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 1926

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# TABLE OF CONTENTS

# DOMINION EXPERIMENTAL STATION, CAP ROUGE, P.Q.

## REPORT OF THE SUPERINTENDENT, G. A. LANGELIER

### THE SEASON

The growing season of 1926 from May to October inclusive was somewhat colder, a little wetter, and duller than the average for the last fifteen years, the figures being respectively 52.03 and 56.60 degrees Fahrenheit for mean temperature, 25.65 and 24.18 inches for precipitation, 1,026.3 and 1,090.6 hours for sunshine. The frost-free season only extended 118 days, from June 4 to October 1, which is seventeen days less than usual.

At this Station, sunflowers and peas and oats for silage, clover hay, barley, cherries, garden beets, garden peas were very good; corn for silage, timothy hay, pasture oats, wheat, field peas, flax for fibre, gooseberries, grapes, raspberries, cabbage, cauliflower, celery, garden carrots, onions, parsnips, squash, sweet corn, ornamental plants, bushes and trees were good; field beans, apples, strawberries, asparagus, muskmelons, watermelons were medium; swede turnips (due to bad seed), flax for seed, plums, and potatoes were practically a failure.

METEOROLOGICAL RECORDS AT CAP ROUGE, P.Q., 1926

| Month | Temperature | | | | | | Precipitation | | | | Sunshine | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Highest | Date | Lowest | Date | Mean | Average 15 years | Rainfall | Snowfall | Total | Average 15 years | Total | Average 15 years |
| | °F. | | °F. | | °F. | °F. | Inches | Inches | Inches | | Hours | |
| January | 38·0 | 6 | −22·0 | 30 | 9·68 | 9·17 | 0·56 | 14·25 | 1·98 | 3·80 | 61·7 | 63·2 |
| February | 32·0 | 26 | −16·0 | 22 | 9·94 | 10·38 | 0·04 | 24·50 | 2·49 | 2·82 | 101·1 | 86·8 |
| March | 39·0 | 20-22-23-30 | −12·0 | 14 | 16·62 | 21·75 | 0·43 | 15·50 | 1·98 | 2·93 | 160·3 | 137·5 |
| April | 49·0 | 25 | 5·0 | 12 | 28·53 | 36·40 | 1·21 | 19·0 | 3·11 | 3·00 | 154·9 | 168·5 |
| May | 70·0 | 16 | 29·0 | 1-8-15 | 45·87 | 50·59 | 2·48 | ..... | 2·48 | 3·50 | 163·4 | 203·4 |
| June | 77·0 | 17 | 31·0 | 4 | 53·63 | 59·04 | 2·74 | ..... | 2·74 | 4·13 | 184·0 | 199·7 |
| July | 84·0 | 31 | 30·0 | 26 | 59·49 | 66·00 | 5·78 | ..... | 5·78 | 3·79 | 237·2 | 229·6 |
| August | 85·0 | 1 | 29·0 | 16-19 | 57·54 | 63·25 | 2·17 | ..... | 2·17 | 3·95 | 220·0 | 211·7 |
| September | 74·0 | 19 | 29·0 | 14-21 | 51·73 | 55·20 | 5·97 | ..... | 5·97 | 4·55 | 140·6 | 151·4 |
| October | 76·0 | 5 | 25·0 | 20-28 | 43·94 | 44·71 | 6·51 | ..... | 6·51 | 4·39 | 81·1 | 107·2 |
| November | 53·0 | 9 | 1·0 | 28 | 32·08 | 30·34 | 2·22 | 13·0 | 3·52 | 3·17 | 50·0 | 60·6 |
| December | 36·0 | 13-14 | −12·0 | 5-20 | 14·72 | 16·23 | ..... | 15·0 | 1·50 | 3·01 | 50·7 | 50·3 |
| Totals | ..... | ..... | ..... | ..... | ..... | ..... | 30·11 | 101·25 | 40·23 | 43·04 | 1,605·0 | 1,669·9 |
| Average | ..... | ..... | ..... | ..... | 35·31 | 38·59 | 2·51 | 8·44 | 3·35 | 3·59 | 133·7 | 139·1 |

## ANIMAL HUSBANDRY

### DAIRY CATTLE

At the beginning of January, 1927, there were 67 head of registered French-Canadian cattle at the Cap Rouge Station: 4 herd bulls, 10 bull calves, 32 cows, 11 heifers, and 10 heifer calves. The herd 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 three years than any other; and it has been accredited since 1922. Everything which could be spared has found ready sale by private treaty, in the past, but it is now proposed to hold each year an auction in the fall in connection with a field day, so that the best animals may find a place in those herds where they will do the most good.

### OFFICIAL RECORDS

During the year, five heifers qualified for Record of Performance, and it is remarkable that three of them broke world records for the breed.

CANADIAN RECORD OF PERFORMANCE TESTS AT CAP ROUGE, APRIL 1, 1926, TO MARCH 31, 1927

| Name and number of cow | Age at commencement of test—years | Number of milking days | Pounds milk | Pounds fat | Average per cent of fat | R.O.P. Number |
|---|---|---|---|---|---|---|
| Jacotte de Cap Rouge..6200 | 2 | 365 | 7,534 | 352 | 4·67 | 271 |
| Lumina de Cap Rouge*.6639 | 2 | 365 | 7,848 | 475 | 6·05 | 330 |
| Julia de Cap Rouge*....6029 | 3 | 365 | 10,181 | 490 | 4·81 | 293 |
| Iliade de Cap Rouge...5593 | 4 | 365 | 7,714 | 342 | 4·43 | 332 |
| Jacqueline de Cap Rouge*.....6031 | 4 | 365 | 8,996 | 490 | 5·45 | 321 |
| Average..... | 3 | 365 | 8,455 | 423 | 5·00 | ..... |

*Heifers making world records.

All cows, and also all heifers having completed two or more lactation periods, have qualified for Record of Performance.

### BREEDING FRENCH-CANADIAN CATTLE

When the herd of French-Canadian cattle was started at the Cap Rouge Experimental Station, colour requirements were not as at present, and bulls which were all black, also females which showed white on the belly, in front of the navel, were commonly used for breeding purposes. Animals with what are now considered serious defects, faults of colour which would prevent them being registered, were used for breeding purposes, as the main point then was to improve for yearly butterfat production.

A few years ago, when it was decided that the Cap Rouge cattle should compete each autumn at the Quebec Provincial Exhibition, in the open classes, with the best herds in existence, a new requirement besides colour, had to be met,—conformation. Thus, instead of having only one end in view, production, there are now two other goals ahead, colour and conformation, which complicates the problem.

To immediately cull out all poor yielders, off-coloured animals, and "bad-lookers" might have been the best solution, if the rather small number left were sure to reproduce all their qualities. Instead of doing this, animals were kept which not necessarily possessed the three requirements themselves, but which reproduced them consistently. A few illustrations will explain the matter more thoroughly.

Colombelle had qualified for R.O.P. with 6,112 pounds of milk and 287 pounds of fat as a two-year-old and showed later on that she was a long distance producer, by giving over 90,000 pounds of 5.2 milk, or about 5,500 pounds of butter between the ages of 6 and 16. She was bred to Delphis, whose dam, Nanette de St. Denis, had qualified four times for R.O.P., with a yearly record of 10,081 pounds of milk, testing 4.66 (equal to 470 pounds of fat) as a

mature cow. From this union was born Eglantine which barely qualified for R.O.P. as a two-year-old with 4,789 pounds of milk testing 4.76 (equal to 228 pounds of fat). This looked like retrograde breeding, but it was decided to breed Eglantine to her half-brother, Elégant, who was by Delphis out of Fanchette, a cow which qualified three times for R.O.P. her high record at maturity being 10,657 pounds of milk testing 4.50 (equal to 480 pounds of butter). This was combining the blood of the three best cows in the herd, giving 25 per cent of the blood of each to the progeny.

From this mating were bred Jacqueline and Hérodiade. Jacqueline became the champion two-year-old producer of the breed, qualifying with 7,792 pounds of milk testing 5.80 (equal to 452 pounds of fat), and later on broke the four-year-old record, qualifying with 8,996 pounds of milk, testing 5.45 (equal to 490 pounds of fat), whilst as a three-year-old she had an unofficial record of 9,588 pounds of milk testing 5.66 (equal to 543 pounds of fat). Both these records were broken during 1926, the first by a Cap Rouge heifer and the second by a cow belonging to A. N. Labrie of St. Pascal de Kamouraska.

BREEDING FOR IMPROVEMENT

French-Canadian cow Lumina de Cap Rouge, 6639, a winner of many prizes. Her great grand dam gave 287 pounds of fat as a two-year-old, her grand dam 295 pounds, her dam 354 pounds. This cow's record is 475 pounds. She was bred at the Dominion Experimental Station at Cap Rouge.

Hérodiade, queerly enough, had an average test of only 4.39 as a two-year-old, when she qualified for R.O.P. with 7,369 pounds of milk and 354 pounds of fat. But her average test went up to 4.83 as a three-year-old and to 5.43 as a four-year-old. Such a wide difference is quite unusual and is mentioned to show that there are exceptions to all rules. Had she been dropped, after her two-year-old record, because she tested more than 1 per cent lower than her dam,

she would not have given a heifer calf which will probably be the most sensational ever bred at Cap Rouge from the point of view of production. The sire of this young cow was Ottawa Champion II, out of Championne de Berthier 5 who qualified at maturity for R.O.P. with 14,185 pounds of milk testing 4 per cent (equal to 568 pounds of fat). When deciding to use this bull, the comparatively low test of his mother was remembered, but she is the cow with the highest official record for quantity of milk, and as one of her half-sisters, Dorienne, had an official R.O.P. record of 12,449 pounds of milk testing 4.30 (equal to 535 pounds of butter), the mating was made. The result was Lumina which has just finished with an R.O.P. record of 7,848 pounds of milk, with the remarkable yearly average test of 6.05 (equal to 475 pounds of fat), which makes her the undisputed two-year-old champion, coming within 15 pounds of the three-year-old record, held by Julia bred at the Cap Rouge Station.

For further breeding work are kept a son of Lumina, by Extra Elegant, the first bull, qualified for R.O.P., to enter the AA class, also a full-brother of Lumina, and a son of Jacqueline, former two- and four-year-old champion of the breed, by Ottawa Champion, mentioned above. Very little can be depended upon as absolutely sure in breeding work, but such future herd sires certainly are very promising. There is no doubt that the record of the dam of any sire is a promise, but the records of high producing daughters are the fulfilment of that promise.

Other instances, not so conspicuous, but still very interesting, might be given in regard to breeding for production, but something must also be said about colour and conformation.

The cow which started the herd on the uphill road to higher production was Nanette de St. Denis, of a jet-black colour which is now not only objectionable but which actually debars bulls from registration. She gave Delphis who qualified for R.O.P. with four of his first five daughters. Another bull, of the right colour, had been used before Delphis, but all his daughters, over twenty in number, were sent to the butcher because they were poor milkers. As time went on, this made Delphis look very valuable and it was decided to breed him to Fanchette, a good coloured cow with an official record at maturity of 10,657 pounds of milk testing 4.50 (equal to 480 pounds of fat). Unfortunately, the tendency to breed blacks was very strong and the resultant calf was Elégant, all black, without the brown tinge, especially on the back, so well liked by fanciers. This concentration of some of the best blood in the herd, from a production point of view, looked so good that Elégant was used and very soon qualified for R.O.P., being at present the sire with the greatest number of qualified daughters.

Of course, Elégant only had 25 per cent of the black-producing blood of Nanette de St. Denis, as his paternal grandfather and his mother, were of the right colour. But the tendency to produce blacks continued, but if the use of this bull had early been discontinued for this reason, the breed would have lost some of its highest producers. What was done, was to find out, by actual trial, which of his black daughters would produce good coloured calves, and to breed them to a related bull, (so as not to lose on the production side), of the right colour, especially one out of a dam producing good coloured calves.

There are now only four cows and heifers which are off colour in the herd, and they are kept for a few specific purposes: to head strains for use later in correcting certain defects, probably through their sons, such as droopy rumps, faulty udders, etc. These four females will be bred to good coloured bulls having inherited the special quality of level rump, etc., or coming from cows having the special quality of long capacious and well-hung udder that it is proposed to get in the offspring.

Coming to the question of conformation or exhibition requirements, the great difficulty at first was that the bulls which had to be used to improve pro-

duction were not show-animals nor out of show-yard ancestry. But with patience and perseverance, good-looking cattle have been produced which have now to be reckoned with by the exhibitors of French-Canadians. A few examples are here given to explain how long the work has been, in certain cases.

Finette was a good coloured cow but too small, and sagging in the back. As she was a high producer, she was bred to Delphis, the son of Nanette, the best cow then in the herd, but rather rough and all black. This bull was also far from smooth, and all black. Out of this mating came Brunette, of good colour and enough size, and certainly an improvement over Finette as regards appearance, but still not a show-cow. Brunette was bred to a black son of Delphis, out of Fanchette, a high producer and a cow something like Finette, the intention being to intensify the high-yielding qualities of the offspring. A heifer out of this mating was not of bad appearance but yet not fit for the ring. She was bred to Ottawa Champion 2, a bull of good conformation and appearance out of a cow of the same type and a heavy milker. The resulting heifer, Nancie, is a show animal which won first prize in her class at Quebec in 1926.

Julia was the daughter of Elégant and Fanchette, mentioned above, and could only win a fifth prize at Quebec in 1924. When bred to Ottawa Champion 2, she gave Leonie which, in a very strong class, at the Quebec Provincial Exhibition of 1926, won first as a 6- to 12-month heifer.

When old Colombelle, perhaps the best producing and reproducing cow in the herd, was bred to Delphis she gave Eglantine which no doubt could not have won even in mediocre company. Eglantine, to the service of Elégant, dropped Hérodiade who was still far from a show-ring star. But when the latter was bred to Ottawa Champion 2, she gave Lumina who, besides holding the two-year-old record for production, won first at the Quebec Provincial Exhibition in 1924 as a junior yearling heifer, and first at the same place in 1926 as a three-year-old in milk.

These examples show that the bull Ottawa Champion 2 nicked with certain strains in the herd for the production of exhibition stuff and that, in some cases, such as for Lumina, good appearance and high-yielding power were combined to a high degree in the same animal. The question, now, will be to maintain production and conformation, if possible, but the first quality will not be sacrificed for the second.

No doubt, a certain number of the best breeders instinctively follow much the same procedure as is in force at the Cap Rouge Experimental Station. It is certainly possible and highly probable that some of them do better than at Cap Rouge. But these records of breeding, giving practically every detail of importance throughout the life of each individual, will have served a purpose in showing where improvement can be made in herd-building. Scores of like records at other experimental stations have pointed the way towards improvement for many breeders throughout the Dominion.

### STUDIES IN BREEDING METHODS WITH DAIRY CATTLE

For the purpose of this experiment, in-breeding refers to a dam bred to her son, to a sire mated to his daughter, or to the union of full brother and sister; line-breeding to unions when the sire is grandfather, grandson, uncle, or a half-brother of the dam; in out-crossing there is no relation between the sire and the dam.

No instance can be given where the same cow was in-bred, line-bred, and out-crossed, as the rather close breeding gave such good results in the Cap Rouge herd that all the best milkers were served by bulls possessing as much as possible of their own fine blood. But there are instances to show how this kind of breeding worked out.

Finette 2 —218—, to the service of an unrelated bull, Delphis de Cap Rouge —3283—, an R.O.P. sire out of an R.O.P. cow, gave Brunette de Cap

Rouge —4171— which qualified for R.O.P. as a two-year-old with 5,867 pounds of milk testing 4.85 (equal to 285 pounds of fat). When Finette was bred to her own son, Victor de Cap Rouge —3818—, she gave Gougou de Cap Rouge —4724— who became the two-year-old champion of the breed by qualifying for R.O.P. with 7,992 pounds of milk testing 3.92 (equal to 313 pounds of fat). This is a case where in-breeding was much better than out-crossing. There was no loss of vigour, either, because Gougou qualified again for R.O.P. as a three-year-old, as a four-year-old, as a mature cow, and produced, to the service of a half-brother of her sire, a heifer, Iliade, who became the champion three-year-old of the breed, qualifying for R.O.P. with 10,092 pounds of milk testing 4.36 (equal to 440 pounds of fat). An important thing to note in this case is the increase in percentage of fat which was too low in Gougou.

To show the good effects of line-breeding, an instance is hereby given. Colombelle —1775—, to the service of Delphis de Cap Rouge —3283—, gave Albertine de Cap Rouge —4162— which qualified for Record of Performance as a two-year-old with 4,789 pounds of milk testing 4.76 (equal to 228 pounds of fat). Albertine was bred to Elégant de Cap Rouge —4157—, a son of Delphis, and gave Hérodiade de Cap Rouge —5299— which qualified for Record of Performance as a two-year-old with 7,369 pounds of milk testing 4.39 (equal to 354 pounds of fat).

Hérodiade, whose paternal grandsire was Delphis de Cap Rouge —3283—, was bred to Ottawa Champion 2 —5119—, whose paternal grandsire was also Delphis, and gave Lumina de Cap Rouge —6639—, the champion two-year-old producer of the breed up to 1927, which qualified for Record of Performance with 7,848 pounds of milk testing 6.05 (equal to 475 pounds of fat).

However, one must never forget that close breeding calls for very rigid selection, not only in regard to vigour and stamina (which should be at the bottom of any kind of breeding work) but also in regard to production. For instance, when Elégant de Cap Rouge —4157—, an R.O.P. bull, was mated to Eglantine de Cap Rouge —4159—, he produced three heifers which made the following official records as two-year-olds: Kaffa de Cap Rouge —6195—, 5,055 pounds of milk testing 5.24 (equal to 265 pounds of fat); Hérodiade de Cap Rouge —4199—, 7,369 pounds of milk testing 4.39 (equal to 354 pounds of fat); Jacqueline de Cap Rouge —6031—, 7,792 pounds of milk testing 5.80 (equal to 452 pounds of fat). In this case, the three cows differ considerably in production, though full sisters, and they will be bred to the same bull until there is at least one heifer out of each of the three, when the reproductive qualities of the dams can be compared.

Close breeding will, of course, intensify defects as well as desirable qualities, and an example of this is given. Princesse du Sable —2261—, an R.O.P. cow, was bred to a bull about whose ancestry nothing was known and, incidentally, who gave only poor-yielding heifers. The result of this mating was Corneille de Cap Rouge —3159—, who gave 3,039 pounds of milk testing 4.44 (equal to 135 pounds of fat) during her first lactation period. When Corneille was bred back to her sire, she dropped Florence de Cap Rouge —4732—, who only gave 1,250 pounds of milk testing 4.24 (equal to 53 pounds of fat) in her first lactation period.

This case is brought out here to show how important selection is, when there is concentration of blood by close breeding.

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

It is still widely believed that any kind of a pure-bred bull will do to improve a grade herd, but this is certainly not always the case. The production of a large number of grade herds is so low that there is a fair chance of improvement in using a registered sire, simply because the milk yield of the average pure-bred herd is higher than the milk yield of the average grade herd. But when a farmer has a good grade herd, he should be just as careful about getting a sire out of a high-producing dam as if he were the owner of pure-

breds. At Cap Rouge, the milk yield of grade heifers was compared with that of their dams at the same age, and they only produced 73 per cent of their dams' production. This is explained by the fact that nothing was known about the ancestry of their sire along production lines, and the result is what happens in too many cases throughout the country.

INFLUENCE OF A PROVEN SIRE ON A DAIRY HERD

To find out the difference between a bull of unrecorded ancestry, but probably from a low-producing dam, and bulls out of heavy yielders, three cows were bred to a bull of each of these classes.

Orange Blossom —886— qualified for Record of Performance as a three-year-old with 6,192 pounds milk, testing 4.98 (or 309 pounds fat). To the service of Denis Lord —1589—she gave Henriette de Cap Rouge —3578—, and when bred to Elégant de Cap Rouge —4157— she dropped Irénée de Cap Rouge —5585—. As a two-year-old Henriette gave, in 373 days, 4,162 pounds of milk (equal to 193 pounds of fat) and was not in calf during this period, whilst at the same age, Irénée qualified for Record of Performance with 6,162 pounds of milk (equal to 311 pounds of fat) and, of course, calved inside of the fifteen months. Nothing was known about the dam of Denis Lord, whilst Elégant is a R.O.P. bull and his dam, Fanchette F, qualified three times in the Cap Rouge herd with 8,733, 10,657, 10,465 pounds of milk and 374, 480, 453 pounds of fat. Here is a case where a R.O.P. cow failed to produce anything good when bred to a poor bull and gave something fine when bred to a R.O.P. bull out of a R.O.P. cow.

Princesse du Sable —2261— qualified for Record of Performance as a three-year-old with 7,000 pounds milk testing 4.13 (or 289 pounds fat). To the service of Denis Lord —1539— she gave Corneille de Cap Rouge —3159—, and when bred to Delphis de Cap Rouge —3283— she dropped Fortune de Cap Rouge —4161—. Corneille dropped her first calf as a three-year-old and gave, in 330 days, 3,039 pounds of milk (equal to 159 pounds of fat), whilst as a two-year-old, Fortune qualified for Record of Performance with 6,373 pounds of milk (equal to 293 pounds of fat). In the first case, nothing was known about the dam of Denis Lord, whilst Delphis is a R.O.P. bull and his dam, Nanette de St. Denis —2413—, qualified four times in the Cap Rouge herd with 5,943 pounds milk and 259 pounds fat as a three-year-old, and 7,544, 9,215, 10,081 pounds milk containing 353, 409, 470 pounds fat as a mature cow. Here is another case where a R.O.P. cow failed to produce anything good when bred to a poor bull and gave something fine when bred to a R.O.P. bull out of a R.O.P. cow.

Finette 2—218—qualified for Record of Performance as a mature cow, with 9,747 pounds milk testing 4.13 (or 403 pounds fat). To the service of Prince de St. Denis—1829—, she gave Annette de Cap Rouge—2517—, and when bred to Delphis de Cap Rouge—3283—she dropped Brunette de Cap Rouge—4171—. As a two-year-old, Annette gave, in 389 days, 4,253 pounds of milk, and 218 pounds of fat, whilst at the same age Brunette qualified for Record of Performance in 365 days, with 5,867 pounds of milk, and 285 pounds of fat; as a three-year-old she qualified again with 8,016 pounds of milk and 358 pounds fat; and as a 4-year-old she qualified again with 8,388 pounds of milk and 392 pounds of fat. Nothing was known about the dam of Prince de St. Denis, whilst Victor is a R.O.P. bull and his dam also qualified for R.O.P. in the Cap Rouge herd. Here is still another case where a R.O.P. cow failed to produce anything good when bred to a poor bull and gave something fine when bred to a R.O.P. bull out of a R.O.P. cow.

It will be noted that the three good heifers were sired by three different bulls, at one time herd-headers at the Cap Rouge Station. These instances are chosen to show that it is not only one very perpotent sire which is responsible for the good milkers, but each one of the three bulls coming from good milkers.

If there is something to learn from this, it is that a dairy herd may be graded down with registered bulls of unknown (probably low-productive) ancestry, whilst it will be graded up with registered bulls of known productive ancestry.

### INFLUENCE OF FEED ON DAIRY BRED CALVES AND HEIFERS

Twins were chosen for this experiment so as to minimize the chance of error due to breeding. One of them was well fed, weighed 785 pounds just previous to dropping her calf at 2 years and 22 days, and qualified for Record of Performance. During her two first periods of lactation she produced 11,392 pounds of milk testing 5.75. Her sister was not well fed, and only produced 3,767 pounds of milk testing 4.45, during the two first periods of lactation she weighed 185 pounds less when she dropped her first calf though she was 61 days older than the other. Both the sire and the dam of these twins had qualified for Record of Performance, which shows that good breeding must be backed by good feeding. Under certain conditions, such as preparing pure-bred stock for sale or exhibition, or when it is desirable to increase size somewhat, it may pay to feed very heavily on grain, and it must be said that there is no fear of hurting heifers in doing so, for if they are bred right they will lose the surplus body fat soon after calving. But, in general, the most profitable course to follow will be an intermediate one, between the two extremes: on very good pasture, no concentrate, and at other times, all the clover hay they will consume, with silage and roots when available, and a grain allowance of from 2 to 3 pounds per animal, per day, according to age.

### INFLUENCE OF FEEDING CONCENTRATES AT DIFFERENT RATES TO MILCH COWS

This experiment was conducted with 27 cows, during five winters, and the animals chosen each year were about of the same weight, the same capacity as milk-producers, and had calved at nearly the same time. The care, housing, and feed given to each of the three lots were alike, except that group 1 received all the meal it would eat, which came up to 1 pound per 2.16 pounds of milk; group 2, 1 pound of meal per 4 pounds of milk, and group 3, 1 pound of meal per 8 pounds of milk. The following table gives details:—

INFLUENCE OF FEEDING CONCENTRATES AT DIFFERENT RATES TO MILK COWS

| — | | 1 pound meal per 2·16 pounds milk | 1 pound meal per 4 pounds milk | 1 pound meal per 8 pounds milk |
|---|---|---|---|---|
| Number cows in test | No. | 10 | 9 | 8 |
| Gross number of days in test | days | 1,435 | 1,300 | 1,137 |
| Average number of days in test per cow | " | 143·5 | 144·4 | 142·1 |
| Gross number of pounds of milk produced | lb. | 23,230·25 | 18,201·66 | 14,557·16 |
| Average number of pounds of milk produced per day per cow | " | 16·18 | 14·00 | 12·80 |
| Average per cent of fat in milk | % | 4·53 | 4·16 | 4·11 |
| Gross number of pounds of fat produced | lb. | 1,053·26 | 756·50 | 598·09 |
| Average number of pounds of fat produced per cow per day | " | 0·73 | 0·58 | 0·53 |
| Total meal consumed | " | 10,753 | 4,524 | 1,815 |
| Total hay consumed | " | 10,807 | 10,006 | 8,694 |
| Total swede turnips and corn silage consumed | " | 67,326 | 60,914 | 54,204 |
| *Findings from experiment* | | | | |
| Meal consumed per 100 pounds milk produced | " | 46·28 | 24·85 | 12·47 |
| Meal consumed per 100 pounds fat produced | " | 1,020·92 | 598·01 | 303·47 |
| Hay consumed per 100 pounds milk produced | " | 46·52 | 54·97 | 59·72 |
| Hay consumed per 100 pounds fat produced | " | 1,026·05 | 1,322·67 | 1,453·63 |
| Roots and silage consumed per 100 pounds milk produced | " | 289·82 | 334·66 | 372·35 |
| Roots and silage consumed per 100 pounds fat produced | " | 6,392·15 | 8,052·08 | 9,062·85 |
| Cost of meal at $1.72 per cwt | $ | 184·95 | 77·81 | 31·22 |
| Value of hay at $9 per ton | $ | 48·63 | 45·03 | 39·12 |
| Value of roots and silage at $2.40 per ton | $ | 80·79 | 73·10 | 65·04 |
| Total cost of feed | $ | 314·37 | 195·94 | 135·38 |
| Feed cost to produce 100 pounds milk | $ | 1·35 | 1·08 | 0·93 |
| Feed cost to produce 100 pounds fat | $ | 29·85 | 25·90 | 22·64 |

The prices of hay and concentrates were those of the summer of 1925, whilst roots and silage were valued proportionately, according to their feeding value.

The slight differences in percentage of fat in the milk of each of the three groups cannot be ascribed to the different quantities of meal fed, but rather to the fact that it was practically impossible to get three lots of cows whose percentage of fat would average exactly alike.

It is seen that the quantity of milk produced increased with the quantity of meal fed. In this case, the cost per 100 pounds of milk increased with the quantity of meal fed, though not in proportion.

However, the net profit would depend very much on the price which could be had for the product. For instance, if butter-fat had been sold at 40 cents per pound, the group receiving unlimited quantities of meal would have made a profit of $106.93 over feed, the 4-to-1 group $106.66, and the 8-to-1 group $105.85, which is practically the same for all.

But if instead of selling butter-fat at 40 cents per pound, raw milk had been retailed at 5 cents per pint, the profit would have been $614.84 for the unlimited meal group, $532.13 for the 4-to-1 group, and $446.91 for the 8-to-1 group.

The conclusion is that heavy meal feeding is profitable for the man who sells raw milk or cream at a high figure, whilst 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, whilst 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

The project consisted in feeding three lots of calves differently until they were 24 weeks old: one bunch receiving whole milk; the second, skim-milk and a home-mixed meal consisting of six parts corn, three parts oats, one and a half part flax seed, by weight, all ground together; the last, Royal Purple calf meal, a well known commercial article. Besides these feeds, the youngsters had all the clover hay, swede turnips, and corn silage which they would clean up. The feed, both liquid and solid, was weighed to the last pound, and the calves were put on the scales at birth, at four, eight, twelve, sixteen, twenty, and twenty-four weeks.

The following figures give details:—

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

| — | | Lot 1 | Lot 2 | Lot 3 |
|---|---|---|---|---|
| | | Whole milk | Skim-milk and Royal Purple Meal | Skim-milk and corn, 6 parts, oats, 3 parts, flax seed, 1½ part, all ground together |
| Number of calves | No. | 12 | 13 | 13 |
| Length of feeding period | days | 168 | 168 | 168 |
| Gross initial weight | lb. | 681 | 802 | 864 |
| Average initial weight | " | 57 | 62 | 66 |
| Gross finished weight | " | 3,519 | 3,586 | 3,470 |
| Average finished weight | " | 293 | 276 | 266·9 |
| Total gain per group | " | 2,838 | 2,784 | 2,606 |
| Average gain per calf | " | 236·5 | 214 | 200·5 |
| Average daily gain per calf | " | 1·4 | 1·27 | 1·19 |
| Amount of whole milk per group | " | 28,711 | 1,852 | 1,742 |
| Amount of whole milk per calf | " | 2,392 | 142 | 134 |
| Amount of skim-milk per group | " | ..... | 29,425 | 29,521 |
| Amount of skim-milk per calf | " | ..... | 2,263 | 2,270 |
| Amount of Royal Purple Meal in milk per group | " | ..... | 1,374·25 | ..... |
| Amount of Royal Purple Meal in milk per calf | " | ..... | 105·7 | ..... |
| Amount of home mixed meal in milk per group | " | ..... | ..... | 1,376·00 |
| Amount of home mixed meal in milk per calf | " | ..... | ..... | 105·8 |
| Amount of dry meal per group | " | ..... | 1,364·75 | 1,244·20 |
| Amount of dry meal per calf | " | ..... | 104·98 | 96 |
| Amount of hay per group | " | 2,684 | 3,567 | 3,266 |
| Amount of hay per calf | " | 224 | 274 | 251 |
| Amount of corn silage per group | " | 1,105 | 1,556 | 1,207 |
| Amount of corn silage per calf | " | 92 | 120 | 92 |
| Amount of swede turnips per group | " | 789 | 1,590 | 1,759 |
| Amount of swede turnips per calf | " | 65·7 | 122 | 135 |
| Total cost of feed per group | $ | 588·67 | 207·88 | 163·21 |
| Cost of feed per calf | $ | 49·03 | 15·99 | 12·53 |
| Cost of feed per pound gain | cts. | 20·7 | 7·4 | 6·26 |

With feeds at current prices of the summer of 1925 (whole milk $2, skim-milk 20 cents, Royal Purple meal $5, home-mixed meal $2.17, other concentrates $1.72 per 100 pounds, clover hay $9, corn silage $3, swede turnips $1.80 per ton) it cost for feed, until the calves were 24 weeks old, an average of $49.03 for each one raised on whole milk, whilst the figures were respectively $15.99 for each of the Royal Purple meal lot, and $12.53 for each of the home-mixed lot. The cost per pound of gain was respectively 20.7 cents for whole milk, 7.4 cents for Royal Purple meal, and 6.26 cents for home-mixed meal.

The conclusion to be drawn is that whole milk is completely out of the question, from a profitable point of view, as a feed for calves until they are nearly six months old, and that a good home-mixed meal is just as satisfactory and cheaper than Royal Purple meal.

### SKIM-MILK VERSUS POWDERED SKIM-MILK, VERSUS WHOLE MILK AND BONE MEAL FOR DAIRY-BRED CALVES

For this experiment, three lots of calves were fed differently until they were twenty-four weeks old: one group received a mixture of 1 quart whole milk, 1 ounce bone meal, and 3 quarts water; another one received skim-milk; and the last lot received powdered skim-milk at the rate of 1 pound per gallon of water. The calves had clover hay and corn silage, as much as they would

eat. All the feed was weighed and the calves were placed on the scales at birth, also at the end of each four-week period. The following table gives details:—

SKIM-MILK VERSUS POWDERED SKIM-MILK, VERSUS WHOLE MILK AND BONE MEAL FOR DAIRY-BRED CALVES

| | | Lot 1 | Lot 2 | Lot 3 |
|---|---|---|---|---|
| | | Whole milk and bone meal | Skim-milk | Powdered skim-milk |
| Number of calves | No. | 5 | 6 | 7 |
| Length of feeding period | days | 168 | 168 | 168 |
| Gross initial weight | lbs. | 269·00 | 346·00 | 392·00 |
| Average initial weight | " | 53·80 | 57·66 | 56·00 |
| Gross finished weight | " | 1,296·00 | 1,586·00 | 1,787·00 |
| Average finished weight | " | 259·20 | 264·32 | 255·28 |
| Total gain per group | " | 1,027·00 | 1,240·00 | 1,395·00 |
| Average gain per calf | " | 205·40 | 206·66 | 199·28 |
| Average daily gain per calf | " | 1·22 | 1·23 | 1·19 |
| Amount of whole milk, at start, per group | " | 1,460·50 | 1,842·00 | 2,280·00 |
| Amount of whole milk, at start, per calf | " | 292·10 | 307·00 | 325·71 |
| Amount of skim-milk per group | " | ..... | 13,297·00 | ..... |
| Amount of skim-milk per calf | " | ..... | 2,216·16 | ..... |
| Amount of powdered skim-milk, in water, per group | " | ..... | ..... | 1,462·00 |
| Amount of powdered skim-milk, in water, per calf | " | ..... | ..... | 208·85 |
| Amount of whole milk, with bone meal, per group | " | 2,794·00 | ..... | ..... |
| Amount of whole milk, with bone meal, per calf | " | 558·80 | ..... | ..... |
| Amount of bone meal, in whole milk, per group | " | 61·80 | ..... | ..... |
| Amount of bone meal, in whole milk, per calf | " | 12·36 | ..... | ..... |
| Amount of dry meal per group | " | 371·10 | 501·50 | 620·30 |
| Amount of dry meal per calf | " | 74·22 | 83·58 | 88·61 |
| Amount of hay per group | " | 1,528·50 | 1,511·12 | 2,122·00 |
| Amount of hay per calf | " | 305·70 | 251·86 | 303·14 |
| Amount of corn silage per group | " | 2,481·00 | 3,060·50 | 3·022·00 |
| Amount of corn silage per calf | " | 496·20 | 510·08 | 431·71 |
| Amount of oilcake per group | " | ..... | 549·50 | 585·20 |
| Amount of oilcake per calf | " | ..... | 91·58 | 83·60 |
| Total cost of feed per group | $ | 105·14 | 98·81 | 201·53 |
| Cost of feed per calf | $ | 21·03 | 16·47 | 41·65 |
| Cost of feed per pound of grain | $ | 0·1023 | 0·079 | 0·209 |

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.

These figures show that the three lots made practically the same gains, but when the most important point, the cost of feed per pound of gain, is looked into, it is not the same story. In fact, the powdered skim-milk group cost so much per pound of gain (20.9 cents) that this feed is out of the question until it can be bought at a much lower figure; the addition of water and bone meal to whole milk has brought the cost per pound of gain down to 10.23 cents, whilst whole milk alone (see previous experiment) amounted to about twice this, 20.7 cents.

There is no doubt that skim-milk is the cheapest feed for raising calves, when a suitable substitute is added to replace the cream taken out, but for the dairyman who sells raw milk at a high price, and who wishes to raise the best heifers, whole milk with water and bone meal, though more costly, may sometimes be the best paying proposition.

### WINTERING DAIRY CATTLE IN SINGLE-BOARDED OPEN-FRONT SHEDS

During the last eight years, 10 bulls and 93 heifers have been wintered under single-boarded open-front sheds. The bulls are always kept in these sheds. The heifers for housing in such sheds must be born at such a time that they will be at least six months old on November first; otherwise they

are kept in the calf-barn until the following spring. It was only in very exceptional cases, such as in cases of injury, that animals had to be brought in. The champion producers of the breed, in the two, three, and four-year-old classes, were thus wintered outside, which probably gave them that ruggedness and that strong constitution without which it is impossible to make high milk records. A large proportion of the Cap Rouge young show stock, which each year stands so high in the various classes at the Quebec Provincial Exhibition, passes the winters practically outside, going into the sheds only during the night or in very bad weather. There are four important points, however, which should not be forgotten; no weak animal nor cow in milk should be wintered in these sheds; no calf dropped after May first will be old enough to withstand the cold when hard weather sets in; all stock should be turned out by about September first, that is before the nights get too cool, and then left out, instead of being brought in and out; and the last essential, the sheds should face south, to get all the benefit from the sun, while the three closed sides should have no hole nor crack to create troublesome drafts.

### PERIODIC COSTS OF REARING DAIRY-BRED FEMALES

An experiment was conducted with eight French-Canadian heifers, from 1914 to 1917 inclusively, to find out how much feed it takes 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. For every one of these animals, it took 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. Feed values continually fluctuate, and there is the perennial question of whether the valuation placed on the feeds should be the cost price or the one at which the feeds could have been sold at the farm, but arbitrary values are here taken to show the cost under certain conditions. Valuing whole milk at $2, skim-milk at 25 cents, and meal at $2 per 100 pounds, hay at $15, corn silage at $4, swede turnips at $4, green feed at $6 per ton, and pasture at $2 per month, the cost per heifer, for feed only, was $93.25. With the addition of labour, bedding, housing, service fee of sire, interest, risks, and crediting manure, the total cost of rearing a heifer until calving can be placed at about $100, more or less, according to value of feeds. This shows that only good sires and dams should be used, as a cull heifer means quite a loss.

### COST OF MILK PRODUCTION

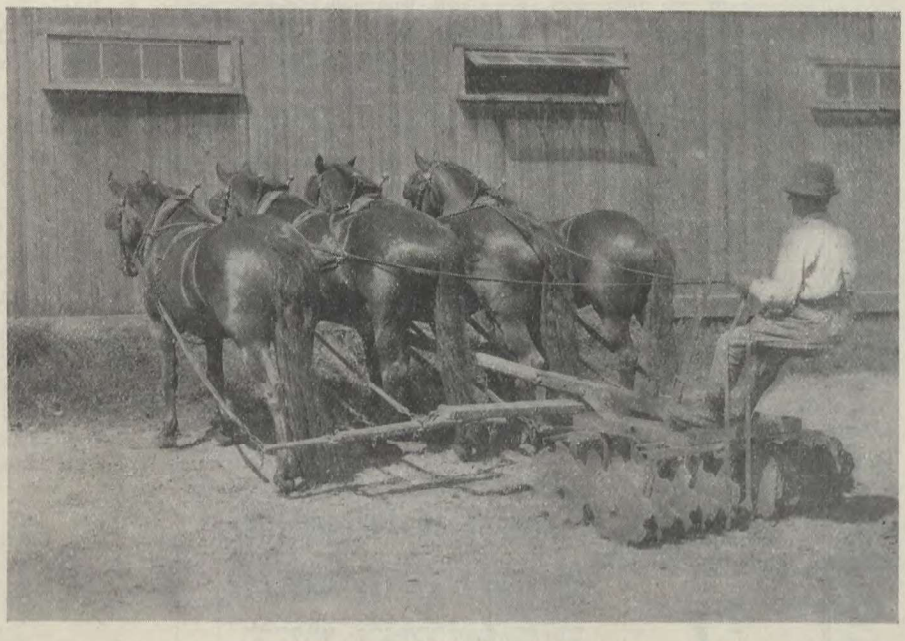
The following table gives details on 23 French-Canadian cows and heifers (20 of which were bred at Cap Rouge) that finished a lactation period during 1926:—

## Herd Record

**Animals finishing a lactation period during the year ending December 31, 1926**

| Name of cow | Registration No. | Age at beginning of lactation period. | Date of dropping calf | Number of days in lactation period | Total pounds of milk for lactation period | *Daily average yield of milk | Average per cent fat in milk | Pounds of butter produced during lactation period | Value of butter at 40 cents per pound | Value of skim-milk at 25 cents per 100 pounds | Total value of products | Pounds of meal eaten at 2 cents per pound | Pounds of roots and ensilage at $4 per ton | Pounds of hay at $15 per ton | Pounds of green feed eaten at $6 per ton | Days in pasture at $2 per month | Total cost of feed between calving | Cost to produce 100 pounds of milk | Cost to produce one pound of butter; skim-milk neglected | Profit over feed on one pound of butter; skim-milk neglected | Profit on cow between calving; labour, manure, and calf neglected |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | lb. | | | $ | $ | $ | | | | | | $ | $ | | | |
| Bruna-Reine | 3228 | 12 | Sept. 17, 1925 | 336 | 6,342·75 | 18·88 | 4·3 | 323·81 | 129 52 | 15 17 | 144 69 | 3,352 | 10,030 | 4,148 | 1,195 | 137 | 130 76 | 2·061 | 0·403 | —0·003 | 13·93 |
| Brunette de Cap Rouge | 4171 | 8 | Dec. 17, 1924 | 516 | 6,548·60 | 12·68 | 4·6 | 357·45 | 143 00 | 15 61 | 158 61 | 2,926 | 13,340 | 6,507 | 408 | 160 | 145 77 | 2·226 | 0·407 | —0·007 | 12·84 |
| Casoberte | 5289 | 6 | Jan. 3, 1926 | 323 | 6,123·75 | 18·96 | 4·8 | 348·81 | 138 52 | 14 56 | 154 08 | 3,336 | 10,250 | 5,127 | 2,229 | 183 | 144 33 | 2·356 | 0·413 | —0·013 | 9·75 |
| Ginette de Cap Rouge | 4801 | 6 | Aug. 11, 1925 | 352 | 7,816·75 | 22·21 | 4·9 | 453·09 | 181 24 | 18 58 | 199 82 | 3,799 | 10,865 | 4,870 | 1,145 | 175 | 149 13 | 1·908 | 0·329 | 0·071 | 50·69 |
| Gougon de Cap Rouge | 4724 | 6 | April 13, 1925 | 533 | 8,839·75 | 16·58 | 4·0 | 419·14 | 167 66 | 21 20 | 188 86 | 3,763 | 11,584 | 6,192 | 1,008 | 237 | 163 36 | 1·848 | 0·389 | 0·011 | 25·50 |
| Hébé de Cap Rouge | 5298 | 5 | June 7, 1925 | 495 | 6,615·75 | 13·36 | 4·8 | 376·70 | 150 68 | 15 74 | 166 42 | 3,643 | 11,030 | 5,631 | 1,780 | 259 | 159 46 | 2·410 | 0·423 | —0·023 | 6 96 |
| Hériodiade de Cap Rouge | 5299 | 5 | Feb. 23, 1925 | 368 | 7,287·75 | 19·80 | 4·9 | 353·61 | 141 44 | 17 33 | 158 77 | 2,943 | 9,030 | 4,228 | 403 | 130 | 118 57 | 1·624 | 0·334 | 0·066 | 40·40 |
| Ida de Cap Rouge | 5596 | 4 | Nov. 18, 1924 | 496 | 8,214·75 | 16·56 | 4·9 | 479·33 | 191 73 | 19 51 | 211 24 | 2,976 | 11,500 | 5,793 | 625 | 137 | 136 83 | 1·665 | 0·286 | 0·114 | 74·41 |
| Iliade de Cap Rouge | 5593 | 4 | Nov. 14, 1924 | 622 | 9,278·25 | 14·92 | 4·5 | 496·81 | 198 72 | 22 14 | 220 86 | 4,188 | 15,103 | 7,224 | 900 | 198 | 183 82 | 1·981 | 0·370 | 0·03 | 37·04 |
| Indienne de Cap Rouge | 5534 | 4 | Dec. 25, 1924 | 375 | 7,474·00 | 19·93 | 4·8 | 426·13 | 170 45 | 17 78 | 188 23 | 2,865 | 10,604 | 5,138 | 408 | 168 | 129 81 | 1·736 | 0·305 | 0·095 | 58·42 |
| Iolande de Cap Rouge | 5587 | 4 | April 15, 1925 | 277 | 7,858·25 | 28·37 | 4·8 | 441·92 | 176 77 | 18 70 | 195 47 | 2,790 | 8,429 | 4,153 | 683 | 130 | 114 36 | 1·455 | 0·259 | 0·141 | 81·11 |
| Irénée de Cap Rouge | 5585 | 5 | Dec. 28, 1925 | 361 | 7,849·75 | 21·74 | 4·9 | 452·76 | 181 10 | 18 66 | 199 76 | 3,946 | 9,355 | 4,303 | 2,195 | 137 | 145 46 | 1·853 | 0·321 | 0·079 | 54·30 |
| Isabelle de Cap Rouge | 5591 | 5 | Sept. 10, 1925 | 296 | 4,672·50 | 15·79 | 4·8 | 266·45 | 106 58 | 11 11 | 117 69 | 2,347 | 8,170 | 3,608 | 80 | 84 | 96 07 | 2·056 | 0·361 | 0·039 | 21·62 |
| Ismène de Cap Rouge | 5586 | 4 | Aug. 10, 1925 | 499 | 7,580·50 | 15·19 | 4·9 | 443·51 | 177 40 | 18 00 | 195 40 | 4,299 | 12,075 | 5,989 | 2,560 | 233 | 181 66 | 2·396 | 0·409 | —0·009 | 13·74 |
| Jacotte de Cap Rouge | 6200 | 2 | Aug. 14, 1924 | 527 | 9,686·25 | 18·38 | 4·9 | 561·08 | 224 43 | 23 02 | 247 45 | 4,270 | 12,248 | 5,852 | 1,055 | 198 | 170 55 | 1·767 | 0·304 | 0·096 | 76·90 |
| Jacqueline de Cap Rouge | 6031 | 3 | Aug. 2, 1925 | 422 | 9,588·50 | 22·72 | 5·6 | 638·34 | 255 34 | 22 62 | 277 96 | 5,144 | 11,635 | 5,455 | 3,145 | 222 | 190 96 | 1·991 | 0·299 | 0·101 | 87·00 |
| Jeanne de Cap Rouge | 6032 | 4 | Nov. 26, 1925 | 334 | 9,045·25 | 27·08 | 4·5 | 483·72 | 193 49 | 21 58 | 215 07 | 3,870 | 10,240 | 4,362 | 2,150 | 160 | 147 52 | 1·630 | 0·305 | 0·095 | 67·55 |
| Julia de Cap Rouge | 6029 | 3 | Nov. 30, 1924 | 452 | 1,096·50 | 24·24 | 4·9 | 639·69 | 255 88 | 26 04 | 281 92 | 4,540 | 14,103 | 6,136 | 950 | 176 | 179 35 | 1·636 | 0·281 | 0·119 | 102·57 |
| Kaffa de Cap Rouge | 6195 | 3 | Aug. 17, 1925 | 356 | 4,611·00 | 13·72 | 4·9 | 266·02 | 106 41 | 10 96 | 117 37 | 2,463 | 8,275 | 4,095 | 367 | 106 | 105 60 | 2·292 | 0·396 | 0·004 | 11·77 |
| Kathleen de Cap Rouge | 6198 | 3 | Aug. 11, 1925 | 343 | 4,367·25 | 12·73 | 4·8 | 245·04 | 98 02 | 10 39 | 108 41 | 2,613 | 8,395 | 4,052 | 930 | 130 | 111 81 | 2·559 | 0·456 | —0·056 | — 3·40 |
| Loretta de Cap Rouge | 6732 | 2 | Sept. 14, 1925 | 341 | 4,254·25 | 12·48 | 4·6 | 232·98 | 93 19 | 10 14 | 103 33 | 3,048 | 9,475 | 4,010 | 710 | 122 | 120 06 | 2·822 | 0·515 | —0·115 | —16·73 |
| Lumina de Cap Rouge | 6639 | 2 | July 23, 1925 | 173 | 9,518·50 | 20·12 | 6·3 | 706·37 | 282 55 | 22 29 | 304 84 | 4,726 | 11,660 | 5,379 | 3,290 | 221 | 182 52 | 1·907 | 0·258 | 0·142 | 122·32 |
| Sylvestre D | 2859 | 12 | Aug. 2, 1925 | 361 | 5,630·00 | 15·60 | 4·5 | 300·25 | 120 10 | 13 44 | 133 54 | 2,615 | 7,835 | 4,205 | 1,095 | 153 | 114 07 | 2·026 | 0·379 | 0·021 | 19·47 |
| Average | ..... | 5 | ..... | 410 | 6,969·59 | 16·99 | 5·15 | 422·30 | 168 92 | 17 59 | 186 51 | 3,498 | 10,664 | 5,063 | 1,274 | 167 | 144·42 | 2·07 | 0·342 | 0·058 | 42·09 |

As the age averaged only five years, the 6,969 pounds of milk with a 5.15 per cent of fat, giving 422.3 pounds of butter, is very good indeed, even if the lactation period was about 45 days longer than the ordinary one of twelve months. The profit per cow, $42.09, could have been brought up to $150.86 if, instead of entering the product as butter, raw milk had been sold at about 5 cents per pint, which would have been possible at Cap Rouge, had skim-milk not been required for calves, pigs, and chicks. In fact, the important point is not the return per cow, nor the cost of production, but rather the relation between the two, and it is obvious that selling raw milk at a high figure, instead of butter at a comparatively much lower one, makes all the difference in the relation between the return per cow and the cost of production. The latter, of course, remains the same in both methods of sale.



French-Canadian mares and fillies. All are prize-winners and were bred at the St. Joachim Experimental Horse Station.

## HORSES

On January 1, 1927, there were 64 registered French Canadian horses at the St. Joachim Station, which is under the management of the Cap Rouge Superintendent: 3 stud horses, 11 young stallions, 3 weaning colts, 26 mares, 12 fillies one to three years of age, and 9 weanling fillies. This stud has won more first prizes and diplomas during the last five years than all the other studs of the breed combined. The main object of the Station is to do experimental breeding work, but there are also quite a number of projects under way in regard to feeding, housing, and management.

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

## SWINE

A start was made a couple of years ago at building up a herd of Yorkshires, and, at the beginning of 1927, there were 2 boars, 1 of them imported, 6 brood sows, 3 gilts, and 12 fall pigs, all registered. Out of the six original sows, only three are left, the others not having produced good enough offspring to be kept. Amongst the three old matrons, one has given such uniform pigs that three of her gilts were picked for breeders in 1925 and three others in 1926. These Yorkshires will be used especially for experimental breeding, but also for projects in regard to feeding, housing, and management.

# FIELD HUSBANDRY

### COST OF PRODUCING FARM CROPS

Profits from his crops are what interests farmers, but it is sometimes difficult to decide just what crops are the best to grow. Rather than recommend, in a general way, that roots, for instance, should be grown instead of silage, or that silage be grown instead of hay, it is probably better to give details as to the respective cost per ton, not only of raw material, but of dry matter, even of digestible dry matter, so that every man may select the right crop to fit his own particular conditions. If one is so situated as to have the manual labour of his family for nothing, a crop of swede turnips, which would cost a great deal too much to a neighbour without a family, could be grown with profit. And a dairyman with a large herd, selling raw milk at a comparatively high price, may profitably grow a silage crop whilst another one with a limited number of cows, and far from the railway, may find it more advantageous to use only clover hay, especially if the milk goes to the factory at a rather low figure.

The following table gives details about the average crop which may be expected, for an average of years, when conditions are such as prevail at Cap Rouge: a sandy loam of average fertility, well manured and tilled, not suffering too much from lack of drainage; during the six growing months from May to October inclusive a mean temperature averaging 56.60 degrees Fahrenheit; precipitation 25.65 inches; sunshine 1,026.3 hours; and frost-free season of 135 days.

FIELD CROP AREAS AND YIELDS AT CAP ROUGE—FIFTEEN YEARS

| Year | Longfellow Corn | | | Good Luck Swedes | | | Banner Oats | | | Timothy Hay | | | Clover Hay | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Area | Total yield of green corn | Yield per acre | Area | Total yield of roots | Yield per acre | Area | Total yield of grain | Yield per acre | Area | Total yield of cured hay | Yield per acre | Area | Total yield of cured hay | Yield per acre |
| | acres | pounds | pounds | acres | pounds | pounds | acres | pounds | pounds | acres | pounds | pounds | acres | pounds | pounds |
| 1912 | 4·88 | 122,925 | 25,189 | 3·00 | 88,920 | 29,640 | 34·36 | 42,808 | 1,246 | 51·00 | 129,000 | 2,529 | 7·00 | 28,000 | 4,000 |
| 1913 | 7·31 | 40,185 | 5,497 | 3·00 | 33,790 | 11,263 | 25·46 | 22,632 | 889 | 21·75 | 65,250 | 3,000 | 27·15 | 108,600 | 4,000 |
| 1914 | 9·92 | 144,082 | 14,524 | 7·67 | 301,354 | 39,290 | 10·89 | 28,955 | 2,659 | 37·13 | 153,904 | 4,145 | 4·00 | 19,805 | 4,951 |
| 1915 | 17·35 | 349,652 | 20,153 | 10·80 | 309,643 | 28,671 | 14·68 | 31,560 | 2,150 | 12·03 | 34,717 | 2,886 | 19·37 | 55,019 | 2,840 |
| 1916 | 17·84 | 307,980 | 17,264 | 5·00 | 182,725 | 36,545 | 15·00 | 36,300 | 2,420 | 14·20 | 41,505 | 2,923 | 15·00 | 46,275 | 3,085 |
| 1917 | 9·38 | 171,047 | 18,235 | 4·00 | 67,130 | 16,782 | 21·19 | 29,179 | 1,377 | 14·07 | 65,425 | 4,650 | 22·22 | 119,698 | 5,387 |
| 1918 | 8·60 | 81,290 | 9,452 | 4·00 | 60,755 | 15,189 | 10·23 | 17,335 | 1,695 | 17·65 | 96,015 | 5,440 | 29·01 | 133,716 | 4,609 |
| 1919 | 18·99 | 397,444 | 20,929 | 4·00 | 45,640 | 11,410 | 20·79 | 24,437 | 1,175 | 16·00 | 72,480 | 4,530 | 14·36 | 61,116 | 4,250 |
| 1920 | 14·13 | 203,348 | 14,391 | 4·00 | 111,334 | 27,833 | 21·48 | 32,313 | 1,504 | 17·00 | 71,963 | 4,233 | 20·00 | 83,828 | 4,191 |
| 1921 | 21·07 | 437,698 | 20,774 | 4·00 | 89,185 | 22,296 | 23·00 | 35,530 | 1,545 | 19·39 | 61,869 | 3,191 | 17·14 | 37,072 | 2,163 |
| 1922 | 21·56 | 386,220 | 17,913 | 1·76 | 35,820 | 20,352 | 29·00 | 58,222 | 2,008 | 4·00 | 26,480 | 6,620 | 22·37 | 99,658 | 4,459 |
| 1923 | 19·80 | 479,355 | 24,210 | 0·70 | 19,270 | 27,529 | 26·80 | 33,167 | 1,238 | 14·10 | 60,300 | 4,277 | 22·60 | 82,450 | 3,648 |
| 1924 | 24·83 | 503,585 | 20,281 | 1·90 | 47,200 | 24,842 | 20·58 | 37,395 | 1,817 | 27·79 | 84,435 | 3,038 | 27·95 | 99,890 | 3,574 |
| 1925 | 20·50 | 409,799 | 19,990 | 1·45 | 28,000 | 19,310 | 25·95 | 54,571 | 2,103 | 19·82 | 106·360 | 5,366 | 23·23 | 129,070 | 5,556 |
| 1926 | 25·84 | 470,605 | 18,212 | ..... | ..... | ..... | 16·15 | 34,349 | 2,127 | 8·55 | 38,480 | 4,348 | 25·85 | 199,332 | 7,711 |
| Average | 16·13 | 300,348 | 18,620 | 3·68 | 94,717 | 25,738 | 21·04 | 34,583 | 1,644 | 19·63 | 73,879 | 3,764 | 19·81 | 86,902 | 4,386 |

YIELD PER ACRE, COST PER ACRE AND PER TON, OF RAW MATERIAL, DRY MATTER, AND DIGESTIBLE NUTRIENTS IN THE FIVE MAIN CROPS OF CENTRAL QUEBEC

Knowing the average number of pounds per acre of each of the main crops of the district, the next thing to get at is the cost of production, and this is given in the following tables. Accurate records were kept, from 1911 to 1926 inclusive, on 189 plots of about an acre each of Longfellow corn grown for silage, Good Luck swede turnips, Banner oats, clover hay, and timothy hay. The large number of plots and of years should give weight to the data. The actual number of pounds of seed, of twine, of crop, and of hours of manual and horse labour were taken for each plot each year and used in compiling these figures.

COST PER ACRE OF PRODUCING CORN FOR SILAGE AT CAP ROUGE

| Item | Statement | Amount |
|---|---|---|
| | | $ cts. |
| 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 38 |
| Seed | ⅔ bushel at $2.20 | 1 46 |
| Machinery | Depreciation, interest, repairs and housing | 2 85 |
| Manual labour | 113·81 hours at 30 cents | 34 14 |
| Horse labour | 96·62 hours at 10 cents | 9 66 |
| | Total cost per acre | 67 29 |

COST PER ACRE OF PRODUCING SWEDE TURNIPS AT CAP ROUGE

| Item | Statement | Amount |
|---|---|---|
| | | $ cts. |
| 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 38 |
| Seed | 3 lb. at 55 cents | 1 65 |
| Machinery | Depreciation, interest, repairs and housing | 2 85 |
| Manual labour | 160·36 hours at 30 cents | 48 11 |
| Horse labour | 88·9 hours at 10 cents | 8·90 |
| | | 80 69 |

COST PER ACRE OF PRODUCING OATS AT CAP ROUGE

| Item | Statement | Amount |
|---|---|---|
| | | $ cts. |
| 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 27 |
| Seed | 2·5 bush. at 66 cents | 1 65 |
| Machinery | Depreciation, interest, repairs and housing | 2 85 |
| Twine | 2·3 lb. at 17 cents | 0 39 |
| Threshing | 45 bush. at 4 cents | 1 80 |
| Manual labour | 36·20 hours at 30 cents | 10 86 |
| Horse labour | 43.38 hours at 10 cents | 4 34 |
| | Total cost per acre | 35 96 |

COST PER ACRE OF PRODUCING CLOVER HAY AT CAP ROUGE

| Item | Statement | Amount |
|---|---|---|
| | | $ cts. |
| 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 | 7 52 |
| Seed | Actual value | 3 54 |
| Machinery | Depreciation, interest, repairs and housing | 2 85 |
| Manual labour | 13·16 hours at 10 cents | 3 95 |
| Horse labour | 10·80 hours at 10 cents | 1·08 |
| | Total cost per acre | 23 74 |

COST PER ACRE OF PRODUCING TIMOTHY HAY AT CAP ROUGE

| Item | Statement | Amount |
|---|---|---|
| | | $ cts. |
| 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 53 |
| Seed | Actual value | 3 54 |
| Machinery | Depreciation, interest, repairs and housing | 2 85 |
| Manual labour | 12·83 hours at 30 cents | 3 85 |
| Horse labour | 10·26 hours at 10 cents | 1 03 |
| | Total cost per acre | 18 60 |

The point for a farmer is not to grow the largest quantity of raw material, even of dry matter per acre, but to grow whatever will produce a ton of digestible nutrients at the lowest cost per ton. Dairying is the main branch of agriculture in Central Quebec. The percentages of digestible nutrients used in the following table (from Henry & Morisson), were chosen as relating to ruminants:—

YIELD PER ACRE, COST PER ACRE AND PER TON, OF RAW MATERIAL, DRY MATTER, AND DIGESTIBLE NUTRIENTS IN THE FIVE MAIN CROPS OF CENTRAL QUEBEC

| Crop | Raw material | | | Dry matter | | | | Digestible nutrients | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pounds per acre | Cost per acre | Cost per ton | % | Pounds per acre | Cost per acre | Cost per ton | % | Pounds per acre | Cost per acre | Cost per ton |
| | | $ | $ | | | $ | $ | | | $ | $ |
| Longfellow corn (for silage) | 18,620 | 67 29 | 7 23 | 20·7 | 3,854 | 67 29 | 34 92 | 14·3 | 2,663 | 67 29 | 50 54 |
| Cood Luck swedes | 25,738 | 80 69 | 6 27 | 10·9 | 2,805 | 80 69 | 57 53 | 9·4 | 2,419 | 80 69 | 66 71 |
| Banner oats (grain only) | 1,644 | 35 96 | 43 75 | 90·8 | 1,493 | 35 96 | 48 17 | 70·4 | 1,157 | 35 96 | 62 16 |
| Timothy hay | 3,764 | 18 60 | 9 88 | 88·4 | 3,327 | 18 60 | 11 18 | 48·5 | 1,826 | 18 60 | 20 37 |
| Clover hay | 4,386 | 23 74 | 10 83 | 87·1 | 3,820 | 23 74 | 12 43 | 50·9 | 2,232 | 23 74 | 21 27 |

It is probably a surprise to many to see that there are nearly as many pounds of digestible nutrients in a one-acre crop of 4,386 pounds of clover hay as there are in one of 25,738 pounds of Swedes. And when it is seen that it costs $23.74 to produce this one acre of clover hay compared with $80.69 for the swedes, it is easy to understand that succulence will need be worth a great deal to make up the difference. The plain fact 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

During nine years, autumn ploughing was compared with spring ploughing for ensilage corn. All manual and horse labour were recorded for this experiment on 68.04 acres, from 1917 to 1925 inclusive. The following tables give details:

## Comparison of Autumn and Spring Ploughing for Ensilage Corn

*Autumn Ploughing*

| Year | Area | Total yield | Yield per acre | Hours and value of labour per acre | | | | | | | | | | Total cost | Cost per ton |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Man | | 1 horse | | 2 horses | | 3 horses | | Tractor | | | |
| | Acres | Pounds | Pounds | Hours | at 25c. | Hours | at 10c. | Hours | at 20c. | Hours | at 30c. | Hours | at $1.00 | | |
| 1917 | 4·67 | 86,957 | 18,620 | 77·5 | $ 19·37 | 0·75 | $ 0·07 | 21·5 | $ 4·30 | 3·5 | $ 1·05 | ..... | ..... | $ 24·79 | $ 2·66 |
| 1918 | 3·80 | 38,670 | 10,176 | 72·0 | 18·00 | 0·75 | 0·07 | 18·0 | 3·60 | 3·0 | 0·90 | ..... | ..... | 22·57 | 4·43 |
| 1919 | 4·21 | 69,647 | 16,543 | 81·5 | 20·37 | ..... | ..... | 29·5 | 5·90 | 3·5 | 1·05 | ..... | ..... | 27·32 | 3·30 |
| 1920 | 4·20 | 52,833 | 12,579 | 83·5 | 20·87 | ..... | ..... | 32·5 | 6·50 | 2·5 | 0·75 | 15·0 | $ 15·00 | 43·12 | 6·85 |
| 1921 | 4·68 | 112,765 | 24,095 | 79·0 | 19·75 | ..... | ..... | 27·5 | 5·50 | 3·0 | 0·90 | 9·5 | 9·50 | 35·65 | 2·96 |
| 1922 | 3·25 | 47,090 | 14,489 | 53·3 | 13·32 | 0·62 | 0·06 | 22·8 | 4·56 | 2·1 | 0·63 | 4·1 | 4·10 | 22·67 | 3·13 |
| 1923 | 2·77 | 79,610 | 28,740 | 38·3 | 9·57 | 2·17 | 0·22 | 17·8 | 3·56 | 1·6 | 0·48 | 1·6 | 1·60 | 15·43 | 1·07 |
| 1924 | 2·89 | 65·115 | 22,887 | 33·2 | 8·30 | 0·90 | 0·09 | 12·7 | 2·54 | 2·0 | 0·60 | 1·3 | 1·30 | 12·83 | 1·12 |
| 1925 | 3·18 | 53,292 | 16,758 | 129·8 | 32·45 | 5·30 | 0·53 | 15·7 | 3·14 | ..... | ..... | 3·5 | 3·50 | 39·62 | 4·73 |
| Average | 3·74 | 67,442 | 18,321 | 72·0 | 18·00 | 1·16 | 0·12 | 22·0 | 4·40 | 2·3 | 0·71 | 3·9 | 3·90 | 27·13 | 2·96 |

*Spring Ploughing*

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1917 | 4·71 | 84·090 | 17·854 | 93·5 | $ 23·37 | 0·75 | $ 0·07 | 10·5 | $ 2·10 | 3·5 | $ 1·05 | ..... | ..... | $ 26·59 | $ 2·98 |
| 1918 | 4·80 | 42,620 | 8,879 | 91·0 | 22·75 | 0·75 | 0·07 | 8·5 | 1·70 | 3·0 | 0·90 | ..... | ..... | 25·42 | 5·73 |
| 1919 | 4·21 | 51,110 | 12,140 | 104·5 | 26·12 | ..... | ..... | 17·0 | 3·40 | 3·5 | 1·05 | ..... | ..... | 30·57 | 5·04 |
| 1920 | 3·90 | 70·300 | 18,026 | 107·0 | 26·75 | ..... | ..... | 23·5 | 4·70 | 2·5 | 0·75 | 15·0 | $ 15·00 | 47·20 | 5·24 |
| 1921 | 4·68 | 108,255 | 23,131 | 94·5 | 23·62 | ..... | ..... | 16·5 | 3·30 | 3·0 | 0·90 | 9·5 | 9·50 | 37·32 | 3·23 |
| 1922 | 3·25 | 53·420 | 16,437 | 38·2 | 9·55 | 0·62 | 0·06 | 14·4 | 2·88 | 1·2 | 0·36 | 2·8 | 2·80 | 15·65 | 1·90 |
| 1923 | 2·77 | 83·440 | 30·123 | 47·0 | 11·75 | 2·17 | 0·22 | 20·3 | 4·06 | 3·1 | 0·93 | 1·6 | 1·60 | 18·56 | 1·23 |
| 1924 | 2·89 | 68·878 | 23·833 | 34·1 | 8·52 | 0·90 | 0·09 | 10·6 | 2·12 | 0·2 | 0·06 | 1·6 | 1·60 | 12·39 | 1·04 |
| 1925 | 3·18 | 65·935 | 20·734 | 123·5 | 30·87 | 5·3 | 0·53 | 16·6 | 3·32 | ..... | ..... | 3·5 | 3·50 | 38·22 | 3·69 |
| Average | 3·82 | 69,783 | 19,017 | 81·5 | 20·37 | 1·16 | 0·12 | 15·3 | 3·06 | 2·2 | 0·66 | 3·8 | 3·80 | 28·01 | 2·99 |

From these figures, it is seen that the average yield per acre was a little higher on the spring-ploughed ground, but the cost was also somewhat higher, especially for manual labour, due to the greater number of weeds; so that the cost per ton is practically the same, with a difference of only 3 cents in favour of the autumn ploughing. Incidentally, two things are brought out: that the yield per acre is a great factor in the cost per ton, also that a rather long period of years is necessary to come to a fairly correct average; for example, the results would have been quite different if this project had been abandoned at the end of three years.

The soil on which the experiment was conducted is a sandy loam of average fertility, well tilled and manured, and generally not suffering from lack of drainage. The frost-free season is, in a normal year, around 135 days at Cap Rouge. The variety of corn used was Longfellow, throughout.

The conclusion is 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 corn.

### PLANTING CORN FOR SILAGE IN DRILLS OR IN HILLS

A time was when everybody advised planting corn in hills and the growing of as many ears as possible. To some, however, this did not seem the best practice, because there was nothing to show that more digestible dry matter per area could not be grown with a larger number of plants for the same area. An experiment to decide this point was started at Cap Rouge in 1911.

The procedure was to sow Longfellow corn in four different ways: in hills 36 inches apart in all directions, in hills 42 inches apart in all directions, in drills 42 inches apart with plants singled out at 8 inches, in drills 48 inches apart with plants singled out at 8 inches. In 1915, a composite sample was taken from each lot, passed through the fodder-cutter, mixed well, so as to include parts of ears, leaves, stalks, and sent to the Dominion Chemist for analysis.

All the corn from 57.3 acres was weighed, with the following results: drills 48 inches, 20,759 pounds per acre; drills 42 inches, 20,185 pounds per acre; hills 36 inches, 12,402 pounds per acre; hills 42 inches, 12,358 pounds per acre. As there was very little difference in the composition of the corn from the four different lots, the advantage, on the sandy loam of Cap Rouge, was certainly in favour of the drills.

As the experiment was conducted during five seasons, it is thought that the results have weight in regard to the average conditions of climate in Central Quebec. But if a farmer has another kind of soil, he must perhaps act differently. The question has well been summed up by Professor Moore, of Wisconsin, as follows: "No method of planting corn for silage betters the old established method of check-rowing corn on the heavier soils that are quite badly infested with weed growth, and sowing in drills on the mellow soils that are not infested with weeds."

### RATES OF SEEDING OATS

The rate of seeding oats depends upon many things, amongst which are the tillering propensity of different varieties, the size of the kernel, the kind of soil and the fertility of it, and the method of seeding. Less seed will be required with a variety which tillers or which is small-kernelled. Less seed may usually be used on heavy rich land, and when the seed is drilled rather than sown broadcast.

This project was to find out the best rate at which to seed Banner oats with the drill on a sandy loam of better than average fertility and in very good

tilth. The experiment was conducted during eight years, and 96 plots of 1/60 acre were used, comparing thirteen densities—from 1 to 4 bushels per acre with each seeding increasing by a quarter of a bushel.

After five seasons, four of the six best average yields were for densities ranging between 2½ to 3¼ bushels, which are fortunately about the same as the ones used in central Quebec. Three more tests, however, showed that, after deducting the quantity of seed used, the yield of grain per acre was at the rate of 2,001 pounds for 2½ bushels, 1,998 pounds for 3¼ bushels, 1,882 pounds for 2¾ bushels, 1,836 pounds for 3 bushels.

Where all the conditions are practically as above mentioned, the rate of 2½ bushels per acre is recommended. But if the variety, the method of seeding, the kind and condition of soil are not the same, a change in the density may be made. On this question, as in a great number of other procedures, every farmer will have to decide according to his own circumstances.

### KIND OF NURSE-CROP

To find out with which of the ordinary grains the best catch of clover and timothy would be had, it was decided in 1912 to use the ordinary mixture of 8 pounds timothy, 12 pounds red clover, and 2 pounds alsike per acre on each of the trial plots of barley, oats, peas, and wheat. During eight seasons, the hay from all these plots, 440 in number, each 1/60 acre in size, was carefully weighed. The average shows that the crop of clover hay yielded at the rate of 2 tons 1,377 pounds after barley, 2 tons 1,232 pounds after wheat, 2 tons 994 pounds after oats, and 2 tons 95 pounds after peas, as will be seen in the following table:—

COMPARISON OF DIFFERENT KINDS OF NURSE-CROPS

| Year | Barley | | Wheat | | Oats | | Peas | |
|---|---|---|---|---|---|---|---|---|
| | No. of 1-60 acre plots | Yield per acre, Pounds | No. of 1-60 acre plots | Yield per acre, Pounds | No. of 1-60 acre plots | Yield per acre Pounds | No. of 1-60 acre plots | Yield per acre, Pounds |
| 1913 | 13 | 4,687 | 14 | 4,386 | 12 | 3,642 | 10 | 4,944 |
| 1914 | 12 | 2,184 | 15 | 1,927 | 10 | 1,488 | 6 | 2,646 |
| 1915 | 9 | 3,276 | 12 | 3,318 | 18 | 2,822 | 13 | 3,246 |
| 1916 | 10 | 6,432 | 16 | 6,186 | 12 | 6,330 | 10 | 4,752 |
| 1917 | 16 | 6,274 | 18 | 6,281 | 16 | 5,854 | 10 | 4,058 |
| 1918 | 16 | 9,250 | 18 | 9,002 | 14 | 9,467 | 10 | 5,210 |
| 1919 | 18 | 5,651 | 22 | 5,550 | 14 | 5,070 | 10 | 2,430 |
| 1920 | 18 | 5,260 | 20 | 5,193 | 20 | 5,277 | 8 | 5,475 |
| Average for 8 yrs. | 14 | 5,377 | 17 | 5,232 | 14 | 4,994 | 10 | 4,095 |

It must be admitted that the difference between the crop of hay following barley and that following oats, the latter generally used as a nurse-crop in Quebec, is fairly large when one takes into consideration that meadows, and pastures following them, are generally kept from five to eight years before grain is sown again. But it is possible that an early variety of oats, or one with narrower lower leaves, or one with little stooling propensity might give as good results as a nurse-crop as barley. In the meantime, it must be acknowledged that barley may be regarded as the best nurse-crop to obtain a good " catch " of clover and grass seed in a normal season on soils of average quality.

### YIELDS OF CLOVER HAY AFTER DIFFERENT RATES OF SOWING OATS

In a district like central Quebec where the oat crop is the main cereal and where hay and pasture form the bulk of the crops, it is important to see if the grain should be sown thin or thick so as to ensure the best " catch " of clovers and grasses. However, in a project of this kind, it is clear that the results

secured apply only to conditions such as existed for the experiment—in this case, Banner oats on a sandy loam of better than average fertility, and in very good tilth.

From 1913 to 1918 inclusive, 132 plots of $\frac{1}{60}$ acre each were used for this project, with densities increasing by a quarter of a bushel, from 1 to 3½ bushels. The following table gives details about the crops of clover hay after the different densities of oats:—

EFFECT ON YIELD OF CLOVER HAY OF QUANTITY OF OATS SOWN AS A NURSE-CROP

| Year | 1 bushel per acre | | | 1¼ bushel per acre | | | 1½ bushel per acre | | | 1¾ bushel per acre | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yield per acre | | | Yield per acre | | | Yield per acre | | | Yield per acre | | |
| | Lb. | Tons | Lb. | Lb. | Tons | Lb. | Lb. | Tons | Lb. | Lb. | Tons | Lb. |
| 1913 | 2,550 | 1 | 550 | 2,550 | 1 | 550 | 3,360 | 1 | 1,360 | 3,900 | 1 | 1,900 |
| 1914 | 1,500 | 0 | 1,500 | 1,320 | 0 | 1,320 | 1,740 | 0 | 1,740 | 1,800 | 0 | 1,800 |
| 1915 | 1,950 | 0 | 1,950 | 2,490 | 1 | 490 | 1,530 | 0 | 1,530 | 1,950 | 0 | 1,950 |
| 1916 | 4,110 | 2 | 110 | 4,020 | 2 | 20 | 4,440 | 2 | 440 | 4,200 | 2 | 200 |
| 1917 | 6,150 | 3 | 150 | 6,360 | 3 | 360 | 6,750 | 3 | 750 | 6,480 | 3 | 480 |
| 1918 | 8,880 | 4 | 880 | 8,460 | 4 | 460 | 9,000 | 4 | 1,000 | 8,250 | 4 | 250 |
| Average | 4,190 | 2 | 190 | 4,200 | 2 | 200 | 4,470 | 2 | 470 | 4,430 | 2 | 430 |

| Year | 2 bushels per acre | | | 2¼ bushels per acre | | | 2½ bushels per acre | | | 2¾ bushels per acre | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yield per acre | | | Yield per acre | | | Yield per acre | | | Yield per acre | | |
| | Lb. | Tons | Lb. | Lb. | Tons | Lb. | Lb. | Tons | Lb. | Lb. | Tons | Lb. |
| 1913 | 3,960 | 1 | 1,960 | 3,720 | 1 | 1,720 | 3,630 | 1 | 1,630 | 3,150 | 1 | 1,150 |
| 1914 | 1,140 | 0 | 1,140 | 900 | 0 | 900 | 1,140 | 0 | 1,140 | 600 | 0 | 600 |
| 1915 | 1,410 | 0 | 1,410 | 1,470 | 0 | 1,470 | 1,800 | 0 | 1,800 | 2,940 | 1 | 940 |
| 1916 | 4,170 | 2 | 170 | 4,350 | 2 | 350 | 5,490 | 2 | 1,490 | 4,920 | 2 | 920 |
| 1917 | 6,450 | 3 | 450 | 6,180 | 3 | 180 | 5,550 | 2 | 1,550 | 5,760 | 2 | 1,760 |
| 1918 | 8,820 | 4 | 820 | 8,250 | 4 | 250 | 4,950 | 2 | 950 | 4,560 | 2 | 560 |
| Average | 4,325 | 2 | 325 | 4,145 | 2 | 145 | 3,760 | 1 | 1,760 | 3,655 | 1 | 1,655 |

| Year | 3 bushels per acre | | | 3¼ bushels per acre | | | 3½ bushels per acre | | |
|---|---|---|---|---|---|---|---|---|---|
| | Yield per acre | | | Yield per acre | | | Yield per acre | | |
| | Lb. | Tons | Lb. | Lb. | Tons | Lb. | Lb. | Tons | Lb. |
| 1913 | 3,120 | 1 | 1,120 | 2,700 | 1 | 700 | 2,460 | 1 | 460 |
| 1914 | 900 | 0 | 900 | 1,260 | 0 | 1,260 | 855 | 0 | 855 |
| 1915 | 2,490 | 1 | 490 | 2,130 | 1 | 130 | 2,670 | 1 | 670 |
| 1916 | 4,650 | 2 | 650 | 5,610 | 2 | 1,610 | 5,400 | 2 | 1,400 |
| 1917 | 5,910 | 2 | 1,910 | 6,480 | 3 | 480 | 6,660 | 3 | 660 |
| 1918 | 4,410 | 2 | 410 | 8,850 | 4 | 850 | 8,040 | 4 | 40 |
| Average | 3,580 | 1 | 1,580 | 4,505 | 2 | 505 | 4,347 | 2 | 347 |

Taken individually, that is for each density, these results do not mean much, as it is hard to explain, for instance, why the crop of clover hay should have yielded at an average rate of 4,505 pounds per acre after 3¼ bushels of oats, and only 3,580 pounds after 3 bushels. But when all the crops of clover after the lower densities, that is from 1 to 2¼ bushels of oats, are added, it is seen that they average at the rate of 4,293 pounds of hay per acre, whilst the corresponding figure is only 3,969 pounds of hay per acre after the higher densities, that is from 2½ to 3½ bushels of oats.

In another experiment it has been found that a thick seeding of timothy and clover is not absolutely necessary for a maximum crop, and in this case,

it is seen that a comparatively thin seeding of oats will give at least as good results as a thicker one, in the following crop of clover hay. But it should not be forgotten that the land on which these experiments were conducted was well manured and in good tilth, and that more seed should be used on soil which is rather lumpy.

RATES OF SEEDING TIMOTHY AND CLOVER

Though corn and roots will no doubt continue to be grown wherever live stock is kept, especially in dairy districts, there is no evading the fact that hay is, and will be for a very long time yet, the principal crop of Eastern Canada. Where products can be sold at a comparatively high price, it will pay to grow corn and possibly roots, but if milk is sent to the factory and the number of cows is small, hay will be the main forage crop, because it will produce dry matter and digestible nutrients at a much lower cost than the other two mentioned crops.

Clover plots at Cap Rouge. Note one of the plots in full bloom. It is desirable to get strains of timothy and red clover which, from the live stock feeding point of view, will be at their best at the same time.

With time, grass and clover mixtures will be found which will not only yield more hay but also give much better pasture than timothy and red clover alone, though these will probably continue to be the most important components of these mixtures. Already, it is well known that red top and alsike will do better than timothy and red clover on sour soils, also that the addition of alfalfa will generally give a heavier crop. But as timothy and red clover alone are now used by the majority of farmers, it is well to look into the question of the quantity to sow per acre.

From 1913 to 1921 inclusive, 160 plots of one-sixtieth-acre each were used for this project. On half of the number of plots, 8 pounds timothy, 12 pounds red clover, and 2 pounds alsike were sown per acre, with Banner oats as a nurse-crop, whilst the others only received half of these quantities. The thick seeding gave an average of 314 pounds, or about 8 per cent more clover hay

than the thin seeding. From 1912 to 1920 inclusive, the years during which the seed was bought, the average prices were 13.4 cents for timothy, 32.9 for red clover, and 30.7 for alsike, so that it cost $2.81 per acre more for the double quantity of seed used in the thick seeding. To this must be added the manual and horse labour necessary to produce the extra 314 pounds of clover hay.

In studying these results, one should not forget the probable extra crops of hay and pasture in the years following; also that the land used for the experiment was in very good tilth, which gave the smaller quantity of seed the advantage of conditions favourable for germination and growth. This means that on well tilled and manured soil, it is not necessary to sow as large quantities of grass and clover seed as on badly worked or poor land. But with ordinary prices of timothy and clover seed, and under poor conditions of tilth and fertility, the cost of an extra quantity of seed is probably a low premium to pay for the assurance of a better crop of hay.

## HORTICULTURE

### FRUITS

APPLE.—Varieties recommended for Central Quebec: Summer; Rupert, yellow, a C. E. F. seedling, the earliest of all; Yellow Transparent, yellow, a well known commercial sort; Lowland Raspberry, red. Only about 5 per cent of these should be planted as they spoil very fast and will be lost unless there is a very good home demand for them. Autumn: Melba, a splendid C. E. F. seedling of McIntosh; Duchess, an old stand-by which is now gradually crowded out by such good ones as the preceding; Okabena, a Minnesota production which is a high yielder; Petrel, a C. E. F. seedling of extra quality but of poor colour. Around 10 per cent of these will be plenty, as they do not keep very long. Early winter: Wealthy is hard to beat and will probably remain popular for a long while, though Pedro, a C. E. F. seedling, has a lot to recommend it. A commercial orchard containing 35 per cent of these is about well balanced for this district. Winter: McIntosh and Fameuse are the standard kinds, with a preference for the first named, and if something later is required, a few Waltons may be put in. Half of the trees, in new plantations, should be of winter varieties, as they pay best, in the long run.

CHERRY.—Montmorency Large is the variety which is recommended, and Early Richmond, from which much was expected, is a disappointment. For the amateur who only looks to quality of fruit, Vladimir stands at the head; where size and quality of fruit must necessarily come after hardiness and yield, Fouche Morello will suit; where climatic conditions are not severe, Griotte d'Ostheim and Griotte Morello will give the largest cherries.

CURRANT—BLACK.—The highest yielder of all has been Climax, a C. E. F. seedling. A limited number of bushes of this variety are offered each year, 3 for $1, postpaid anywhere in the province of Quebec.

CURRANT—RED.—For size and appearance of fruit, Cherry is an easy leader, but it does not yield nearly as much as Fay. Bushes of the latter are offered at 3 for $1, postpaid anywhere in the province of Quebec.

CURRANT—WHITE.—White Cherry is the heaviest producer, but White Grape is of much better quality and is recommended.

GOOSEBERRY.—The one which has given the best results is a C. E. F. seedling, Silvia, averaging over 15,000 pounds of fruit per acre. Bushes are offered at 3 for $1, postpaid anywhere in the province of Quebec.

GRAPE.—Out of some forty varieties tested, the only ones which are promising are Early Daisy, black; Winchell (also called Green Mountain), green; Wyoming Red, red. The second will probably give satisfaction in most cases, but there are years when it will not mature.

PEAR.—Though sixty-four trees of nine varieties have been planted since 1911, not a single marketable fruit was produced. Pears can certainly not be recommended for Central Quebec, until hardier varieties are bred.

PLUM.—The Europeans do best at Cap Rouge, probably on account of the abundance of moisture in the air, whilst the Americans might succeed well not very far inland. Those that have stood up in the tests are Bonne Ste. Anne, blue, which is hardy, early, and gives a large fruit of high quality; Montmorency, yellow, not quite so hardy, early, and producing a medium-sized fruit of good quality; Quackenboss, blue, the hardiest of all, late, with a large fruit of good quality.

RASPBERRY.—Brighton and Newman 23 are the best of the seventeen varieties tested. The first mentioned has the advantage of remaining on the cane for some time after it is ready to pick and gives a fruit more firm for shipping than that of the latter. The Old Cuthbert may now well be discarded, as it cannot compare with the newer kinds. The greatest care should be taken to get disease-free canes when a plantation is started, and to heavily cull afterwards, as anthracnose will make all the difference between profit and loss. Canes of Brighton and Newman 23 are offered at 6 for $1, postpaid anywhere in the province of Quebec.

The orchards at the Cap Rouge Experimental Station are the largest in Eastern Quebec. Over 100 varieties of apples, cherries, pears, and plums are tested.

STRAWBERRY.—This is easily the most popular small fruit of the district. It is recommended, now that there are so many good perfect varieties, not to plant any of the imperfect sorts. For earliness, Excelsior is the thing, but the quality of the fruit is poor. The amateur who wishes a large showy berry may take Uncle Jim and can put in some of the so-called everbearing kinds, as Progressive, to get some fruit in the autumn. But the commercial grower cannot improve much on Dunlap. Varieties which do well in the south, and that remain firm when put up in jars, are recommended by jam manufacturers, but

most of these varieties are low yielders and should not be grown unless a contract can be had which will place them on the same footing as Dunlap regarding the revenue per acre. Plants of an exceptionally good selection of Dunlap are offered, in limited quantities, 24 for $1, postpaid anywhere in the province of Quebec.

## ORNAMENTAL

### ANNUALS, VARIETY EXPERIMENT

In 1926, seventy-four varieties and strains of annuals were tested, and notes were taken on hundreds during the last fifteen years. Though everybody would like to see the farmer's flower garden as pretty as any, there is not always enough time left to be devoted to this work, so that the list of plantings must of necessity be short. In this case, ageratum and centaurea gymnocarpa (dusty miller) may be used as border plants; antirrhinum (snapdragon), aster, ten-week stock, reseda (mignonette), centaurea cyanus (cornflower) and poppy will give long-stemmed flowers; dimorphotheca (African golden daisy), petunia, schizanthus, and nasturtium are good for ornamentation; balsam, cosmos, kochia, zinnia do well for bedding; and nicotiana is very sweet-scented. To these, the amateur may add browallia, nemesia, and lobelia for the border; ageratum mexicanum, didiscus (blue lace-flower), larkspur, salpiglossis, sweet sultan, scabious for long-stemmed flowers; clarkia for basket ornamentation; petunia and ricinus (castor-oil bean) for the border. Most annuals will do much better, especially from the standpoint of length of time in bloom, if started inside and pricked out at least twice before being planted out, probable exceptions being the larkspurs and the blue lace-flower which may be started outside, as they will thus flower at a time of the year when bloom is very scarce.

### EVERLASTING FLOWERS—VARIETY EXPERIMENT

It is hard to understand why paper flowers are so much used for interior decoration during winter, when everlastings can be so easily grown, requiring no more care than ordinary annuals. Amongst the ones which have succeeded well at Cap Rouge are the following, given in alphabetical order: Acroclinium, in mixtures of rose and white, just as pretty as the English daisy; helichrysum, in yellow, orange, or brown, care being taken to cut the flowers as soon as they come, because they are not so good when in full bloom; rhodanthe, single and double; statices of many varieties; xeranthemum, in a delicate mauve colour. All these are annuals, but there is a perennial statice, the latifolia, also gypsophilia paniculata, for those who would like to save the trouble of sowing every year.

### WILD FLOWERS—VARIETY EXPERIMENT

Some of our wild flowers are very pretty indeed, and may be transplanted safely if one is careful to give them conditions somewhat similar to those to which they are accustomed. For instance, any of the three ferns, Christmas, cinnamon, or holly will do well if put in a place having as much shade as they enjoyed where they were taken from. Amongst the wild flowering plants which may be used are the hepaticas, Trillium erectum, Sanguinaria canadensis, Cornus canadensis, corydalis, mentha, asarum. The violas seem rather hard to transplant, but it is possible to succeed, with enough care. In general, it is better to choose plants growing near the edge of the bush, or at least where there is plenty of sunshine, so that the change may not be too radical when they are brought out in the open of the garden.

HERBACEOUS PERENNIALS, VARIETY EXPERIMENT

In 1926, eighty-six varieties and strains of herbaceous perennials were tested, whilst notes have been taken on hundreds since 1911. A perennial border, once established, requires very little time for the quantity of bloom furnished, and should be near the home of practically every farmer of Central Quebec. To have flowers continually, or practically so, from April to November, the following could be used in the rural garden: April, crocus and pansy; May, narcissus and early tulip; June, Darwin tulip, iris, paeony; July, delphinium (larkspur), digitalis (foxglove), and madonna lily; August, hollyhock; September, phlox; October, rudbeckia purpurea; November, pansy. The amateur can add others to this list, such as scilla and chionodoxa for April; myosotis, violet, Arabis alpina for May; aquilegia, lupine, oriental poppy, lily of the valley for June; sweet william for July; lily, anchusa for August; and Lilium speciosum for September.

A perennial border at Cap Rouge. Just such a border as this can add much to the beauty of the farm home. Notes will be found in this report on the best plants and best varieties to grow.

TREES AND SHRUBS, ORNAMENTAL AND SHELTER, VARIETY EXPERIMENT.

Out of the 124 varieties and strains of ornamental and shelter trees and shrubs tested since 1911, only fifty were left to take notes on during 1926, and out of these, the following may be considered as the best:—

| Name | Class | Hardiness | Length of flowering season days | Height |
|---|---|---|---|---|
| | | | | inches |
| Cornelian Cherry | Decid. tree. | V. H. | ..... | 126 |
| Cut-leaved Maple (Wier) | " | V. H. | ..... | 179 |
| False Indigo | " | H. | July 7—Aug. 22 | 92 |
| Norway Maple | " | V. H. | No date | 203 |
| Rose Acacia (Robinia) | " | V. H. | June 18—July 9 | 162 |
| Western Catalpa | " | V. H. | July 20—Aug. 12 | 132 |
| White Birch | " | V. H. | No date | 211 |
| Colorado Blue Spruce | Conifer..... | V. H. | ..... | 120 |
| Plume Japan Cypress | " .... | H. | ..... | 45 |
| Pyramidal Arborvitae | " .... | V. H. | ..... | 74 |
| Honeysuckle, tatarian | Shrub..... | V. H. | June 8—July 16 | 120 |
| Hydrangea, Large flowered | " ..... | V. H. | July 11—Oct. 12 | 36 |
| Mahonia aquifolium (Barberry) | " ..... | V. H. | May 26—June 12 | 18 |
| Lilac (Charles X) | " ..... | H. | ..... | 28 |
| " (Michel Buchner) | " ..... | H. | ..... | 79 |
| Mock Orange (Bouquet blanc) | " ..... | H. | July 29—Aug. 19 | 96 |
| Neillia opulifolia aurea | " ..... | V. H. | June 18—July 4 | 72 |
| Viburnum (lantana) | " ..... | V. H. | June 7—June 17 | 78 |
| Potentilla fruticosa | " ..... | V. H. | June 7—Sept. 26 | 24 |
| Spirea vanhouttei | " ..... | V. H. | June 11—June 30 | 78 |

## HEDGES, VARIETY EXPERIMENT

During the last fourteen years, eighteen kinds of shrubs and trees have been tested for hedges. Out of these, for reasons not yet quite well understood, White Pine and White Spruce have not done well, Irish Juniper was not hardy enough, Siberian Dogwood was badly subject to attacks of kermes, Alder Buckthorn, Amur Lilac, Cockspur Thorn, Josika Lilac have not enough growth at bottom, whilst Sweet Mockorange and Tatarian Honeysuckle have not been growing long enough to see what they will do. The following table gives details about those which were kept from the original plantations:—

VARIETY TEST OF ORNAMENTAL TREES AND SHRUBS FOR HEDGES

| Name | Kind | Year planted | Height, autumn 1926 | Remarks |
|---|---|---|---|---|
| | | | inches | |
| American Arborvitae | Conifer..... | 1912 | 42 | Very hardy. One of the very prettiest |
| Colorado Blue Spruce | " ..... | 1912 | 44 | Very hardy. " " |
| Norway Spruce | " ..... | 1912 | 44 | Very hardy. " " |
| Alder Buckthorn | Deciduous.... | 1912 | 78 | Hardy; not enough growth at bottom. |
| Amur Lilac | " .... | 1912 | 72 | Very hardy " " |
| Big Scentless Mockorange | " .... | 1922 | 42 | Very hardy " " |
| Cockspur Thorn | " .... | 1912 | 50 | Very hardy " " |
| Goldenwig Dogwood | " .... | 1922 | 34 | Hardy " " |
| Josika Lilac | " .... | 1912 | 54 | Very hardy " " |
| Siberian Pea Tree | " .... | 1912 | 75 | Fine foliage. Very hardy. |
| Thunberg Barberry | " .... | 1912 | 36 | Very hardy. Very fine foliage in autumn. |
| Wayfaring Tree | " .... | 1913 | 45 | Very hardy. |

The best of the conifers are American Arborvitae and Colorado Blue Spruce; but if the latter is bought, an extra number should be had and grown for a year at a place where those which are not true to name—that is, are not really bluish in colour—can be eliminated before the hedge is planted. Amongst the good decidious kinds are Siberian Pea Tree, Thunberg Barberry, and Wayfaring Tree.

LAWN, WEED CONTROL

In this case, the object is to find out how many sprayings of a 25 per cent solution of iron sulphate will be necessary to kill dandelions on a lawn. Plot I is sprayed six times, plot II four times, and plot III is not sprayed. All plants of dandelions are counted. The following table gives details:

SPRAYING WITH IRON SULPHATE TO KILL DANDELIONS ON LAWNS

| 1925 | | | | | | 1926 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Six sprayings | | Four sprayings | | No spraying | | Six sprayings | | Four sprayings | | No spraying | |
| Date of spraying | Number of dandelions | Date of spraying | Number of dandelions | Date | Number of dandelions | Date of spraying | Number of dandelions | Date of spraying | Number of dandelions | Date | Number of dandelions |
| June 10 | 937 | June 10 | 615 | ..... | 527 | June 17 | 629 | June 17 | 767 | June 17 | 586 |
| " 24 | 308 | " 24 | 385 | ..... | ..... | July 2 | 391 | July 2 | 454 | ..... | ..... |
| July 11 | 47 | July 11 | 22 | ..... | ..... | " 16 | 97 | " 16 | 115 | ..... | ..... |
| " 25 | 0 | " 25 | 0 | ..... | ..... | " 30 | 12 | " 30 | 28 | ..... | ..... |
| Aug. 10 | 0 | ..... | ..... | ..... | ..... | Aug. 13 | 0 | ..... | ..... | ..... | ..... |
| " 25 | 0 | Aug. 25 | 17 | Aug. 25 | 594 | " 27 | 0 | Aug. 27 | 35 | Aug. 27 | 681 |

From this, it is seen that six sprayings kill all dandelions, and this is done without affecting the lawn which looks somewhat dark just after receiving the iron sulphate solution but which soon gets green again.

ANTIRRHINUM, VARIETY EXPERIMENT

This is one of the most useful annuals, as plants which do not give many flowers in summer may be brought into the house and furnish bloom during winter. Of the three classes, talls, intermediates, and Tom Thumbs, the latter are only used for bedding purposes, for which they are getting more and more popular. Amongst the others, which are useful not only on the border, but as cut flowers, certain colours, such as red, rose, orange, yellow, seem to be preferred, especially for commerce, whilst white, and rose and white, are not popular. To succeed, seed should be sown inside during the second half of March, pricked out at least twice, and planted out when there is no more danger of frost, which is about the beginning of June in Central Quebec. Care should be taken, when watering the young plants, that they are not wetted, as they will soon damp out. The prettiest of the eight varieties tested was Old Gold, old rose and old gold with a length of stem of 25 inches, and in bloom during 86 days from August 2 to October 27; the second choice was Copper King, dark red, with a length of stem of 24 inches and in bloom during 89 days, from July 30 to October 27; the next was The Rose, old rose, with a length of stem of 24 inches, and in bloom 89 days from July 30 to October 27; another good one is Canary Bird, pure yellow, with a length of stem of 18 inches, in bloom 102 days from July 17 to October 27. The first-named is no doubt the very best, whilst the last is the most profuse bloomer.

CROCUS—VARIETY EXPERIMENT

The crocus has very little value commercially, but it produces the earliest bloom in the spring, so that it should be in all gardens. Only the vernal sorts should receive attention and among these there are such colours as purple, white, yellow, striped. In 1926, the following were tested side by side: Purpurea grandiflora, purple, which was in bloom 20 days, from May 1 to 20, and which is the first choice; Sir Walter Scott, white with purple stripes, in bloom during 18 days, from April 30 to May 17, and coming in second place; Cloth of Gold, yellow, in bloom 14 days, from April 29 to May 12, and placed in third position.

King of the Whites, white with purple base, and Large Yellow were not found as pretty as the first three mentioned. Since 1912, the earliest bloom was in 1925, on April 10, and the latest was in 1926, on April 29. The length of duration of bloom is between 2 and 3 weeks, according to season and variety.

GLADIOLUS—VARIETY EXPERIMENT

Since 1912, 162 varieties of gladiolus have been tested, and 88 were in the trial plots in 1925. Out of these, only 54 will be kept; so that 108 were discarded, during the last 14 years. The gladioli from Cap Rouge, as cut flowers, were never beaten at an exhibition and took first prizes again in 1925, both at Three Rivers and at Quebec. For persons who do not care to pay too much for corms but desire something pretty, the following would do well: Prince of Wales (salmon), Marechal 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 (ashs of roses).

GLADIOLUS—PRODUCING FROM BULBLETS

The object of this experiment is to determine if it is possible to produce first quality gladiolus bulbs in this district from the young bulblets. There are different methods, but the following is the one adapted at Cap Rouge: bulblets are placed in paper bags, with name of variety inside and outside of each, and stored in a cellar where the temperature is kept as much as possible between 35 and 40° F; these bulblets are graded into sizes, sown like garden peas in shallow furrows about the time that gladiolus are planted, and allowed to bloom when they will do so the first year. Out of twenty-five varieties used in 1925, only two did not grow in 1926; from the twenty-three others, nine gave flowers, and those from Byron L. Smith won prizes at Quebec Provincial Exhibition, in rather strong competition.

GLADIOLUS, GROWING COMMERCIALLY

This experiment was conducted in 1925 and in 1926, to see if growing the gladiolus for cut flowers would be a paying proposition near a city of about 125,000 population, like Quebec. Out of 409 corms planted, 259 flowers were sold at 5 cents each, which gave a revenue of $12.95, whilst the total expense was $20.35. The varieties used were America, Halley, Herada, Mrs. Francis King, Mrs. Frank Pendelton jr., Niagara, Panama, Prince of Wales, Red Emperor, Schwaben. Only five of these (America, Herada, Panama, Prince of Wales, Schwaben) are really very much liked by dealers, and it would be better to plant just these, especially as they are not all of the same season. Whites and reds are generally plentiful on the market and should be left aside. Though the financial statement shows a loss, 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. However, a few more years are required before definite conclusions may be arrived at as to profit or loss from growing gladiolus to sell as cut flowers.

HYACINTH, VARIETY EXPERIMENT

No Double Dutch, Grape, Musiari, nor Roman Hyacinth has been tested, only the Single Dutch receiving attention. Notes taken during eight different

seasons, both in the greenhouse and outside, on sixty-four plants of twenty-eight varieties, show that the time in bloom averaged fifteen days, varying from seven to twenty-three. As the widest variations took place the same year, it is probable that variety is an important factor regarding length of time in bloom. Fifteen of the twenty-eight varieties tested have been discarded because they were inferior in some respect to those which were kept, and had nothing special to recommend them. The following have given the best satisfaction, and the average number of days in bloom is given in the bracket: Arentine Arundsen, white, early (14); La Grandesse, white, late (16); King of the Yellows, yellow (10); Buff Beauty, buff (8); Beauty, orchid (8); Gigantea, shell pink (21); Lady Derby, pale pink (14), Moreno, carmine pink (18); La Victoire, carmine (15); Roi des Belges, red (19); Grand Lilas, light blue (21); Menelik, dark blue (7); Lord Balfour, mauve (14). Probably the best six would be La Grandesse, King of the Yellows, Gigantea, La Victoire, Grand Lilas, and Lord Balfour.

IRIS—VARIETY EXPERIMENT

Thirty-eight varieties of German iris have been tested at Cap Rouge since 1911. The outstanding ones are Queen of May (Coquette) which looks very much like an orchid; Kharput, ultramarine; Courcy (Lord Seymour), lilac blue; Madame Chereau, white and blue; Darius, yellow, orange and lilac. To these may be added Duc de Nemours, white and blue, and amongst the ones only tried lately, Chester Hunt, azure blue; Perfection, mauve and violet; Pauline, pansy violet; Monsignor, violet; Mrs. Sherman Wright, yellow; Prosper Langier, maroon. A number of Japanese iris have been added to the collection, but it is yet too early to say much about them.

LILY—VARIETY EXPERIMENT

The notes taken during ten years on fifteen varieties of lilies show that the following are adapted to conditions such as exist at Cap Rouge: Auratum, a plant of which, in 1926, had a stem over 3 feet long with nine large flowers which remained in bloom more than two weeks; Regale, pearl-grey and yellow at the exterior and pale rose at the interior; Speciosum rubrum, in flower near the end of October, "the last but not the least"; Tigrinum, also Elegans, which should be in all collections, as they practically always bloom profusely. Two important things to do, with lilies, is to place them where it will not be always wet, and to cover them up well in the autumn.

NARCISSUS—VARIETY EXPERIMENT

The double narcissus has practically no value as a cut flower so that it did not receive much attention at this Station, and only Van Sion, a yellow "large trumpet", was grown for demonstration purposes. The "stars", "poets", "hoop petticoats", "tazettas", "angel's tears", and "jonquils" may form part of the amateur's garden, but the single "large trumpets" certainly deserve the greatest consideration. The best of them is probably Emperor, a yellow which finds a ready sale practically everywhere, though King Alfred is preferred by some. Glory of Leiden has been very much advertized but it is not as well liked, in Quebec city, as the two above mentioned. Amongst the bicolors, Victoria and Empress are about on an equal footing, but dealers do not like them as well as Emperor.

NARCISSUS—GROWING COMMERCIALLY

Very large quantities of narcissi are forced each year for commercial purposes, especially near American cities, and this project was started to find out the possibilities around Quebec. The experiment started in the autumn of 1920, when 100 bulbs of Emperor were planted 18 inches apart in all directions, in a

good sandy loam. At the end of 1926,the preparation of the land, cost of bulbs, value of manure and fertilizers, also manual labour amounted to $20.53. The number of flowers which could have been sold was 1890 and they would have brought $78.68, leaving a total profit of $58.15, or an average yearly one of $9.69, for a piece of ground about 15 feet square. Double narcissi have practically no market value, and among the singles it is well to choose a variety with a long stem, and which is in demand locally.

### PAEONY—VARIETY EXPERIMENT

The Cap Rouge collection of paeonies comprises forty-seven varieties, and notes are carefully taken for each one of them. Officinalis rubraplena (semi-double, dark crimson) stands in a class by itself for earliness, blooming about the end of May when flowers are at a premium; for size of bloom, an easy leader is Madame Geisler (double, dark pink); Festiva Maxima (double) is the prettiest white; for length of stem, a very good one is La Tulipe (semi-double, pink); to close the season, when all others are gone, there is Felix Crousse (semi-double, carmine-red). Excellent ones amongst those tried in latter years are Gerard (flesh pink to creamy white), Livingstone (soft rose-pink with silvery tips), and Philomele (old rose with amber centre).

### PHLOX, PERENNIAL—VARIETY EXPERIMENT

After having tested thirty-seven varieties of perennial phloxes during the last 10 years, some information may be given regarding the ones which have done best at Cap Rouge. There are three very good whites: Flocons de Neige and Snowdon, which are early, and Jeanne d'Arc, one of the latest; Selma, with a rather bizarre coloration of light pink and a purple-crimson eye; Rynstorm, rose pink; Le Printemps, carmine-rose; Viking, rose; Admiral Jaure, white and carmine; Nuée, violet purple and dark red. Perennial phloxes come at a time when bloom is rather scarce in the garden, so that they are quite useful and should be grown more extensively.

### ROSES—VARIETY EXPERIMENT

During fifteen years, sixty-one varieties of roses have been tested, besides the climbing which are reported on elsewhere. There is no doubt that for hardiness, the Rugosas and their hybrids are easily first, but their flowers are not as pretty, they remain in bloom for a very short while, and they take lots of room, so that they can only be employed for clumps or groups of bushes rather than individually. Practically all those which have done best at Cap Rouge are from the Hybrid Tea and Hybrid Perpetual groups. The main point, for this district, is hardiness, and about ninety per cent have fallen in this regard. The ones which can be recommended are: Frau Karl Druschki, white; Gruss an Teplitz, bright crimson, and Hugh Dickson, crimson. Other good ones are La France, bright pink; Jules Margottin, pink; Mrs. Aaron Ward, indian yellow; Madame Edouard Herriot, coral red, and Mrs. John Laing, soft pink.

### ROSES, CLIMBING—VARIETY EXPERIMENT

Since 1912, eleven varieties of climbing roses have been tested, and as the following have bloomed, notes are given about them: Dorothy Perkins, double, shell pink, is probably first choice both as regards length of season and quality of flowers. A good second is Crimson Rambler, double, crimson, which does not last quite as long, though it is as pretty as the one just mentioned. Tausendchon, double, pink to rosy carmine, would come next; and Trier, a single white, might be added to the collection because it is somewhat different from the others. Goldfinch, a single pale yellow, and Lady Gay, a double carmine rose, also flowered, but they are not to be compared with the four above named, either as to the number of days they were in bloom, or as to the quality of the flowers.

SWEET PEAS—VARIETY EXPERIMENT

During the last fifteen years, 222 varieties and strains of sweet peas were tested, amongst which were the best from England, the United States, and Canada. It is possible that some of the seed bought in England was produced in British Columbia. In 1926, notes were taken on eighty-five varieties and strains, and only forty-eight were deemed good enough to be continued in 1927, the others being either practically the same as some which were retained, or not possessing the desired qualities. 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 not wanted, the most popular ones being whites, roses, creams, mauves, and blues. The twelve prettiest ones are the following, which are not placed in order of merit, because they are practically all of the same value:

NOTES ON THE TWELVE BEST SWEET PEAS OF 1926

| Name | Colour | Days in bloom | From | Length of plant |
|---|---|---|---|---|
| | | | | Inches |
| King White | White | 58 | July 29 to Sept. 25 | 54 |
| Matchless | Cream | 63 | " 27 " " 28 | 64 |
| Daisybird | Light Pink | 61 | " 25 " " 23 | 48 |
| Chevalier | Rose | 56 | Aug. 1 " " 25 | 50 |
| Celeste | Light Blue | 55 | July 29 " " 22 | 36 |
| Sapphire | Blue | 61 | " 27 " " 28 | 53 |
| Royal Scot | Light Red | 62 | " 29 " " 25 | 42 |
| Fordhook Orange | Orange | 59 | " 31 " " 28 | 42 |
| Charity | Red | 57 | Aug. 1 " " 20 | 50 |
| Commander Godsell | Dark Blue | 64 | July 26 " " 28 | 46 |
| Bacchus | Maroon | 66 | " 24 " " 28 | 50 |
| Elegance | Blush | 53 | Aug. 3 " " 25 | 50 |

SYRINGA—VARIETY EXPERIMENT

Out of seventeen varieties of lilacs tested during the last fifteen years, the following have not been found hardy enough: Charles Joly, Chinensis (var?), Congo, Léon Simon, Melle F. Viger, Mme. F. Morel. The following table gives details, for 1926, about some of the good ones:—

FOUR GOOD LILACS TESTED AT THE CAP ROUGE STATION 1926

| Class | Name | Single or Double | Height Inches | In bloom From | To |
|---|---|---|---|---|---|
| Amurensis | | S | 72 | May 1— | May 16 |
| Villosa | | S | 74 | June 20— | July 8 |
| Vulgaris | Charles X | S | 28 | June 13— | June 30 |
| " | Michel Buchner | D | 28 | June 14— | June 29 |

The two last mentioned are the best, but the others may be planted by those who wish to have earlier bloom and taller shrubs.

TULIP—VARIETY EXPERIMENT

During the last eleven years, one hundred and eleven varieties of tulips have been tested, from six groups, and only twenty of them have been kept for further consideration. The Single Earlies and Double Earlies are generally used for bedding, the Cottages, Darwins, and Breeders for cut flowers, and the Parrots for ornamenting the garden. Amongst the Single Earlies, Pottebakker

Scarlet (scarlet) is probably the best, with Duchesse de Parma a very close second; and Couleur Cardinal (bronze-scarlet) deserves attention. The prettiest of the Double Earlies is Couronne d'Or (yellow and orange), followed by one only lately tried, Salvator Rosea (dark pink). Picotee (white-carmine), and La Merveille (salmon-scarlet) stand at the head of the Cottages, though two newly arrived, Avis Kennicott (yellow) and Fairy Queen (lilac and amber) have much merit. The Darwins are justly the most popular in Central Quebec, and the three old favourites are hard to beat: Pride of Haarlem (rosy-carmine), Clara Butt (clear pink), Rvd. Ewbank (lavender-violet); for an odd one, La Tulipe Noire (maroon-black) is in a class by itself; and amongst the new comers, Margaret (silvery-rose), and Mme. Krelage (lilac-rose) are worthy of trial. Cramoisie Brilliant (carmine-red, striped black) is a very good Parrot.

### TULIPS—COMMERCIAL GROWING

The object was to find out if a plantation of tulips would pay to sell as cut flowers. Fifty bulbs each of Baronne de la Tonnaye, Clara Butt, Pride of Haarlem, and Reverend Ewbank were planted in the autumn of 1923. The cost of the 200 bulbs was $3, the 800 pounds of manure amounted to $3.20, the preparation of the land, 10 feet by 10 feet, was 60 cents. In 1924, 186 flowers were sold at 6 cents each, which brought $11.16, whilst 60 cents was spent for labour. In 1925, only 48 flowers were sold, and they only brought $1.80, because they were not of the highest quality, and $1.95 had to be expended for labour. In 1926, just 30 flowers were sold, and they only brought $1.13, again because they were of rather poor quality, whilst 25 cents was spent for labour and 2 pounds of bone meal. The result of this experiment shows that there is too much risk in commercial growing of tulips out-of-doors. When they are in beds, the flowers look well, even if from old bulbs, but when they are cut for bloom and examined individually, it is seen that Darwins are apt to be spotted, which decreases their value very much. In the border, if half of the bulbs do not bloom, it does not make much difference, whilst this is too large a loss for the commercial grower.

## VEGETABLES

Asparagus.—Eleven varieties and strains have been tested, with the result that only Donald Elmira (Dreer) and Washington are now left as worthy of further trial. A Cap Rouge selection of Donald Elmira is the most productive of all, though the spikes are green and rather small. Seed and plants of this are for sale each year at reasonable prices.

Bean, Garden—Out of seventy-one varieties and strains tested since 1911, only about half a dozen can be recommended. The limas are generally too late for this district, and the poles too costly to grow, on account of the stakes required, so that the kidneys alone are suitable. Stringless Green Pod is of the highest quality, though its colour is against it on many markets. Hodson is the heaviest bearer amongst the wax-podded kinds, but grows too large for discriminate buyers. Pencil Pod, all told, is probably the best, and seed from a good Cap Rouge selection may be had at a comparatively low figure.

Beet, Garden—During the last fifteen years, twenty-four varieties and strains have been tested, of the different types. Eclipse proved the heaviest yielder, but it has not dark-coloured enough flesh to be popular. Black Red Ball is about what is wanted, especially if sold when about 2 inches in diameter. A good selection of this, started in 1915, is available to those who look for quality first.

Cabbage.—Of the twenty-six varieties and strains tested since 1911, Jersey Wakefield has been the earliest, but Copenhagen Market, ready for use about

three days later, is a much better yielder. Succession does well to fill the gap between the summer and winter sorts. As a heavy producer and a good keeper, Danish Roundhead is hard to beat, and seed is offered of a fine Cap Rouge selection.

CARROT, GARDEN—Just twenty-five varieties and strains have been compared at some time or other during the last fifteen years. The earliest no doubt is Guérande, sometimes called Oxheart, which can also be used for forcing. The highest yielder is Hutchinson, but it is a long carrot and not so popular on the Quebec market as the intermediates. Of the latter, Chantenay is probably the best, due to its fair production, smooth shape, and good appearance. A small quantity of seed is grown each year, and may be had at a reasonable price, of a Cap Rouge selection of Chantenay.

CAULIFLOWER.—This is one of the hardest vegetables to grow commercially, as a large percentage of the heads are not often marketable. With a comparatively short season, and a long period of dry weather during summer such as is often experienced at Cap Rouge, a very early variety, like Snowball, must be started under glass, or else a late one used, as Algiers. During the last few years, a variety called Monarch has done very well.

CELERY.—White Plume for very early use, Golden Self Blanching for the main crop, and Giant Pascal for a good keeper, is a combination which is hard to beat. Market requirements will be a guide to the grower as to the percentage of each which should be put in.

CORN.—Out of practically all the well-known varieties and strains of corn tested, only three are of outstanding merit. Early Malakoff is the earliest, ready in 91 days after sowing, and producing the largest number of ears per acre. Golden Bantam comes 13 days later and gives about 2,500 ears less per acre; compared with Early Malakoff, it only has its well known name in its favour. Country Gentleman does well for a late variety, coming in over a month after Early Malakoff. A selection of the last named was made at Cap Rouge and seed is available each year.

CUCUMBER.—For pickling, Chicago is the right sort. Out of the standard varieties, a good strain of White Spine cannot be beaten. Two good ones are Fordhook Famous and Davis Perfect.

MUSKMELON.—The season is too short for muskmelons in Central Quebec, and they should be started under individual cold frames to have any chance of succeeding. Early Green Citron is the surest of all the ones tried, but, at best, it is only suitable for the home garden. Amongst the real commercial varieties, Hackensack and Montreal Market could be tried.

ONION.—Twenty-four varieties of onions, of different shapes and colors, have been tested since 1911. It was found that seed sown in hot-beds will give plants ready to put in as soon as the ground is fit, and produce a much more profitable crop than when sown directly outside. Prizetaker, thus treated, will be a high yielder, but for ordinary treatment, Red Wethersfield takes the lead, especially as it is a very good keeper during winter.

PEA, GARDEN.—About seventy varieties have been tested, during latter years, including smooth, wrinkled, climbing, semi-dwarf, dwarf, early, mid-season, late, and peas of different colours. The climbing sorts, on account of stakes, are too costly to grow commercially. Amongst the others, Gregory Surprise is the earliest, being ready for use 58 days after sowing, and Juno is the heaviest yielder, averaging 1,763 quarts of shelled peas per acre. An extremely good selection of the latter, made at Cap Rouge, is available each year.

POTATO.—After carefully testing a great number of varieties, it is safe to say that nothing excels Irish Cobbler for an early sort and Green Mountain for the main crop. Certified seed should be procured, as if diseased tubers are

used, there is not much money in growing this crop. A variety by the name of Dooley has done exceedingly well at Cap Rouge, but growers would do well to continue growing the two standard ones.

PUMPKIN.—A very heavy crop may be grown of varieties such as Large Field, Jumbo, or Mammoth, going up to 25 tons per acre, but there is very little demand for them, the market generally requiring smaller kinds like Sugar, which will make more money though producing only about half the weight of the larger sorts.

RHUBARB.—Out of six varieties tested since 1911, St. Martin has proved by far the heaviest yielder, and though it is not highly coloured, it finds a ready sale on the Quebec market. Roots of this are for sale each year. A Central Experimental Farm selection, Ruby, is very highly coloured, and it will be compared with St. Martin for revenue per acre.

SQUASH.—The Crooknecks and Scalloped may be interesting in appearance, but the edible portion is so small that they are hard to sell. For yield, nothing equals Long Vegetable Marrows; for quality, the Hubbards just fill the bill; and for the person who has a limited area of ground at his disposal, the Bush Marrows will suit best.

TOMATO.—The main quality in a commercial tomato in Central Quebec is earliness. It would, of course, be best to grow a smooth early tomato, but it is better to grow a rough early one than a smooth late one. Practically only strains of Earliana suit the short season of the district, and the Cap Rouge Station has brought one out, called Capiana, which gives a larger proportion of ripe fruit early in the season than any of the 80 varieties and strains tested since 1911. Seed of this is offered each year.

TURNIP, GARDEN.—Swedes are better liked for the table, in the district, than the regular garden turnip such as Purple Top Milan. One of the best of the former is Skirving, but either Good Luck or Bangholm will suit the purpose.

WATERMELON.—This should not be grown commercially, as the season is too short. For the home garden, any of the following may be tried: Red Citron, Cole Early, Ice Cream, Florida Favourite.

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NOTE.—The reader is referred to the 1925 report of the Cap Rouge Station for details regarding 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 bean or of pea 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, turnips at different distances.

## CEREALS

### BARLEY

For an average of thirteen years, barley has only yielded at the rate of 1,541 pounds of grain per acre, at Cap Rouge, whilst wheat gave 1,596, field peas 2,158, and oats 2,307; so that it is not profitable to grow it for live stock feeding, even if it contains about 3 per cent more digestible nutrients than peas and 9 per cent more than oats. In general, with the exception of Early Chevalier, the six-rowed varieties have been earlier and have yielded more than the others. A Cap Rouge selection of Manchurian has done better than all others, the figures;

for the three highest yielders, being, for an average of seven years, at the rate of 1,849 pounds of grain per acre for Manchurian Cap Rouge 14, 1,776 for Early Chevalier, and 1,763 for O.A.C. 21. Seed of Manchurian Cap Rouge 14 barley is offered for sale each year, in sealed bags, at a reasonable price.

### BEANS, FIELD

Because field beans do not produce as much digestible nutrients or protein per acre as field peas, they can only be considered from the point of view of human consumption. To make money with them, a variety must be chosen which will suit the district where grown, as white beans sell well at some places while coloured ones are a drug on the market, and vice versa. Anthracnose should be avoided by culling from the seed plot not only the beans which show the disease but also the beans from affected pods. For an average of five years, the production per acre has been at the rate of 1,996 pounds for Norwegian, yellowish brown, of medium size; 1,800 for Navy A, white, medium to large; 1,532 for Large White, white, large; 1,389 for Beauty, white with yellow spots, medium to small.

### FLAX

It has been conclusively shown at Cap Rouge that both climate and soil are favourable for the production of flax for fibre in this district, but until machines are devised to cut down manual labour, especially for pulling, this crop cannot compete profitably with others in Central Quebec. Longstem is the best variety to be grown for fibre, as it will grow from 25 to over 50 per cent longer than others. When it comes to seed production, Novelty is at the head, with an average production for six years, at the rate of 1,453 pounds per acre. In flax, there are no "dual purpose" varieties which are as advantageous to grow as the two above mentioned.

### OATS

Oats produced, at Cap Rouge, on soils varying from a sandy to a clayey loam, so many more pounds of digestible nutrients per acre than barley or wheat, that they will no doubt, for a very long time, continue to be the main grain crop of Central Quebec. Tests of at least five years' duration have shown that a variety which takes a comparatively long time to mature, such as Banner, will outyield early ones like Daubeney and very early ones like Eighty Day, the production being respectively at the rates of 2,384, 2,191, and 1,991 pounds of grain per acre. Side-oats were also compared with Banner, and a very good variety, Leader, produced about 15 per cent less than the open-headed one. Hulless sorts, like Liberty, were also tested for a period of five years, but even in taking out the hulls of Banner, the latter produced more "meat" per acre. The three varieties which have consistently stood at the top are Banner, Victory, and Gold Rain. The latter, on account of the yellowish colour of its kernel, is not liked commercially, and as Banner is much better known than Victory, and a little ahead of it for yield, it is strongly recommended. A Cap Rouge selection, Banner Cap Rouge 31, has beaten all other sorts tested with it for five years, and seed is offered every year, in sealed bags, at a reasonable price.

### PEAS, FIELD

For an average of thirteen years, field peas have produced at an average rate of 410 pounds of protein per acre, compared with 208 for oats, 149 for barley, and 147 for wheat. As protein is by far the most costly part of the ration of live stock, it is seen that field peas are the most profitable of the grains grown in Central Quebec for this purpose. And as there is a good demand

in this district for peas for human consumption, this legume, which can take a great deal of its nitrogen from the air, should be grown more than it is. Only white peas find a ready sale for cooking, and Arthur is strongly recommended. Very uniform strains have now been isolated at Cap Rouge and seed of some of these selections is offered at a reasonable price.

#### WHEAT, COMMON SPRING

Wheat is out of question in this district, when grown for live stock feed, as it cannot produce enough, compared with oats or with field peas. Even for persons desiring to grow it for flour, it is better to leave aside the well known varieties of the West, such as the Fifes, or Marquis, as they do not yield as much as Huron. The latter is strongly recommended. It may not give quite as good a bread as the others, though it would probably take experts to find the difference, but it produces so much more grain per acre that it should be grown in Central Quebec. A selection made at this Station, Huron Cap Rouge 7, has yielded, for an average of seven years, at the rate of 1,649 pounds of grain per acre, compared with 1,472 for Marquis, and seed is offered each year, in limited quantities, at a reasonable price.

#### MIXTURES FOR GRAIN PRODUCTION

In careful tests, mixtures of barley and oats, barley, oats and wheat, peas and oats have not produced as many pounds of grain per acre as oats alone. The latter, at Cap Rouge, as already pointed out, yield more than barley, peas or wheat and probably suffer when competing for room with the other grains which all produce less. For an average of five seasons, Manchurian barley and Daubeney oats yielded at the rate of 1,368 pounds of grain per acre whilst, for the same years, Daubeney oats alone yielded at the rate of 1,563 pounds; for another period of five years, Duckbill barley and Banner oats yielded at the rate of 1,740 pounds of grain per acre whilst, for the same seasons, Banner oats alone yielded at the rate of 2,155 pounds; for a period of three years, Duckbill barley, Banner oats, and Huron wheat yielded at the rate of 1,790 pounds of grain per acre, and for the same seasons, Banner oats alone yielded at the rate of 2,110 pounds; for a period of four years, Arthur peas and Banner oats yielded at the rate of 1,807 pounds of grain per acre, whilst Banner oats alone yielded at the rate of 2,167 pounds. If it is desired to grow a mixture, the latter is recommended, because it may be used for soiling, for hay, for ensilage, or for grain, as desired, and the percentage of protein, which is the most costly part of the ration, will be high when the grain is left to ripen.

## FORAGE PLANTS

### ENSILAGE CROPS

#### INDIAN CORN

After twelve years of testing, it was found out that small varieties like Free Press, Gehu, Ninety Day, Quebec Yellow, and Twitchell Pride, though maturing earlier than others, did not give enough tonnage to bring up to a profitable point the number of pounds of digestible nutrients per acre. Longfellow has always been recommended as the best for silage production, but unless it stands up better during the next few years, a couple of others will probably take its place. Practically nothing has been done in systematic corn-breeding to produce commercial seed, and when testing varieties, it probably often happens that mixtures are compared.

### SUNFLOWERS

Results to date have shown that Giant Russian will outyield all others, giving, in some cases, over 7,000 pounds of dry matter per acre, compared with about 4,500 for varieties like Manteca. That there is a vast difference between strains of Giant Russian is seen by the average yield for three years of a crop from Disco seed of 7,436 pounds of dry matter per acre, 5,778 pounds from seed from McDonald, and 4,233 pounds from seed from the C.P.R. Here again there is lots of work for the plant-breeder.

## ROOT CROPS

### FIELD CARROTS

On a sandy loam of average fertility, well drained, manured, and tilled, field carrots have not given as much dry matter per acre as mangels or swede turnips at Cap Rouge, and they are not recommended for the district. The three types, long, intermediate, and short have been carefully tested, including white and coloured, and if a farmer is so situated that he wishes to grow this class of roots, the best one to choose is the White Belgian.

### MANGELS

On the light and shallow sandy loams of this district, mangels will not produce as much dry matter per acre as swede turnips, and very few of them are grown in Central Quebec. Out of the fifty varieties and strains tested during fifteen years, Yellow Intermediate has been the heaviest yielder. Trouble is often experienced in regard to the germination of mangel seed, and nine different treatments were tried at least five times, with the result that soaking the seed-ball in water for fifteen hours was the more satisfactory, and much more easily done than any other treatment.

### SWEDE TURNIPS

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 are so situated that manual labour can be had at a very low figure, swede turnips will give better results than field carrots or mangels, on the light sandy loams of Central Quebec. Out of some eighty varieties and strains tested since 1911, Good Luck has been the heaviest producer.

### FIELD TURNIPS

These should only be grown to be fed before winter, as they will rot very early. The highest yielders have given more tonnage than any other class of roots, but their use will always be quite limited on account of their poor keeping qualities. Pomeranian White Globe and Yellow Aberdeen are good varieties, but tests have not been conducted long enough to warrant saying that they are the best.

## HAY CROPS

### ALFALFA

Since 1915, a selection of Grimm has been made for hardiness, being sown on unprotected spots, where the snow did not remain, seed gathered from the plants which withstood the rigours of winter, sown again on unprotected spots, and so on. This strain is now compared with a few others, for hay production,

but it is too early yet to come to conclusions. In the meantime, it is much better to sow alfalfa seed which has been produced in the district where it is intended to grow it for hay.

### RED CLOVER

Red clover seed from southern Europe showed up quite badly, for hay production, when compared at Cap Rouge with seed produced in Quebec or in Ontario. A few strains are tested each year, and it is hoped to some day find one that will be hardy, a good yielder of hay, and especially, that will be at its best (from a live stock feeding point of view) at the same time as timothy, so that when the two are cut one will not have to be too ripe, or the other not quite ripe enough, as now happens.

In comparing the profits from two crops of clover cut for hay with one cut for hay and the other for seed, it was seen that there is not much difference; and if there is a little, it is in favour of the two crops of hay. This means that farmers of this district would certainly do well, when possible, to produce their own clover seed, but that they should not embark too hastily in the commercial red clover seed-producing business.

### TIMOTHY

A certain number of strains of timothy have been tested, but it is too early to draw conclusions. A selection made at the Central Experimental Farm, Ottawa, named Boon, has showed up very well, and the sooner it can be put on the market, the better it will be for farmers.

## POULTRY

Thirty-six different experiments have been or are being conducted with poultry. The reader is referred to the 1925 report of the Cap Rouge Station for details regarding the seventeen most important projects.

Some 300 Barred Rocks are kept for experiments in breeding, feeding, housing and management.

### 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. And the size of eggs must not be neglected, because there seems to be a tendency for eggs to get smaller when they are laid in larger quantities. How will close breeding affect egg production? What is the effect of age of bird at the time the first egg is laid? Is there correlation between pause and egg yield? Is the heavy layer during the ordinary winter season, November to February inclusive, the largest producer during the whole year? These are only a few of the questions on which some light will be thrown after a few more years of pedigree work.

### FEEDING

It is obviously difficult to conduct breeding and feeding experiments at the same time unless the flock is large enough to be divided, as it is hard to ascribe the results to one or to the other. If a lot of pullets, specially bred for egg production, are fed a certain ration and produce 40 per cent more eggs than

another low-bred lot fed another ration, the feeding experiment is not worth much. If, on the other hand, a better ration is fed to a certain lot of birds, this may again lead to false conclusions when the breeding records are studied.

It has been found, at Cap Rouge, that beef scrap can be replaced by skim-milk, if the latter is available to the birds at all times; if it freezes and not enough can be taken, there will be a deficiency of protein from animal sources, and egg production will not be as high as it should be. Dry clover leaves, fed in boxes, may replace roots, but on the express condition that the digestive tract of layers be kept in good shape with Epsom salts in the water or milk, or with another mild laxative given at rather frequent intervals. If they are not composed of more than 35 per cent of oats, which have too much fibrous material in the hulls, screenings from the fanning mill may replace commercial grain, as long as they represent about half of the grain which is cleaned. Snow can take the place of water, when the latter may not conveniently be given; but this should not be necessary in many cases.

Early pullets pay better than late-hatched pullets and hens.

## HOUSING

When houses of the same style and shape, but of different widths, were compared, it was found that the range of temperature, that is the difference between the highest and the lowest, increased as the width decreased. This means that the temperature is more equable in a wide than in a narrow house. But one should not go to extremes, as in low-set buildings such as poultry-houses, it is hard to get sunlight to every corner when they are too wide, and the well known germ-killing power of the sun is lost. Houses 12 feet wide are probably too narrow, except for small colonies, whilst 20 feet is probably near the other extreme, 16 feet being the happy medium.

MANAGEMENT

When pullets hatched before May were compared for egg production with later-hatched birds, also with yearling hens and old hens, it was found that, from November to February inclusive, for the same weight of eggs, when it cost $1 to produce them with early pullets, it cost $2.35 with yearling hens, $2.92 with late pullets, and $8.10 with old hens. The cost went up with age when early pullets which had been the most efficient producers were kept as yearlings and as older hens.

EGG PRESERVATIVES

Nine different methods of preserving eggs have been tested for a number of years, with the result that lime-water is found to be the best. For details the reader is referred to Circular 31, The Household Preservation of Eggs, available at the Publications Branch, Department of Agriculture, Ottawa.

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