested 1927	Hay (15 p.c. moisture), per acre	Digestible nutrients per acre
		Harvested 1925 (two cuttings)	Harvested 1926 (one cutting)	Average of two years				
		lb.	lb.	lb.	lb.	lb.	lb.	lb.
Peel Variegated	Peel County	5,067	3,994	4,530	2,224	5,737	4,933	2,422
Grimm	A. B. Lyman	3,508	3,986	3,747	1,840	5,758	4,417	2,169

In addition to the above varieties, Medicago Falcata and Variegated from Ewing were sown. Medicago Falcata had a very poor germination every year, whilst seed from Ewing was sown only in 1926, and was first in 1927 with 6,333 pounds of hay.

Only one cutting was done in 1926 on account of weeds. From the above table it seems that Variegated produced more than Grimm but it is too early yet to come to conclusions. In the meantime, farmers should understand that, from the standpoint of hardiness, it is useless to sow alfalfa seed unless it has been produced in their district or in one where the conditions of temperature and rainfall are rather similar.

RED CLOVER

VARIETY TESTS FOR YIELD AND GENERAL SUITABILITY

The object of the experiment is to ascertain the comparative value of various strains and varieties of red clover. Since 1924, fourteen lots were tested in triplicate one-hundredth acre plots, with oats as a cover crop. The plots were made one foot larger each way than required; this border foot was removed previous to cutting for yield record. In this way the influence of the cultivated paths was practically eliminated.

Representative samples of each plot were taken at the time of harvesting and sent to Ottawa, where the absolute dry matter was determined. The hay reported in the following table contains 15 per cent moisture and is figured from the absolute dry matter in all cases, so that each variety is comparable in as far as moisture content is concerned.

TEST OF RED CLOVER FROM DIFFERENT SOURCES

Variety or strain	Source	Season	1925			1926			1927			Average for three years			
			Date in bloom	Height at harvest	Hay (15 p.c. moisture), per acre	Date in bloom	Height at harvest	Hay (15 p.c. moisture), per acre	Date in bloom	Height at harvest	Hay (15 p.c. moisture), per acre	Date in bloom	Height at harvest	Hay (15 p.c. moisture), per acre	Digestible nutrients per acre
				ins.	lb.		ins.	lb.		ins.	lb.		ins.	lb.	lb.
Late Swedish	Sweden	Late	July 15	25·0	5,474	July 27	31·0	8,212	July 29	37·3	8,567	July 24	31·0	7,417	3,812
Dauphine	South Eastern France	Early	" 2	28·3	6,019	" 4	20·7	5,635	" 7	26·7	9,820	" 4	25·2	7,158	3,679
Medium Late Swedish	Sweden	Late	" 14	25·0	4,877	" 28	31·0	6,354	" 29	36·0	9,088	" 24	30·7	6,773	3,481
St Clet	St Clet, Quebec	Early	June 27	28·6	6,195	" 3	21·0	5,201	" 6	24·7	8,815	" 2	24·8	6,737	3,463
Chateauguay	Chateauguay, Quebec	Early	" 27	27·6	6,977	" 3	22·0	5,190	" 6	28·0	7,991	" 2	25·8	6,719	3,454
Ottawa	C.E.F. Ottawa	Early	" 27	28·3	6,166	" 4	21·7	5,201	" 6	27·0	8,335	" 2	25·7	6,567	3,375
Kenora	Kenora, Ontario	Late	" 28	28·0	5,418	" 25	30·0	5,911	" 25	35·0	8,373	" 16	31·0	6,567	3,375
Altaswede	Alberta	Late	July 25	26·3	4,326	" 26	30·7	6,408	" 26	35·0	8,477	" 26	30·6	6,404	3,292
Early Swedish	Sweden	Early	June 28	26·6	5,403	" 5	21·7	4,181	" 7	26·3	8,122	" 3	24·9	5,902	3,034
Spadone	North Italy	Early	July 2	29·0	5,919	" 5	19·0	3,524	" 5	23·7	6,749	" 4	23·9	5,397	2,774
Marche	North Central Italy	Early	June 28	26·0	4,977	" 5	20·3	4,110	" 4	21·7	5,277	" 2	22·7	4,788	2,461
Umbria	North Central Italy	Early	" 27	25·0	3,884	" 5	21·0	3,921	" 4	23·0	5,577	" 2	23·0	4,461	2,293

In addition to the above varieties, Alfred from Ontario and Emilia from North Central Italy were tested in 1925 and 1926. For the average of two years, the first named was the eighth on the list whilst the other was the eleventh.

Under the conditions of this experiment it seems that, although this should by no means be considered as final, the two late strains from Sweden, with only one cutting made, like other late varieties, have produced more than the Canadian-grown. They are in bloom a few days later than timothy, but when grown together and cut as soon as first blossoms turn brown, this mixture will contain a high percentage of digestible nutrients, which is important from a live stock feeding point of view.

It has been clearly shown at Cap Rouge that clover seed from Italy does not produce plants hardy enough for this district. Until this project is conducted a few years more to throw further light on the subject, farmers should exercise all possible precaution to buy clover seed grown under conditions about the same as those under which it will be grown on their farms.

RED CLOVER—SEED GROWING VERSUS HAY FOR PROFIT

It is generally admitted that the red clover seed required in Canada should be grown in this country to obtain the best crops of hay; with the colouring process of foreign seed the farmers should know exactly what they are buying. But all districts in Canada are not equally suitable for the production of red clover seed, this is why an experiment was started at the Cap Rouge Experimental Station, in 1921, to determine the relative profit that may be obtained by cutting the second crop of red clover for hay against harvesting it for seed.

This experiment was conducted for six years, with as many different seedings. The soil was a sandy loam of just ordinary fertility but which had been well manured with the hoed crop two years previously, and was in very good tilth when the clover seed was put in. The current prices at which clover hay and clover seed sold in the district of Quebec at the time of harvest are taken for figures. The most difficult matter was to value the clover straw after the seed was threshed, but the Dominion Chemist, after analysing samples, came to the conclusion that the threshed straw was worth about 57·5 per cent of the hay.

The following table gives results for six years showing that the two crops of hay were worth $1.03 for every $1 for a crop of hay followed by one of seed. Under the conditions of this experiment the revenues are about the same in both cases so that the reader should use his own judgment and then decide, according to his own circumstances and neighbourhood conditions, which may change the relative value of hay and clover seed, what is the best thing to do.

—	Two crops for hay										One crop for hay and one crop for seed											
	Date of first cutting	Yield per acre of cured hay from first cutting	Price of hay per ton	Value of first crop per acre	Date of second cutting	Yield per acre of cured hay from second cutting	Price of hay per ton	Value of second crop per acre	Value of the two crops per acre	Comparative value with one crop of hay followed by seed is entered as $1	Date of first cutting for hay	Yield per acre of cured hay from first cutting	Price of hay per ton	Value of first crop per acre	Date of second cutting for seed	Yield per acre of seed from second cutting	Price of seed per pound	Value of seed per acre	Yield per acre of straw from second cutting	Estimated price after analysis of straw per ton	Value of straw per acre	Value of three crops per acre
		lb.	$	$		lb.	$	$	$	$		lb.	$	$		lb.	$	$	lb.	$	$	$
1921	July 5	1,291	28 00	18 07	Sept. 16	3,386	33 00	55 87	73 94	1 64	June 16	608	21 00	6 38	Sept. 17	71.4	0 38	27 13	1,899	12 07	11 46	44 97
1922	" 3	3,000	23 00	34 50	Aug. 26	1,687	18 00	15 18	49 68	1 13	" 22	2,195	17 25	18 93	" 2	60.0	0 28	16 80	1,645	9 92	8 16	43 89
1924	" 25	7,213	12 00	43 28	Oct. 7	2,462	12 00	14 77	58 05	0 72	" 26	2,370	12 00	14 22	Oct. 7	152.0	0 385	58 52	2,200	6 90	7 59	80 33
1925	" 15	5,009	12 00	30 05	Sept. 15	3,757	12 00	22 54	52 59	1 16	" 23	2,450	12 00	14 70	Sept. 15	82.2	0 30	24 66	1,715	6 90	5 92	45 28
1926	" 16	6,336	15 33	48 57	" 10	1,628	16 00	13 02	61 59	1 29	" 24	2,046	15 33	15 68	" 18	66.9	0 34	22 75	1,991	9 20	9 16	47 59
1927	" 23	6,006	15 65	47 00	" 8	3,564	15 35	27 35	74 35	0 77	" 21	5,258	15 65	41 14	" 13	128·3	0 33	42 34	2,885	8 83	12 74	96 22
Average for 6 years	July 14	4,809	.....	36 91	Sept. 13	2,747	.....	24 79	61 70	1 03	June 22	2,488	.....	18 51	Sept. 17	93.5	.....	32 03	2,056	8 97	9 17	59 71

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

The object of this experiment is to find out by what method red clover seed can be grown to the best advantage in central Quebec. This project was conducted during five seasons, with four methods, on a sandy loam of only average fertility but in very good tilth, and which, though not the very best for this crop, is representative of a very large area of territory covered by this Station.

Four plots were sown each season as follows: on the first the red clover seed was put in in rows 12 inches apart; on the second in rows 24 inches apart; and on the two others broadcast. Oats was used as cover crop and seed was harvested the next season. The first crop was cut for seed, on the three first plots, whilst the first crop was cut for hay, early in summer, and the second for seed, on the fourth plot. In the following table, actual prices were entered at which clover seed and clover hay sold in the district of Quebec at the time of harvest; straw was valued at 57·5 per cent of clover hay according to the analyses of samples of our crop made by the Dominion Chemist.

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

Year	Sown in rows 12 inches apart									Sown in rows 24 inches apart								
	Date of cutting	Weight per acre of seed	Price of seed per pound	Value of seed per acre	Weight per acre of straw	Estimated price after analysis of straw per ton	Value of straw per acre	Value of the two crops per acre	Yield of seed entering 100 for ordinary method of growing it (1st for hay and 2nd for seed)	Date of cutting	Weight per acre of seed	Price of seed per pound	Value of seed per acre	Weight per acre of straw	Estimated price after analysis of straw per ton	Value of straw per acre	Value of the two crops per acre	Yield of seed entering 100 for ordinary method of growing it (1st for hay and 2nd for seed)
		lb.	$	$	lb.	$	$	$			lb.	$	$	lb.	$	$	$	
1922	July 31	62·5	0 28	17 50	2,040	9 92	10 12	27 62	104	July 31	54·0	0 28	15 12	2,079	9 92	10 31	25 43	90
1924	Aug. 29	179·0	0·385	68 91	1,946	6 90	6 71	75 62	118	Aug. 29	139·0	0·385	53 51	944	6 90	3 26	56 77	91
1925	" 15	84·0	0 30	25 20	3,636	6 90	12 34	37 74	102	" 15	86·7	0 30	26 01	3,688	6 90	12 72	38 73	105
1926	" 17	192·7	0 34	65 52	3,657	9 20	16 82	82 34	288	" 17	135·7	0 34	46 14	4,154	9 20	19 11	65 25	202
1927	" 6	84·3	0 33	27 82	2,830	8 83	12 49	40 31	66	" 6	81·6	0 33	26 93	2,426	8 83	10 71	37 64	64
Average for 5 years	Aug. 13	120·5	.....	40 99	2,822	.....	11 74	52 73	123	Aug. 13	99·4	.....	33 54	2,658	.....	11 22	44 76	102

Year	Sown broadcast									Sown broadcast, 1st crop for hay, 2nd crop for seed										
	Date of cutting	Weight per acre of seed	Price of seed per pound	Value of seed per acre	Weight per acre of straw	Estimated price after analysis of straw per ton	Value of straw per acre	Value of the two crops per acre	Yield of seed entering 100 for ordinary method of growing it (1st for hay 2nd for seed)	Date of first cutting for hay	Yield per acre of cured hay from first cutting	Price of hay per ton	Value of first crop per acre	Date of second cutting	Weight per acre of seed	Price of seed per pound	Value of seed per acre	Weight per acre of straw	Estimated price after analysis of straw per ton	Value of straw per acre	Value of the three crops
		lb.	$	$	lb.	$	$	$			lb.	$	$		lb.	$	$	lb.	$	$	$
1922	July 31	86·0	0·28	24 08	2,242	9 92	11 12	35 20	143	June 22	2,195	17 25	18 93	Sept. 2	60·0	0 28	16 80	1,645	9 92	8 16	43 89
1924	Aug. 29	185·0	0 385	71 22	2,815	6 90	9 71	80 93	122	" 26	2,370	12 00	14 22	Oct. 7	152·0	0 385	58 52	2,200	6 90	7 59	80 33
1925	" 15	70·8	0 30	21 24	4,013	6 90	13 84	35 08	86	" 23	2,453	12 00	14 70	Sept. 15	82·2	0 30	24 66	1,715	6 90	5 92	45 28
1926	" 17	171·6	0 34	58 34	4,295	9 20	19 76	78 10	256	" 24	2,046	15 33	15 68	" 18	66·9	0 34	22 75	1,991	9 20	9 16	47 59
1927	" 6	108·2	0 33	35 71	3,819	8 83	16 86	52 57	84	" 21	5,258	15 65	41 14	" 13	128·3	0 33	42 34	2,885	8 83	12 74	96 22
Average for 5 years	Aug. 13	124·3	.....	42 12	3,437	.....	14 26	53 38	127	June 23	2,864	.....	20 93	Sept. 17	97·9	.....	33 02	2,087	.....	8 71	62 66

The above table shows that for every 100 pounds of seed produced when sown broadcast and the first crop cut for hay, there were 102 pounds when sown in drills twenty-four inches apart, 123 when sown in drills twelve inches apart, and 127 when sown broadcast and the first cutting used for seed. However, as the main point is the greatest profit it is interesting to note that the acre value of the products were respectively $62.66 when sown broadcast and the first crop was cut for hay, $56.38 when sown broadcast and the first crop was cut for seed, $52.73 when sown in drills twelve inches apart, and $44.76 when sown in drills twenty-four inches apart. The value of the first crop of hay gives the advantage to the first method.

Therefore, the most profitable way seems to be to put in broadcast clean seed on clean land, and cut the first crop for hay, on condition, however, that the first cutting be made around the middle of June, for if it is delayed until the clover reaches full bloom, the seed crop might be compromised on account of the short season of this district.

TIMOTHY

VARIETY TESTS FOR YIELD AND PURITY

Since 1924, six varieties or strains of timothy were sown in triplicate one-hundredth acre plots, with oats as a nurse-crop. The first crop was harvested in 1925. The soil is a sandy loam of an average fertility and was in very good tilth. Although it is not the best for timothy, it is representative of a very large area of land in the district covered by the Cap Rouge Station. The following table gives both the green yield and yield of hay containing 15 per cent moisture. The latter was of course based on absolute dry matter so that the yields of hay from the plots are comparable in so far as moisture content is concerned.

TIMOTHY—VARIETY TESTS

Variety	Source	Yield per acre												
		Sown 1924						Sown 1925		Sown 1926		Average of four crops		
		Cut 1925		Cut 1926		Average		Cut 1926		Cut 1927				
		Green yield	Hay yield (15 p.c. moisture)	Green yield	Hay yield (15 p.c. moisture)	Green yield	Hay yield (15 p.c. moisture)	Green yield	Hay yield (15 p.c. moisture)	Green yield	Hay yield (15 p.c. moisture)	Green yield	Hay yield (15 p.c. moisture)	Digestible nutrients
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
3937	Ohio	7,630	3,136	11,200	4,955	9,415	4,045	10,260	4,539	9,230	4,053	9,580	4,171	1,990
Boon	C.E.F., Ottawa	6,630	3,008	8,400	4,547	7,515	3,777	8,570	4,023	7,800	3,328	7,850	3,726	1,777
Gloria	Sweden	6,830	2,776	12,100	4,620	9,465	3,698	9,670	3,691	8,700	3,673	9,325	3,690	1,761
Commercial*		6,360	2,885	9,000	3,947	7,680	3,416	8,800	3,982	8,570	3,580	8,182	3,598	1,716

* This is the commercial seed that we used generally on the farm each year.

Besides these four strains, another one of commercial seed from Ohio was sown in 1924 and 1925. For this period, it was the fourth on the list. Only one cutting was done of the 1925 seeding on account of weeds.

As this experiment has only been conducted for three years, the above results cannot be taken as conclusive, but only as a progress report. However, it seems that breeding counts in plants as well as in animals, since the commercial seed is at the bottom of the list, while the selections of Ohio and Ottawa are the best yielders of hay and digestible nutrients.

ANNUAL HAYS

VARIETY TESTS OF GRAIN VARIETIES FOR SUITABILITY

Though silage and root crops are very important indeed wherever cattle are kept in Canada, there is no getting out of the fact that hay and pastures have been and will probably for a long while yet continue to be the main reliance for the majority of farmers. This is why the failure of both of these, or even of only one, brings such a grave situation that sometimes live stock has been sacrificed at very low figures when, if held over for another season or year, it would have brought a substantial profit.

In 1915, an experiment was started at this Station to find a good annual crop to be used in such cases of failure. Five different crops were tried: Banner oats, Gold Rain oats, Victory oats, Banner oats with Arthur peas, and Banner oats with vetches. The above named varieties of oats and peas were the ones which, singly, had shown themselves to be the very best for grain production, and it was thought best to use them for the experiment because farmers would be likely to have them for seed. These grains were sown on one-sixtieth-acre plots and a careful record kept of the yield. The following tables give interesting details:—

OATS—TESTS OF VARIETIES FOR HAY—SEVEN YEARS

Variety of oats	Yield of cured hay per acre							
	1915	1916	1917	1918	1920	1922	1923	Average
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Victory	6,120	7,920	7,560	8,820	7,620	9,000	3,075	7,159
Gold Rain	7,200	7,440	6,840	7,860	7,620	8,125	4,875	7,137
Banner	4,440	5,940	5,760	7,500	7,500	9,625	5,725	6,641

ANNUAL HAY CROPS—TEST OF GRAIN VARIETIES FOR YIELD AND SUITABILITY

Year	Banner oats and Arthur peas			Banner oats and vetches			Victory oats			Gold Rain oats			Banner oats			Clover and timothy hay		
	Pounds per acre			Pounds per acre			Pounds per acre			Pounds per acre			Pounds per acre			Pounds per acre		
	Yield	Protein	Total digestible nutrients	Yield	Protein	Total digestible nutrients	Yield	Protein	Total digestible nutrients	Yield	Protein	Total digestible nutrients	Yield	Protein	Total digestible nutrients	Yield	Protein	Total digestible nutrients
1915	3,360	278·9	1,639·7	6,060	418·1	2,854·3	6,120	275·4	2,839·7	7,200	324·0	3,340·8	4,440	199·8	2,060·2	3,006	120·2	1,388·8
1916	6,270	557·8	3,279·4	5,820	401·6	2,741·2	7,920	356·4	3,674·9	7,440	334·8	3,452·2	5,940	267·3	2,756·2	5,728	229·1	2,646·3
1917	6,240	517·9	3,045·1	4,200	289·8	1,978·2	7,560	340·2	3,507·8	6,840	307·8	3,173·8	5,760	259·2	2,672·6	5,397	215·9	2,492·4
1918	7,140	592·6	3,484·3	10,740	741·1	5,058·5	8,820	396·9	4,092·5	7,860	353·7	3,647·0	7,500	337·5	3,480·0	5,055	202·2	2,335·4
1920	7,080	587·6	3,455·0	8,400	579·6	3,956·4	7,620	342·9	3,535·7	7,620	342·9	3,535·7	7,500	337·5	3,480·0	4,212	168·5	1,945·9
Average	6,180	507·0	2,980·7	7,044	486·0	3,317·7	7,608	342·4	3,530·1	7,392	332·6	3,429·6	6,228	280·3	2,889·8	4,680	187·2	2,162·2

The yield of roughage per acre is no doubt important, but the main considerations are the total digestible nutrients and the protein per acre. From the above it can readily be seen that a tall, heavy stooling variety of oats, such as Victory, will yield the highest quantity of digestible nutrients per acre; and that a mixture of Banner oats and Arthur peas, sown at the rate of about sixty pounds of each per acre, gives the greatest yield of protein per acre, which is one of the main considerations in live stock feeding. The advantage of this mixture of peas and oats is that it makes good ensilage, or may be left to produce grain, if too large an area has been sown for hay.

Exhibit of the Cap Rouge Experimental Station at the Quebec Provincial Exhibition.

HAY AND PASTURE

MIXTURES, WITH MIXED CLOVERS AS A BASIS

This project was started in 1916 when plots were sown with different grasses and clovers, single, to find out how they would do in the district. This preliminary trial showed that perennial rye grass, western rye grass, Kentucky blue grass and red top could be left out of the mixtures, for the sandy loam of the district. Timothy, orchard grass, meadow fescue, tall oat grass, red clover, alsike and white Dutch clover were thus used for the project, which was started in 1920. Oats was sown as cover crop. The following table gives quantities of seed entering in each mixture, also yields of hay containing 15 per cent moisture, estimated from the absolute dry matter so that each mixture is comparable in as far as moisture content is concerned.

GRASS AND CLOVER MIXTURES

Seeding—Pounds per acre							Hay (15 p.c. moisture)—Pounds per acre					
Red Clover	Timothy	Alsike	White Dutch Clover	Orchard Grass	Meadow Fescue	Tall Oat Grass	Sown 1920 Cut 1921	Sown 1923 Cut 1924	Sown 1924 Cut 1925	Sown 1925 Cut 1926	Sown 1926 Cut 1927	Average of five years
10	12	.....	1	.....	.....	.....	1,026	2,147	2,399	3,379	10,208	3,831
8	12	2	1	.....	.....	.....	1,222	1,892	2,648	3,982	8,883	3,725
8	6	2	1	12	.....	.....	1,390	1,782	2,487	2,944	8,028	3,326
8	6	2	1	.....	12	.....	1,602	1,632	2,297	3,329	7,911	3,354
8	6	2	1	.....	.....	12	1,366	1,654	2,487	3,717	8,014	3,448
8	6	2	1	6	.....	6	1,227	1,817	2,467	4,055	8,482	3,610
8	6	2	1	.....	6	6	1,126	2,323	2,117	3,616	7,360	3,308
8	6	2	1	6	6	.....	1,757	1,712	2,280	4,758	3,971	2,896

As the per cent of dry matter was available for the three last years only, the average of these three seasons was used to determine the dry matter of crops of 1921 and 1924.

The above table shows that, for an average of five years, the mixtures of timothy and clovers are the best yielders. The addition of other grasses is no doubt an advantage in certain circumstances, but the price of seed is generally high and the quality low in this country so that it is well to move slowly before more light has been thrown on the subject.

POULTRY

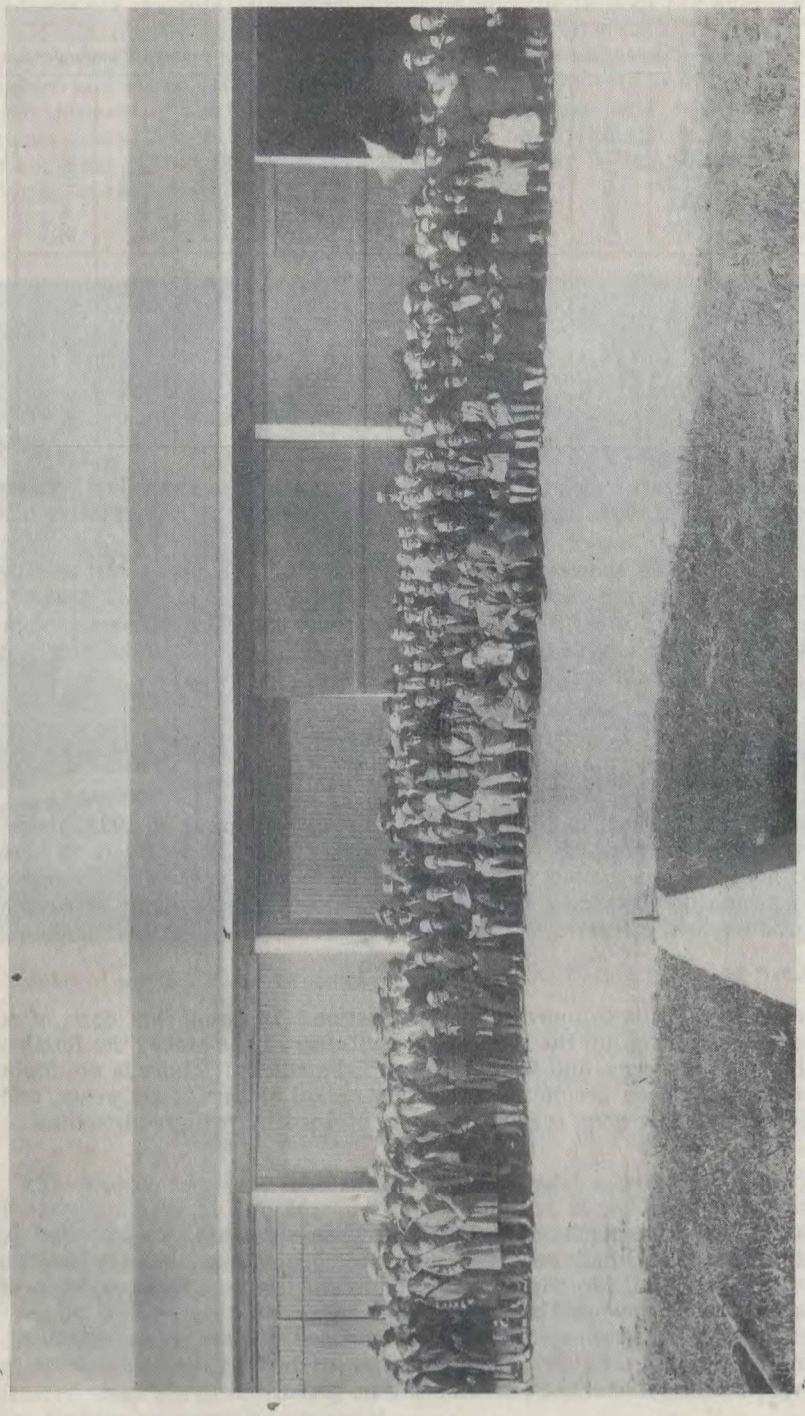
Barred Rocks exclusively are bred. At the beginning of 1928, there were 357 birds, 29 males and 328 females. The principal projects relate to breeding, feeding, housing and management, but the main one is certainly the pedigree work by which it is expected that good producing strains will be isolated which will reproduce heavy layers.

BREEDING

The main point is to increase egg production. In doing this, care, of course, must be taken to keep up the size and the vitality of the stock, the fertility and hatchability of the eggs, and the viability of the chicks. There is no doubt that improvement has been accomplished over a period of five or six years, and it is expected that further good results may be obtained by pedigree breeding.

FEEDING

Feeding experiments have shown that when skim-milk can be had by the birds at all times, it will advantageously replace beef-scrap; that dry clover leaves are as good as roots, for winter egg production, if the digestive tract of the layer is kept in good condition; that screenings consisting of half of the grain passed through the fanning mill, if not composed of more than one-third oats, are worth practically as much as commercial grain; and that snow may replace water, when the latter cannot conveniently be given.



Special poultry excursion to the Cap Rouge Experimental Station in 1927.

HOUSING

The general way of ventilating is simply to let in fresh air through open windows or cotton fronts. A comparison of houses of different widths but of the same shape has shown that the range of temperature decreases as the width increases so that the temperature is more equable in a house 16 feet wide than it is in one 12 feet wide.

MANAGEMENT

Results, to date, show conclusively that early pullets are the cheapest producers of winter eggs. Even when yearling hens were the same birds as used in the experiment as pullets the preceding year, they showed a higher cost of production as yearlings than they had as pullets. Leaving aside the time required to come to the poultry-house, it was found that it took about one minute per day per ten birds for actual trap-nesting, when birds laid well.

MARKETING

Contrary to expectations the sale of surplus cockerels as fryers and roasters gave more profit than as broilers; however, until more data are gathered, farmers would probably do better to sell all surplus cockerels at as early a date as possible.

EGG PRESERVATIVES

Of the ten preservatives tested during thirteen years, lime water may be used with a certainty that it will give satisfaction if the eggs are perfectly fresh when put in, and if they come from flocks having no male birds in them.

GENERAL FARM NOTES

We had the honour to receive the Honourable Minister of Agriculture, Mr. Motherwell, with delegates of other countries, on the occasion of the World's Poultry Congress, held during July.

BUILDING.—A horse barn for eighteen head was built during this year.

EXCURSIONS.—Three excursions of farmers of the district came to Cap Rouge during July and August. The Superintendent explained experimental work.

A field day of the French Canadian Cattle Breeders' Association took place in September, when good animals were disposed of at an auction sale.

A special poultry excursion, which took place in October, assembled over 250 poultrymen and was a great success.

EXHIBITIONS.—Some thirty French-Canadian horses and about as many French-Canadian cattle and Yorkshire swine were shown at the Regional and at the Provincial Quebec exhibitions, whilst the horses alone went to Three Rivers. Besides diplomas, about three-fourths of the first prizes were won by this stock.

MEETINGS.—The Superintendent attended many meetings during the year, among which that of the French Canadian Cattle Breeders' Association, of which he is the president; that of the French Canadian Horse Breeders' Association, and that of the Quebec Seed Board of which he is a member. The Assistant, F. X. Robitaille, attended meetings of the Quebec Seed Board and made a trip of inspection of Seed Board Comparative Tests.

PUBLICITY.—A great number of bulletins, leaflets, circulars were distributed, while articles were prepared for "Seasonable Hints" and the press.