DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

# ANIMAL HUSBANDRY DIVISION

## INTERIM REPORT OF THE DOMINION ANIMAL HUSBANDMAN

G. B. ROTHWELL, B.S.A.

FOR THE YEAR ENDING MARCH 31, 1921

Clydesdales at the Central Experimental Farm.

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# REPORT OF THE DOMINION ANIMAL HUSBANDMAN

G. B. ROTHWELL, B. S. A.

In presenting the report of the Animal Husbandry Division for the fiscal year ending March 31, 1921, in preface a successful year may be recorded, notwithstanding high costs of production incidental to the period. One of the most serious difficulties met with in the past, shortage of range and pasture, has been partially solved by the acquisition of the grazing privileges of the Connaught Rifle Ranges, near Ottawa. Reactions to the tuberculin test, while still numerous during the earlier months of the year, have latterly been reduced to a point indicating the control of the disease through the medium of the tuberculin test. Steer feeding was seriously affected by reactions to the combined test. With the dairy herd, the great majority of the individuals of which are on official test, little feeding experimental work has been possible, other than as reported. With swine, a most successful year may be reported, in experimental work, improvement of stock, sales, etc. With sheep, increased range has shown a consequent reflection in better grown lambs and freedom from parasitic trouble. Horse breeding is not progressing so favourably. With such exceptionally high-class mares, only a stallion of similar quality can account for improvement, or at least maintenance, of quality. Such a horse has not been available.

Certain changes may be briefly reported in the personnel of the staff. Mr. J. A. Ste. Marie resigned as assistant to accept a position with the Live Stock Branch. Mr. R. Cunningham, for several years directly in charge of herds and flocks, has been advanced to the position of assistant.

## HORSES

The quality of the horses on this Farm has steadily improved. At present there are thirty-two head in all, including four driving and three general-purpose horses. A very creditable line-up of registered Clydesdale mares may be shown, from which several good foals have been reared. Two home-bred stallions of good quality are kept at Ottawa with the ultimate object of sending them to Branch Farms where horse breeding is being carried on.

During the year no purchases of pure-bred stock were made. Until some provision is made for the importation or purchase of a really high-class stallion no headway is possible in horse-breeding work. Considering that in these stables are some of as good representative mares as may be found in Canada, the fact that only comparatively mediocre sires are available is to be deplored.

During the year 7,939 days of horse labour were accounted for, upon which a valuation of $1, per day is charged. With this stable of horses, practically all of which work every day of the year, experimental feeding work is impossible. It is hoped that in the near future accommodation may be made for a larger number of pure-breds, enabling work to be carried on in both the feeding and breeding of horses.

Horses were exhibited at Ottawa, Toronto, Guelph, and Chicago, with very gratifying results from the publicity standpoint.

## BEEF CATTLE

There were on hand on April 1, 1920, twenty-four steers. Twenty-two of these had been recently purchased, while the other two were baby beef steers which were shipped in from the Kapuskasing Experimental Station for exhibition purposes, and which

had made a good showing at the 1920 Ottawa Winter Fair and also at the Fall Fair the same year. These two were killed immediately after the latter fair.

The twenty-two steers mentioned above were put on pasture at the Connaught Rifle Ranges early in the season. In July another lot, consisting of one carload of twenty-five head, was added. Again, in September, another twenty-five head were purchased and sent to the ranges for two months. These, with three young steers purchased in October and pastured at the Farm during the remainder of the season, made a total of seventy-five head that were brought in on the 6th of November. These

Export Steers in Out-door Feeding Quarters. Winter 1921.

steers were subjected to the tuberculin test, and twenty-three reacted. The reactors were immediately disposed of for beef, being slaughtered under Government inspection. The remainder were put in outdoor feeding pens and started on heavy feed at once, with the intention of having them ready for the Christmas market. However, as prices were low when the time for sale for Christmas market came, they were held over and the ration slightly reduced.

The average daily ration from time of starting feeding to March 31, 1921, consisted of mixed grains, 6 pounds; ensilage, 35 pounds; and roughage—rough hay, oat hay, straw, etc.—8 to 10 pounds. The steers made rapid gains, but, owing to the falling market for beef and the persistently high market for grain feeds, the gains were far from economical. As a certain loss was inevitable, it was eventually decided to hold them and use them as an experimental export shipment, in view of the renewal of the export trade in live cattle. This phase of the work will be reported on in the next annual report, when full data as to results of the shipment will be available.

## DAIRY CATTLE

There are, in all, 147 head of dairy cattle in the barns at Ottawa, this number being made up of 140 pure-breds and 7 grades. All of these cattle are kept for experimental and demonstrative work of various kinds.

PURE-BRED BREEDING CATTLE

| | | | | | | |
|---|---|---|---|---|---|---|
| Ayrshires | 30 | milch cows, | 26 | heifers, | 7 | bulls |
| Holsteins | 29 | " " | 20 | " | 8 | " |
| Jerseys | 6 | " " | 4 | " | 3 | " |
| French-Canadians | | | 5 | " | 2 | " |

GRADE BREEDING CATTLE

| | | | | | | |
|---|---|---|---|---|---|---|
| Grade Ayrshires | 1 | milch cow, | 3 | heifers | | |
| Grade Holsteins | | | 3 | " | | |

AYRSHIRES

The Ayrshire herd continues to show marked improvement in quality, besides having increased in numbers in spite of natural losses and vigorous weeding out of poor animals. In the spring of 1920 thirteen head were imported from Scotland. These consisted of a yearling bull, ten milk cows and two yearling heifers. The quality of the lot can best be realized from the fact that the bull "Overton Lord Kyle" proved good enough to win his class and the Grand Championship, at Toronto and Ottawa 1920 exhibitions; while a number of the females stood well up to the top of their classes. Overton Lord Kyle is a rare combination of a show and breeding bull and he has excellent backing for milk production as well. Already there are a number of fine heifers in the herd from the cows of this importation, which, with the calves from the imported bull, should make for continued improvement.

Holsteins and Ayrshires at the Central Experimental Farm.

HOLSTEINS

The Holstein herd was replenished during the year by the addition of a number of mature, high record cows. The line-up is now a very imposing one, consisting as it does of big, strong, heavy producing cows. The heifers are a very promising lot. During the greater part of the year the herd was headed by the aged bull 'Sir Francy Het Loo," a son of "Pontiac Korndyke Het Loo." When he was disposed of,

"Roycroft King Johanna," a son of "King Segis Alcartra Spofford," took his place. The junior herd sire is "Maplecrest De Kol Korndyke Boy," a bull imported from the United States and notable for his backing in milk and fat production, his dam's milk testing 4·8 per cent fat. The object in introducing the blood of this bull is to raise the percentage of fat in the milk of the Holstein herd.

### JERSEYS

The Jersey herd was considerably reduced during the early part of the year, owing to some unfortunate losses. Purchases were made from the herd of E. A. Johnson, L'Orignal, where the three-year-old "Leoni of Pinehurst" and the two-year-old "Fairy's Fern" were secured. These are both very promising individuals. In addition, four head were selected from the herd of B. H. Bull & Son, Brampton, Ont. The herd sire "Br. Cowslip's Heir" was sold to avoid inbreeding, and the young bull "Rower's Golden Maid's Prince" was purchased from John Pringle, London, Ont. This bull was Junior Champion at the Toronto Exhibition in 1920, and is a bull of outstanding breeding, being sired by "Imported Champion Rower" and out of a daughter of "Golden Maid's Prince."

### FRENCH CANADIANS

Owing to the fact that this French Canadian herd is an isolated one in the province of Ontario, that, as a consequence, it has been found difficult to dispose of breeding stock, and that there is comparatively little call for information as to the breed, it has been deemed advisable to cut down the representation in the herd. Five high quality heifers have been kept. The herd sire "Le Beau Brumell 3rd" is a most typical specimen of the breed, and is out of the champion milk-producing cow of the breed. The junior herd sire is Ottawa Champion 3rd, another exceptionally well-bred bull, his dam having a record of over 14,000 pounds of milk.

## SALE OF BREEDING STOCK

During the past year a number of young bulls have been sold, including five Ayrshires, eight Holsteins, five Jerseys, and one French Canadian. Besides these, two Ayrshire bulls and one Holstein bull were shipped to branch farms, All of these bulls were of choice individuality and breeding, and should help to improve the quality of the herds into which they have gone.

## SUMMER FEEDING

The summer of 1920 was a fairly favourable one for the pasturing of the cattle. The pasture available for the milch cows, while of good quality, was rather limited in area, and as the milking herd is a fairly large one the pasture does not last very long, the cows being charged with only one month's feeding from it. The remainder of the season it acts as an exercising area. The heifers and dry cows had unlimited pasture on rented areas, and presented a very good appearance when stabled in the fall. The value of silage for summer feeding, to supplement the pasture for the milch cows, was again demonstrated, there being a sufficient supply for this purpose left in one of the silos at the end of the 1919-20 stable-feeding period. It was, however, all used up at silo filling time in the fall of 1920, this being the first time in a number of years that the silos have all been completely cleaned out.

## WINTER FEEDING

The wintering of the dairy cattle was carried on under very favourable conditions. The previous season's crops were good and were well harvested, though, the acreage of hay being rather limited, there was not the quantity of this roughage that was usually on hand, which accounted for the necessity of purchasing a considerable quantity before the feeding season was over. However, the corn and roots were an abundant crop, there being sufficient of these to meet all requirements and still leave a good quantity of the former for summer feeding in 1921. The grain feeds, which are largely purchased ones, were bought on a somewhat easier market than in the previous year, and eased off still more towards the latter part of the season. The ration fed the milch cows was, on the average, about as follows:—

| | |
|---|---|
| Corn silage | 25-35 lb. |
| Hay | 6- 8 " |
| Roots | 10-80 " |
| Meal | 6-20 " |

The meal mixture consisted, for the most part, of bran, 5 parts; brewers' grains or malt sprouts, 5 parts; oil meal, 3 parts; and cotton seed meal, 3 parts.

The meal was fed on top of the ensilage in the manger just after the morning milking. As soon as the ensilage and grain are cleaned up the hay is given uncut. At two-thirty in the afternoon the cows are given their other feed of corn silage and grain, while the final feed of hay is given the last thing at night. Generally speaking, the cows get all the roughage they will eat up clean, and one pound of meal for about every four pounds of milk produced, this having been found on experiment, reported elsewhere, to have been the most economical rate at which to feed the grain. Water is before the cows at all times, while salt is added to the roughage and meals at the time of mixing.

## DAIRY CATTLE FEEDING EXPERIMENTS

### MOST PROFITABLE AMOUNT OF GRAIN TO FEED

In the computation of a ration for dairy cows, under normal conditions, a fixed roughage ration can usually be given, this to be supplemented by a certain number of pounds of a grain mixture, the amount of the latter depending upon the amount of milk each individual is giving. This system of computing rations appeals to the average feeder or farmer on account of its simplicity and, when used with good judgment, it gives excellent results.

There is, however, the question of the rate at which the grain feed should be fed, in order to give the most economical results. Some feeders claim that one pound of grain for every three pounds of milk produced will give economical production, while others claim that this feeding is much too heavy. Naturally the economy of such heavy feeding would depend to a certain extent on the milk-producing qualities of the cow, as well as upon the nutritive qualities of the roughage ration fed. An attempt was made to arrive at the most economical ration in the following experiment:—

#### *Object of Experiment*

To compare the relative economy of feeding a well-balanced grain ration at different rates per amount of milk produced, varying from one pound of meal for every two pounds of milk produced to one pound of meal for every five pounds of milk produced, using the one to three rate as the basic ration.

*Plan of Experiment*

The cows in the grade herds were used for this experiment, and they were at various stages of their lactation periods. The experiment was conducted in periods of three weeks each, the last week only being used for computation. In each division of the experiment the first and last periods are averaged and compared with the second, thus obviating the miscalculation that would otherwise be caused by the normal decline in milk flow. The same meal mixture was used throughout, and it consisted of bran, 400 pounds; gluten feed, 200 pounds; dried distillers' grains, 200 pounds; and nutted oil cake, 100 pounds.

In addition to the grain feed, each cow received 30 pounds of ensilage, 10 pounds of turnips and 6 pounds of hay per day. This ration was continued throughout the whole experiment, the only change being in the amount of meal fed. This was arrived at by averaging the production of milk for the three days prior to the change and calculating the amount of grain to be fed per day from that. This same amount was then continued throughout the three-week period. This, at the best, could only be an approximation of the rate at which the grain should be fed to agree with the outline of the experiment. The actual rate of feeding is given in the tables in each case.

Samples of feeds were taken for analysis. All feed left over was weighed and credited to the cows. The cows were weighed at the start of the experiment and at the end of each period thereafter. The milk from all cows was tested during the last week of each period.

The value placed upon the various feeds used was as follows: Hay, $7; roots, $2; ensilage, $2; meal mixture, $25.40 per ton.

The following table gives the results of the comparison of the 1:3 and 1:2 rations:—

DAIRY COW FEEDING EXPERIMENT No. 1.

| — | Period 1. | Period 3. | Period 1 & 3 Average. | Period 2. |
|---|---|---|---|---|
| Experimental grain ration (approx.) | 1-3 | 1-3 | 1-3 | 1-2 |
| Experimental grain ration (actual) | 1-2·61 | 1-2·34 | 1-2·47 | 1-1·74 |
| Number of cows on test | 16 | 16 | 16 | 16 |
| Pounds of milk produced by 16 cows....Lbs. | 2,961·50 | 2,222·50 | 2·592·00 | 2,909·50 |
| Average milk per cow per day.... " | 26·44 | 19·80 | 23·13 | 25·97 |
| Average per cent fat in milk.... % | 4·07 | 4·09 | 4·08 | 4·16 |
| Total pounds fat produced by 16 cows....Lbs. | 120·57 | 90·90 | 105·73 | 121·06 |
| Average pounds fat per cow per day.... " | 1·08 | 0·81 | 0·94 | 1·08 |
| Total meal consumed.... " | 1,134·0 | 945·0 | 1,039·50 | 1,701·00 |
| Total hay consumed.... " | 672·0 | 672·0 | 672·0 | 672·0 |
| Total roots consumed.... " | 1,120·0 | 1,120·0 | 1,120·0 | 1,120·0 |
| Total ensilage consumed.... " | 3,360·0 | 3,360·0 | 3,360·0 | 3,360·0 |
| Mixture consumed per 100 pounds fat produced.... " | 940·36 | 1,039·60 | 983·24 | 1,405·08 |
| Mixture consumed per 100 pounds milk produced.. " | 38·29 | 42·52 | 40·40 | 58·46 |
| *Findings from Experiment.* | | | | |
| Cost of meal mixture fed.... $ | 14·40 | 12·00 | 13·20 | 21·60 |
| Value of roughage fed.... $ | 6·83 | 6·83 | 6·83 | 6·83 |
| Total cost of feed.... $ | 21·23 | 18·83 | 20·03 | 28·43 |
| Cost to produce 100 pounds fat.... $ | 17·60 | 20·71 | 18·94 | 23·48 |
| Cost to produce 1 pound fat....cts. | 17·60 | 20·71 | 18·94 | 23·48 |
| Cost to produce 1 pound butter....cts. | 14·97 | 17·61 | 16·10 | 19·96 |
| Profit on 1 pound butter at 35 cents per pound....cts. | 20·03 | 17·39 | 18·90 | 15·04 |
| Cost to produce 100 pounds milk....cts. | 71·68 | 84·72 | 77·27 | 96·34 |
| Profit on 100 pounds milk at $1.70 per hundredweight....cts. | 98·32 | 85·28 | 92·73 | 73·66 |
| Average weight per cow for period....Lbs. | 1,021 | 1,055 | .... | 1,079 |
| Average gain or loss in weight.... " | −29 | −24 | .... | +58 |

In the foregoing part of the experiment, as will be noticed by reference to the second line in the table, the grain feed was fed at higher rates than those specified in the outline. In period 2 it amounted to as much as the cows would eat. This produced an increase in milk production of only 317·5 pounds of milk in period 2 over the average of periods 1 and 3. Milk was produced in the former period for 96·34 cents per 100 pounds, while in the latter it cost only 77·27 cents per 100 pounds, a difference of 19·07 cents per 100 pounds in favour of the 1:3 ration. Valuing the milk at $1.70 per 100 pounds, the 1:3 ration gave a profit of $24.03, while the 1:2 ration gave a profit of $21.03. The weights of the cows do not usually have a decided bearing on the results in a dairy cattle feeding experiment, but in this case they are of importance in that they show that, during the heavy feeding period, the cattle were inclined to put on flesh rapidly, rather than to give an increased flow of milk.

The following table presents the data on the comparison of the 1:3 and 1:4 rations:—

DAIRY COW FEEDING EXPERIMENT No. 2.

| —— | Period 3. | Period 5. | Periods 3 & 5 Average. | Period 4. |
|---|---|---|---|---|
| Experimental grain ration (approx.) | 1–3 | 1–3 | 1–3 | 1–4 |
| Experimental grain ration (actual) | 1–2·34 | 1–2·75 | 1–2·53 | 1–3·76 |
| Number of cows in test ..... No. | 16 | 16 | 16 | 16 |
| Pounds of milk produced by 16 cows ..... Lbs. | 2,222·5 | 2,120·50 | 2,171·50 | 2,236·0 |
| Average milk per cow per day ..... " | 19·80 | 18·92 | 19·40 | 19·96 |
| Average per cent fat in milk ..... " | 4·09 | 3·70 | 3·89 | 3·92 |
| Total pounds fat produced by 16 cows ..... " | 90·90 | 78·46 | 84·68 | 87·81 |
| Average pounds fat per cow per day ..... " | 0·81 | ·70 | ·75 | 0·78 |
| Total meal consumed ..... " | 945·0 | 770·0 | 857·50 | 595·0 |
| Total hay consumed ..... " | 672·0 | 672·0 | 672·0 | 672·0 |
| Total roots consumed ..... " | 1,120·0 | 1,120·0 | 1,120·0 | 1,120·0 |
| Total ensilage consumed ..... " | 3,360·0 | 3,360·0 | 3,360·0 | 3,360·0 |
| Mixture consumed per 100 pounds fat produced .... " | 1,039·60 | 981·30 | 1,010·45 | 677·60 |
| Mixture consumed per 100 pounds milk produced .. " | 42·51 | 36·32 | 39·41 | 26·21 |
| *Findings from Experiment.* | | | | |
| Cost of meal mixture fed ..... $ | 12·00 | 9·78 | 10·89 | 7·56 |
| Value of roughage fed ..... $ | 6·83 | 6·83 | 6·83 | 6·83 |
| Total cost of feed ..... $ | 18·83 | 16·61 | 17·72 | 14·39 |
| Cost to produce 100 pounds fat ..... $ | 20·71 | 21·17 | 20·94 | 16·38 |
| Cost to produce 1 pound fat ..... cts. | 20·71 | 21·17 | 20·94 | 16·38 |
| Cost to produce 1 pound butter ..... cts. | 17·61 | 18·00 | 17·80 | 13·93 |
| Profit on 1 pound butter at 35 cents per pound .... cts. | 17·39 | 17·00 | 17·20 | 21·07 |
| Cost to produce 100 pounds milk ..... cts. | 84·72 | 78·33 | 81·60 | 64·35 |
| Profit on 100 pounds milk at $1.70 per hundredweight ..... cts. | 85·28 | 91|67 | 88·40 | 105·65 |
| Average weight per cow for period ..... Lbs. | 1,055 | 1,129 | ..... | 1,073 |
| Average gain or loss in weight ..... " | −24 | +56 | ..... | +18 |

In the foregoing table it will again be noticed that there was some difficulty in keeping the amount of grain fed at the rates specified. The results of this phase of the experiment are interesting, in that the 1:4 ration produced 64·5 pounds more milk than the 1:3 ration, and produced it for 17·25 cents less per 100 pounds. Valuing milk at $1.70 per 100 pounds, the 1:3 ration gave a profit of $19.19, while the 1:4 ration gave a profit of $23.62. Throughout this phase of the experiment there was a gradual increase in the weight of the cows, though this was to be expected with cows some of which were pregnant and advancing in their lactation periods. The exceptional results with the 1:4 ration quoted above was probably due in part to the effects of the heavy feeding of the previous periods not having had sufficient time to disappear. A longer time between changes would appear to be advisable in such an experiment.

The following table presents the data on the comparison of the 1:3 and 1:5 rations:—

DAIRY COW FEEDING EXPERIMENT No. 3.

| — | Period 5 | Period 7 | Periods 5 & 7 Average. | Period 6 |
|---|---|---|---|---|
| Experimental grain ration (approx.) | 1-3 | 1-3 | 1-3 | 1-5 |
| Experimental grain ration (actual) | 1-2·91 | 1-3·21 | 1-3·04 | 1-4·44 |
| Number of cows in test | 19 | 19 | 19 | 19 |
| Pounds of milk produced by 19 cows ..... Lbs. | 3,119·50 | 2,855·50 | 2,987·50 | 2,815·0 |
| Average milk per cow per day ..... " | 23·45 | 21·47 | 22·46 | 21·13 |
| Average per cent fat in milk ..... % | 3·65 | 3·62 | 3·63 | 3·64 |
| Total pounds fat produced by 19 cows ..... Lbs. | 113·79 | 103·37 | 108·58 | 102·68 |
| Average pounds fat per cow per day ..... " | 0·86 | ·78 | 0·82 | 0·77 |
| Total meal consumed ..... " | 1,071·0 | 889·0 | 980·0 | 633·50 |
| Total hay consumed ..... " | 798·0 | 798·0 | 798·0 | 798·0 |
| Total roots consumed ..... " | 1,330·0 | 1,330·0 | 1,330 0 | 1,330·0 |
| Total ensilage consumed ..... " | 3,990 0 | 3,990·0 | 3,990 0 | 3,990 0 |
| Mixture consumed per 100 pounds fat produced .... " | 941·20 | 860·00 | 900·60 | 616·96 |
| Mixture consumed per 100 pounds milk produced .. " | 34·36 | 31·13 | 32·80 | 22·50 |
| *Findings from Experiment.* | | | | |
| Cost of meal mixture fed ..... $ | 13·60 | 11·29 | 12·44 | 8·05 |
| Value of roughage fed ..... $ | 8·11 | 8·11 | 8·11 | 8·11 |
| Total cost of feed ..... $ | 21·71 | 19·40 | 20·55 | 16·16 |
| Cost to produce 100 pounds fat ..... $ | 19·08 | 18·76 | 18·92 | 15·73 |
| Cost to produce 1 pound fat ..... cts. | 19·08 | 18·76 | 18·92 | 15·73 |
| Cost to produce 1 pound butter ..... cts. | 16·21 | 15·95 | 16·08 | 13·39 |
| Profit on 1 pound butter at 35 cents per pound .... cts. | 18·79 | 19·05 | 18·92 | 21·61 |
| Cost to produce 100 pounds milk ..... cts. | 69·59 | 67·93 | 68·76 | 57·40 |
| Profit on 100 pounds milk at $1.70 per hundredweight ..... cts. | 100·41 | 102·07 | 101·24 | 112·60 |
| Average weight per cow for period ..... Lbs. | 1,138 | 1,139 | ..... | 1,130 |
| Average gain or loss in weight ..... " | +56 | + 9 | ..... | −8 |

In the foregoing table the 1:3 ration produced very little better results than the 1:5 ration, there being a gain of only 172·5 pounds. Milk was produced at 68·76 cents per 100 pounds on the 1:3 ration, and at 57·4 cents per 100 pounds on the 1:5 ration, giving a dfierence of 11·36 cents per 100 pounds in favour of the latter. Valuing milk at $1.70 per 100 pounds, the 1:3 ration gave a profit of $30.23, while the 1:5 ration gave a profit of $31.69. The lowered cost of milk production in this experiment is due to the introduction of a number of fresh calved, heavy producing cows into the experiment. The weights of the cattle for this phase show that, while they gained while on the heavy ration, they lost while on the lighter one. Had this latter ration been continued for a sufficient length of time to have exhausted the surplus of fat which the animals had stored up while on the heavier ration, it is possible such economical feeding results would not have been shown.

## *Summary*

A study of the foregoing data reveals the fact that the actual food cost of the production of 100 pounds of milk when the cows were fed a grain ration amounting to approximately 1 pound of grain for every 2 pounds of milk produced was 96·34 cents; when fed at the rate of 1 to 3 it was 75·66 cents (average four trials); when fed at the rate of 1 to 4 it was 64·35 cents; and when fed at the rate of 1 to 5 it was 57·40 cents. This last figure is exceptionally low, due to the fact, already mentioned, that a number of fresh cows were introduced into the experiment for this period. Naturally with the lighter ration a smaller flow of milk would be expected, and this is found to be the case in every period except that when fed at the rate of 1 to 4.

This apparent discrepancy in results is to be accounted for by the small change in the amount of grain in the ration, and also by the fact that the cows had not had time to get over the effects of the heavy ration fed previously, and were still filling the pail by drawing upon the stores laid up during the previous heavy feeding period. However, in all cases the decrease in milk flow was not so great but what the lighter grain ration proved the more profitable; though when the 1 to 5 ration was reached, it and the basic ration, 1 to 3, became almost equal in profits. It would seem, then, that with a herd of cows of varying lactation periods, a 1 to 5 grain ration should prove about the most profitable, with the least outlay of capital for feeds.

It is worthy of note, however, that while a 1 to 5 ration proved sufficient to be profitable in a herd of cows averaging 21 pounds of milk per day, heavier feeding might become more profitable with those of the cows which were giving more than this amount of milk per day. Taking the cows in the second phase of the experiment and splitting them up into two groups, the one containing those cows averaging over 20 pounds per day, of which there were seven, and the other containing those cows averaging under 20 pounds per day, of which there were nine, it was found that the cows producing 20 pounds of milk or over produced it for 73·19 cents per 100 pounds on the 1 to 3 ration and at 59·38 cents per 100 pounds on the 1 to 4 ration. On the other hand, the cows which produced under 20 pounds of milk per day produced it for 92.73 cents per 100 pounds on the 1:3 ration and at 70·57 cents on the 1:4 ration. This goes to show that considerable distinction should be made between the light and heavy producing cows when feeding the grain ration in this way. The cow that is producing from 60 to 70 pounds of milk per day requires, according to the best feeding standards, a grain ration amounting to the 1:3 rate to provide the necessary nutrients. In some cases, however, for instance with exceptionally high-producing cows, this 1:3 rate will not hold, for such a rate would provide more meal than the cows are capable of consuming. For instance, in a recent test a 97-pound cow was able to consume meal only at the rate of 1:4. Such a cow is a most economical producer. Certainly the time to feed grain heavily for the greatest profit is during the first few months of the lactation period.

Another factor influencing the amount of meal to be fed per pound of milk produced is the quality or strength of the meal mixture. In the foregoing experiment the meal mixture was a comparatively rich, heavy one, which would account to some extent for the low rate at which it was found necessary to feed it. Under average farm conditions, where the meal mixture would consist more largely of home-grown grains, such as oats, or an oat, pea and barley mixture, together with bran, and probably a very little of the heavier feeds, a heavier rate of feeding would be found more profitable.

The condition which the cows are in will also affect the rate at which the meal ration can be most profitably fed. A cow cannot do her best if she calves in poor condition, and, if she is in such a condition, it takes extra feed to replace the wear and tear on her body, and extra meal must be supplied for this purpose. Again, it is much easier to keep the body fat on an animal than it is to replace it when once it has been milked off; so that if the best results from the herd, as well as the best appearance of the herd, are to be considered, then it may often be found profitable to feed at a higher rate than one pound of meal for every four to five pounds of milk produced.

Lastly, the nature of the roughage ration would have an affect on the results in such an experiment as the foregoing. In this case the roughage ration was a commendable one. Where clover and alfalfa hay, together with roots and ensilage, can be obtained, the problem is solved and the necessity for heavy grain feeding greatly reduced. Upon the production of large quantities of such cheap, succulent, and nutritious roughages depends the really economical production of milk.

READY MIXED VS. HOME MIXED VS. COMMERCIAL FEEDS

A trial of a home mixed grain ration vs. Ontario Standard Dairy Feed in one instance and Schumacher feed (Quaker Oats Co.) replacing the bran of the home-mixed grain ration in another instance.

*Plan*

The experiment was divided into five periods, as follows:—

Period 1—Home-mixed grain ration.
Period 2—Ontario Standard meal mixture.
Period 3—Home-mixed grain ration.
Period 4—Schumacher feed replacing bran of meal ration in periods 1, 3 and 5.
Period 5—Home-mixed grain ration.

Each period lasted three weeks, and the final week only was used as a basis of calculation. In the data following periods 1 and 3 are averaged and compared with period 2, and periods 3 and 5 are averaged and compared with period 4, thus eliminating error that might be caused by normal decline in milk flow. Meal was fed at the rate of 1 pound for every 3½ pounds of milk being produced. The amount to be fed was determined at the start of each period, and continued at that rate throughout the period. The roughage ration was kept at the same rate throughout the experiment, except as hereafter noted. Samples of milk were taken during the last week of each period, to determine the amount of fat produced.

*Meals Used and Prices of Same*

Home mixed grain ration—

| | | | | |
|---|---|---|---|---|
| Wheat bran | 500 lb. | at | $35 00 | per ton |
| Oil cake meal | 200 " | " | 58 50 | " " |
| Distillers' dried grains | 100 " | " | 53 00 | " " |
| Cottonseed meal | 100 " | " | 51 00 | " " |
| Palm nut cake meal | 100 " | " | 32 00 | " " |
| Ontario Standard Dairy meal | | | 60 00 | " " |

Composition of Standard Dairy meal—

| | |
|---|---|
| Corn | 4 parts |
| Gluten | 3 " |
| Bran | 4 " |
| Middlings | 2 " |
| Brewers' grains | 2 " |
| Oil cake meal, 34 per cent | 4 " |
| Cottonseed meal, 41 per cent | 4 " |

Analysis—

20.0 per cent protein (total)
19.0 per cent protein (digestible)
10.0 per cent fibre
4.5 per cent fat
45.7 per cent carbohydrates
4.3 per cent ash.

Schumacher Feed at $53 per ton—

Composition—

Products of corn, wheat, oats, and barley

Analysis—

Per G. Harcourt, O.A.C.

| Per cent | Guaranteed |
|---|---|
| 11.54 protein | 10.5 |
| 3.92 fat | 3.5 |
| 11.51 fibre | 10.6 |
| 61.61 carbohydrates | 62.8 |
| 4.25 ash | 3.2 |

Values placed on roughages—

| | |
|---|---|
| Hay | $7 per ton |
| Ensilage | 2 " " |

*Data from Experiment*

It was previously stated that the roughage ration was kept constant. This was found to be impossible in so far as the ensilage was concerned. That which was being fed was four-year-old ensilage, therefore, rather strong, and, as time advanced, the cows relished it less and consumed less, until eventually, in the middle of period 4, this particular ensilage had to be discontinued and that from another silo used.

*Conclusions Drawn from Experiment*

The change in the quality of the silage and amounts fed during the first phase of the experiment (periods 1, 2 and 3), is fully offset by the method of averaging periods 1 and 3; therefore, the figures in table 1 can be taken on their face value. It will be noted that when Ontario Standard Dairy feed was fed more milk and fat were produced and less meal was required to produce 100 pounds of each than when the home-mixed meal ration was fed. This would go to show that, when compared pound for pound, the former is superior to the latter. However, when judged upon the basis of cost to produce 100 pounds of either milk or fat the home-mixed meal ration has a decided advantage, as it can be made up for a little over two-thirds of the cost of the Ontario Standard Dairy feed. In palatability the Ontario Standard Dairy feed seemed to have a slight advantage, this being due to the inclusion in the home-mixed meal ration of the palm nut cake, which was not too palatable.

TABLE I.—REGULAR MEAL MIXTURE *vs.* ONTARIO STANDARD DAIRY MEAL.

| Factor. | | Period 1. Regular Meal Mixture. | Period 2. Ontario Standard Meal Mixture. | Period 3. Regular Meal Mixture. | Average 1 and 3 Regular Meal Mixture. |
|---|---|---|---|---|---|
| Number cows in test | | 12 | 12 | 12 | 12 |
| Milk produced by 12 cows | Lbs. | 2,256·0 | 2,109·5 | 1,707·0 | 1,981·5 |
| Average milk per cow per day | " | 26·8 | 25·1 | 20·3 | 23·6 |
| Average per cent fat in milk | % | 3·7 | 3·7 | 3·7 | 3·7 |
| Total fat produced by 12 cows | Lbs. | 83·9 | 78·7 | 62·8 | 73·3 |
| Average fat per cow per day | " | 1·0 | 0·94 | 0·75 | 0·87 |
| Total meal consumed | " | 798·0 | 647·5 | 567·0 | 682·5 |
| Total hay consumed | " | 756·0 | 756·0 | 756·0 | 756·0 |
| Total ensilage consumed | " | 2,765·0 | 2,345·0 | 1,925·0 | 2,345·0 |
| Meal mixture consumed per 100 pounds of fat produced | " | 951·1 | 822·7 | 902·8 | 926·9 |
| Meal mixture consumed per 100 pounds of milk produced | " | 35·3 | 30·7 | 33·2 | 34·2 |
| Cost of meal mixture fed | $ | 17·08 | 19·42 | 12·13 | 14·60 |
| Value of roughage fed | $ | 5·41 | 4·99 | 4·57 | 4·99 |
| Total cost of feed | $ | 22·49 | 24·41 | 16·70 | 19·59 |
| Cost to produce 100 lbs. fat | $ | 26·80 | 31·02 | 26·59 | 26·69 |
| Cost to produce 100 pounds milk | $ | 0·99 | 1·15 | 0·98 | 0·985 |

TABLE II.—REGULAR MEAL MIXTURE *vs.* SCHUMACHER REPLACING BRAN OF REGULAR MIXTURE

| Factor. | Period 3. Regular Meal Mixture. | Period 4. Schumacher Feed replacing Bran in Regular Mixture. | Period 5. Regular Meal Mixture. | Average 3 and 5 Regular Meal Mixture. |
|---|---|---|---|---|
| Number cows in test | 9 | 9 | 9 | 9 |
| Milk produced by cows....Lbs. | 1,264·0 | 1,244·5 | 1,309·0 | 1,286·5 |
| Average milk per cow per day.... " | 20·0 | 19·75 | 20·77 | 20·38 |
| Average per cent fat in milk.... % | 3·7 | 3·65 | 3·79 | 3·74 |
| Total fat produced by cows....Lbs. | 46·76 | 45·45 | 49·62 | 48·19 |
| Average fat per cow per day.... " | 0·74 | 0·74 | 0·79 | 0·76 |
| Total meal consumed.... " | 455·0 | 318·5 | 371·0 | 413·0 |
| Total hay consumed.... " | 567·0 | 567·0 | 567·0 | 567·0 |
| Total ensilage consumed.... " | 1,435·0 | 1,750·0 | 2,240·0 | 1,837·0 |
| Meal mixture consumed per 100 pounds of fat produced.... " | 973·0 | 700·0 | 647·0 | 810·0 |
| Meal mixture consumed per 100 pounds of milk produced.... " | 36·0 | 25·7 | 28·30 | 32·15 |
| Cost of meal mixture fed.... $ | 9·74 | 8·25 | 7·94 | 8·84 |
| Value of roughage fed.... $ | 3·43 | 3·73 | 4·22 | 3·82 |
| Total cost of feed.... $ | 13·17 | 11·98 | 12·16 | 12·67 |
| Cost to produce 100 pounds of fat.... $ | 28·16 | 26·35 | 24·50 | 26·33 |
| Cost to produce 100 pounds of milk.... $ | 1·04 | 0·96 | 0·93 | 0·98 |

In the second phase of the experiment (periods 3, 4 and 5) less reliance should be placed on the figures, owing to the change in silage. It will be noted that the cows did not decline in milk production to any extent in period 4, and that they improved considerably during period 5. This was to be expected from the improvement in the silage. However, had the Schumacher ration been better than the regular ration, better results in period 4 could be looked for. The main feature is in the feed required to produce milk and fat. In this regard the Schumacher feed ration has quite an advantage, for even in the next period, on better ensilage and heavier grain feed, more feed was required per milk and fat produced. The "cost to produce" figures cannot be considered to any extent, as they are too greatly affected by the changes.

## CALF-FEEDING EXPERIMENTS

While a large number of calves have been excellently reared to six months of age in the calf barn during the past year, in only one instance could the feeding be considered in the nature of an experiment.

### *Trial of "Zool"*

Zool, a patented condimental "Perfected Food for Horses and Cattle" of French manufacture, which certain parties proposed manufacturing in Canada, was submitted for trial. The literature accompanying this material made most extravagant claims for it for all classes of stock, recommending it particularly for young stock or any with diseases of the bones. As only a limited quantity was available, three calves were chosen for the experiment. One had an affection of the bones, while the other two were twin calves in good thrifty condition. The diseased calf and one of the twin calves were fed the "Zool," while the remaining calf was fed a similar ration minus the "Zool," as a check. The feeding was continued for five weeks, and the animals

were weighed at the start and at the conclusion of the experiment. No improvement was noted in the condition of the diseased calf, nor did the thrifty twin fed "Zool" look any better or make any better gains than its mate which received no "Zool," proving fairly conclusively that the material had no great value either of a medicinal or nutritive nature. A chemical analysis made by the Division of Chemistry has shown that the material "Zool" is valuable chiefly for its phosphoric acid content, the latter having medicinal and tonic properties. However, the results of the test would go to show that these properties were not very marked in this particular case.

## RAISING DAIRY CALVES

The calves in the herd are separated from their dams as soon as born, and are reared in a separate calf barn. They are fed pasteurized whole milk for from three to five weeks; then they are gradually changed over to a ration of skim-milk and a calf meal. The one at present in use consists of 2 parts ground corn, 2 parts fine ground oats or oatmeal and 1 part ground flax. This has proved a satisfactory and economical meal. It is scalded, allowed to stand for a time, and then fed with the skim-milk. As soon as the calves learn to eat they are fed a little dry grain mixture consisting of 4 parts bran, 3 parts oats, and 1 part ground corn. The younger calves receive this mixture dry in the manger, while the older ones receive it on their silage. Second cut alfalfa and clover hay comprise the remainder of the ration. Water is kept before the older calves at all times, watch being kept to see that they do not take too much. Calves under six months are not allowed out to pasture except at night, it being considered inadvisable to subject them to the heat of the sun and to the flies in the middle of the day. This method of calf feeding has given most satisfactory results, as is evidenced by the condition of the calves, which draw favourable comments from the many visitors to the calf barns.

## RAISING DAIRY HEIFERS

The yearling and two-year-old heifers came off the grass in good shape, and required comparatively light winter feeding. All heifers received a ration of approximately 20 pounds of silage and 4 pounds of clover hay daily, while the younger ones received an additional grain ration of from 2 to 4 pounds per day. This proved sufficient to keep them in good growing condition throughout the winter.

## MILKING MACHINES

During the past year investigational work with milking machines has been continued. This work has, as previously, taken the form of practical tests of the various machines against hand milking. One new machine has been added to those that were already on trial, viz., the Nu-Way. It is a machine of the double-action type; that is a machine using metal teat cups with rubber linings actuated by alternate suction and atmospheric pressure on the teats. This is the type of machine which had proved most satisfactory in other tests, and this particular machine compares favourably with others of the same type previously reported on.

All cows, except those on short time test work, are milked with milking machines. As heretofore, no undue ill effects are noticeable, while some very commendable records are being made with cows milked entirely by milking machines.

From the viewpoint of the average dairy farmer they may be looked upon as one of the newer standard machines of the farm. They may be installed with reason-

able expectation of profitable return, provided that sufficient hand labour cannot be easily secured, that there are a sufficient number of cows to milk to make the installation worth while, and that the machine is intelligently handled.

## MISCELLANEOUS EXPERIMENTS

### TREATMENT OF ABORTION

Practical tests of abortion vaccine have been continued. In the spring of 1920 quite a number of cows were purchased. It is universally conceded that unaffected cows that are brought into a stable where abortion has occurred will succumb to the ravages of abortion more readily than will cows that have been accustomed to such a stable. It was thought that these newly purchased cows, which would all be susceptible to infection, would make good material for a trial. Accordingly a number were treated, then bred, and a number were bred without being treated and used as controls. The treated cows included ten Ayrshires and ten Holsteins.

TABLE SHOWING RESULTS OF ABORTION TREATMENT

| Class. | Number. | Number reported on. | Number Normal Calvings. | Number abortions | Percentage of total cows that aborted. |
|---|---|---|---|---|---|
| Treated cows | 20 | 8 | 7 | 1 | 5% |
| Controls | 11 | 9 | 5 | 4 | 35·5% |

This shows quite a distinct balance in favour of the treated cows, though the final reports on all cows may change this somewhat.

## DAIRY HERD RECORDS

The following are the dairy cow milk records for all cows and heifers which have finished a lactation period during the fiscal year ending March 31, 1921. Others of the cows and heifers have started lactation periods, but, as they are not completed, they will be reported on later.

In the case of heifers with their first calves, charges for feed include the consumption from a date two months prior to parturition to the time of being dried off preparatory to their second calving. In the case of heifers and cows 3 years old or over, charges for feed include the period in which they were dry prior to the lactation period herein reported.

In estimating the cost of feeds the following values were used:—

| | | |
|---|---|---|
| Pasture per month | per cow | $ 2 00 |
| Meal mixture | per ton | 55 00 |
| Hay | " " | 7 00 |
| Straw | " " | 6 00 |
| Roots | " " | 4 30 |
| Silage | " " | 3 25 |
| Green feed | " " | 9 00 |

These values represent the cost of raising in the case of feeds which are or can be home grown, and the actual cost price in the case of mill feeds, factory by-products, etc., that were purchased.

In calculating the value of products the actual cash value was used, which amounted to 65 cents per pound for butter, and 35 cents per hundred pounds for skim-milk. This is a change from the previous method of reporting, as formerly a set price was used from year to year, to enable comparisons within and between breeds. It was felt that the system now being used would give more nearly the correct cost and profit figures, which are the important ones at the present time to the farmer.

The cost of caring for the cattle, other than feeding, the manufacture of the butter, etc., have not been accounted for. On the other hand, the value of the manure made and the value of the calves at birth will effectually counterbalance the above mentioned items, though not sufficiently to cover other overhead charges such as interest, depreciation, etc.

| Name and Breed of Cow | Age at beginning of lactation period | Date of dropping calf | No. days in the lactation period | Total pounds of milk for period | Daily average yield of milk | Average p.c. fat in milk | Pounds of butter produced in period | Value of butter at 65c. per pound |
|---|---|---|---|---|---|---|---|---|
| | | | | lbs. | lbs. | p.c. | lbs. | $ cts. |
| Canaan Beauty 2nd.....H. | 6 | Dec. 7, 1919.. | 330 | 17,405[5] | 52.74 | 3.44 | 706.18 | 459 01 |
| Ottawa Woodcrest Lyn.....H. | 4 | Jan. 5, 1919.. | 467 | 15,393[5] | 32.96 | 3.71 | 670.29 | 435 68 |
| Helena Keyes Plus.....H. | 3 | Dec. 30, 1918.. | 625 | 13,545[5] | 21.67 | 3.91 | 624.07 | 405 64 |
| Sibyl of Fieldhouse.....A. | 8 | Oct. 25, 1919.. | 401 | 12,260 | 30.57 | 3.9 | 557.00 | 362 05 |
| Helena Keyes Posch.....H. | 5 | Mar. 12, 1920.. | 303 | 13,886[5] | 46.22 | 3.29 | 537.98 | 349 66 |
| Marjorie 8th of Ottawa.....A. | 6 | Sept. 30, 1919.. | 284 | 10,449[5] | 36.79 | 4.13 | 508.26 | 330 37 |
| La Belle Denise.....F.C. | 5 | May 26, 1919.. | 367 | 8,583[5] | 23.4 | 4.74 | 490.98 | 319 14 |
| Oliva Schuiling DeKol.....H. | 9 | Feb. 21, 1920.. | 300 | 12,939 | 43.13 | 3.44 | 524.67 | 341 03 |
| Ottawa Bessie Ann.....H. | 7 | Feb. 14, 1920.. | 290 | 11,703[5] | 40.35 | 3.61 | 486.27 | 316 07 |
| Ottawa Pietertje Ormsby.....H. | 4 | Mar. 6, 1920.. | 290 | 8,602 | 29.66 | 4.28 | 433.34 | 281 67 |
| Ottawa March Ormsby.....H. | 5 | Jan. 6, 1920.. | 309 | 10,605[5] | 34.33 | 3.51 | 438.64 | 285 11 |
| Korndyke Canary Butter Girl..H. | 3 | Nov. 18, 1919.. | 295 | 10,327[5] | 35.00 | 3.7 | 451.11 | 293 22 |
| Pauline.....Gr. A. | 8 | Aug. 22, 1919.. | 465 | 10,490 | 22.55 | 3.53 | 456.52 | 393 56 |
| Ormsby Rhoda Maud.....H. | 3 | Sept. 2, 1919.. | 291 | 10,249[5] | 35.22 | 3.37 | 406.85 | 264 45 |
| Isabel of Maplehurst.....A. | 10 | Mar. 17, 1920.. | 306 | 8,573[5] | 28.02 | 4.04 | 390.56 | 253 86 |
| Ruby Canary Posch.....H. | 3 | Mar. 13, 1920.. | 316 | 9 287 | 29.39 | 3.23 | 353.04 | 229 47 |
| Maud of Fernbrooke 5th.....A. | 5 | Mar. 1, 1920.. | 332 | 9,055[5] | 27.27 | 3.78 | 403.69 | 262 29 |
| Belle of Oban.....A. | 8 | April 12, 1919.. | 409 | 9,838[5] | 24.05 | 3.68 | 426.23 | 277 04 |
| K.S.A.C. Netherland.....H. | 3 | Nov. 18, 1919.. | 498 | 10,533 | 21.15 | 3.62 | 448.7 | 291 65 |
| Primrose of Athens.....A. | 3 | May 23, 1920.. | 302 | 7,153 | 23.68 | 4.42 | 372.34 | 242 02 |
| Dutchess of Briarcrest.....A. | 5 | Nov. 18, 1919.. | 314 | 6,633[5] | 23.86 | 3.98 | 310.80 | 202 02 |
| Trilby.....A. | 6 | Mar. 19, 1920.. | 324 | 7,454 | 23.00 | 3.84 | 337.38 | 219 29 |
| Pietertje Walker.....H. | 4 | Oct. 7, 1919.. | 232 | 6,940 | 29.91 | 3.85 | 314.47 | 204 41 |
| Flavia Second's D.....A. | 3 | Dec. 8, 1919.. | 312 | 6,714 | 21.51 | 4.06 | 321.43 | 208 92 |
| Marjorie 9th of Ottawa.....A. | 2 | Oct. 14, 1919.. | 314 | 6,117[5] | 19.48 | 4.4 | 314.31 | 204 30 |
| Susan Calamity Posch.....H. | 7 | Mar. 12, 1920.. | 243 | 8,736[5] | 31.83 | 3.1 | 319.30 | 207 54 |
| Denise Fortune.....F.C. | 5 | April 4, 1920.. | 239 | 6,511[5] | 27.24 | 3.89 | 298.49 | 194 01 |
| Dalwhatswoll Blossom 2nd.....A. | 5 | May 12, 1920.. | 304 | 7,162 | 23.55 | 3.23 | 296.25 | 192 56 |
| Grace Fagne Aaggie.....H. | 5 | Dec. 1, 1920.. | 169 | 5,777[5] | 34.18 | 3.62 | 257.89 | 167 62 |
| Ottawa Kate.....A. | 16 | Mar. 13, 1920.. | 260 | 6,505 | 25.02 | 3.41 | 261.05 | 169 68 |
| Belle Artis Fayne.....H. | 2 | Mar. 12, 1920.. | 232 | 6,241[5] | 26.90 | 3.59 | 263.51 | 171 28 |
| Beauty of Oaklawn.....A. | 5 | Nov. —, 1919.. | 244 | 4,898[5] | 20.08 | 3.9 | 228.59 | 148 58 |
| Catlinns Barbara.....A. | 6 | Mar. —, 1920.. | 300 | 5,776[5] | 19.25 | 3.9 | 265.62 | 172 65 |
| Jessie of Oaklawn.....A. | 6 | May 6, 1920.. | 304 | 6,204[5] | 20.40 | 3.58 | 261.18 | 170 07 |
| Ottawa Mirabel.....A. | 2 | Nov. 6, 1919.. | 202 | 4,141[5] | 20.5 | 4.13 | 201.20 | 130 78 |
| Shadelawn Lassie.....H. | 6 | Mar. 14, 1920.. | 275 | 5,723[5] | 20.81 | 3.67 | 237 02 | 153 06 |
| Leila Posch Mechthilde.....H. | 4 | Oct. —, 1919.. | 275 | 5,403 | 19.64 | 3.69 | 235.18 | 152 86 |
| Beauty Sensen.....H. | 10 | Feb. 13, 1920.. | 214 | 5,445[5] | 25.44 | 3.23 | 207.34 | 134 67 |
| Faforit Fayne.....H. | 7 | Dec. 4, 1920.. | 169 | 4,873[5] | 28.83 | 3.50 | 201.08 | 130 70 |
| Merry Christmas.....A. | 6 | Mar. —, 1920.. | 340 | 6,233[5] | 18.33 | 3.34 | 245.34 | 159 47 |
| Dunlop Betsy.....A. | 3 | April 1, 1920.. | 204 | 3,202[5] | 15.69 | 3.48 | 131.37 | 85 39 |
| Championne de Berthier.....F.C. | 4 | Sept. 12, 1919.. | 236 | 2,744[5] | 11.62 | 4.08 | 131.81 | 85 67 |
| Average for herd (42 cows)..... | 214 | ..... | 12.887 | 350,121 | 1142.22 | 156.62 | 15,427.95 | 9,958 52 |
| Average for herd (42 cows)..... | 5 | ..... | 306.8 | 8,336.19 | 27.17 | 3.75 | 367.33 | 237 10 |
| **HOL** | | | | | | | | |
| Canaan Beauty 2nd..... | 6 | Dec. 7, 1919.. | 330 | 17,405[5] | 52.74 | 3.44 | 706.18 | 459 01 |
| Ottawa Woodcrest Lyn..... | 4 | Dec. 5, 1919.. | 467 | 15,393[5] | 32.96 | 3.71 | 670.29 | 435 68 |
| Helena Keyes Plus..... | 3 | Dec. 30, 1918.. | 625 | 13.545[5] | 21.67 | 3.91 | 624.07 | 405 64 |
| Helena Keyes Posch..... | 5 | Mar. 12, 1920.. | 303 | 13,886[5] | 46.22 | 3.29 | 537.98 | 349 66 |
| Oliva Schuiling DeKol..... | 9 | Feb. 21, 1920.. | 300 | 12,939 | 43.13 | 3.44 | 524.67 | 341 03 |
| Average of best 5 cows..... | 5.4 | ..... | 405 | 14,634 | 36.13 | 3.55 | 612.63 | 398 20 |
| Average of herd (20 cows)..... | 5.5 | ..... | 306.3 | 96,809 | 31.28 | 3.52 | 401.84 | 263 74 |
| **AYR** | | | | | | | | |
| Sibyl of Fieldhouse..... | 8 | Oct. 5, 1919.. | 401 | 12,260 | 30.57 | 3.9 | 557 | 362 05 |
| Marjorie 8th of Ottawa..... | 6 | Sept. 30, 1919.. | 284 | 10,449[5] | 36.79 | 4.13 | 508.26 | 330 37 |
| Isabel of Maplehurst..... | 10 | Mar. 7, 1920.. | 306 | 8,573[5] | 28.02 | 4.04 | 390.56 | 253 86 |
| Maud of Fernbrooke 5th..... | 5 | Mar. 1, 1920.. | 332 | 9,055[5] | 27.27 | 3.78 | 403.69 | 262 29 |
| Belle of Oban..... | 8 | April 12, 1919 | 409 | 9,838[5] | 24.05 | 3.68 | 426.23 | 277 04 |
| Average of best 5 cows..... | 7.4 | ..... | 346 | 10,035[4] | 29 | 3.88 | 457.14 | 297 12 |
| Average of herd (18 cows)..... | 5.8 | ..... | 303.1 | 7,076[1] | 23.34 | 3.88 | 324.06 | 210 63 |
| **FRENCH** | | | | | | | | |
| La Belle Denise..... | 5 | May 26, 1919.. | 367 | 8,583[5] | 23.4 | 4.74 | 490.98 | 319 14 |
| Denise Fortune..... | 5 | April 4, 1920.. | 239 | 6,511[5] | 27.24 | 3.89 | 298.49 | 194 01 |
| Championne de Berthier..... | 4 | Sept. 12, 1919.. | 236 | 2,744[5] | 11.62 | 4.08 | 131.81 | 85 67 |
| Average for herd (3 cows)..... | 4.6 | ..... | 280.6 | 5,946[5] | 21.19 | 4.38 | 307.09 | 199 60 |
| **GRADE** | | | | | | | | |
| Pauline..... | ..... | Aug. 12, 1919.. | 465 | 10,490 | 22.55 | 3.53 | 456.52 | 293 56 |

| Value of skim-milk at 35c. per cwt. | Total value of product | Amount of meal eaten at 2.75c. per pound | Amount of roots at $4.30 per ton and ensilage at $3.25 per ton | Amount of hay eaten at $7.00 per ton | Amount of green feed eaten at $9.00 per ton | Months on pasture at $2.00 per month | Total cost of feed between calvings | Cost to produce 100 lbs. of milk | Cost to produce one pound of butter skim-milk neglected | Profit on one pound of butter skim-milk neglected | Profit on cow between calvings, labour and calf neglected |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $ cts. | $ cts. | lbs. | lbs. | lbs. | lbs. | mos. | $ cts. | $ cts. | cts. | cts. | $ cts. |
| 58 81 | 517 82 | 5,088 | 22,235 | 2,562 | ..... | 1 | 192 89 | 1.10 | 27.3 | 37.7 | 324 93 |
| 51 88 | 487 56 | 5,153 | 21,315 | 3,071 | ..... | 1 | 191 88 | 1.246 | 28.6 | 36.4 | 295 68 |
| 45 52 | 451 16 | 4,782 | 20 276 | 3,720 | 900 | 1 | 184 19 | 1.35 | 29.5 | 35.5 | 266 97 |
| 41 25 | 413 30 | 4,070 | 12,915 | 3,398 | ..... | 1 | 146 80 | 1.198 | 26.4 | 38.6 | 266 50 |
| 47 20 | 396 86 | 4,367 | 12,635 | 2,476 | ..... | 1 | 141 28 | 1.01 | 26.2 | 38.8 | 255 58 |
| 35 06 | 365 43 | 3,238 | 9,265 | 2,578 | ..... | 1 | 115.12 | 1.101 | 22.6 | 42.4 | 250 31 |
| 28 58 | 347 72 | 2,869 | 11,560 | 2,556 | ..... | 1 | 108 61 | 1.26 | 21.4 | 43.6 | 239 11 |
| 43 73 | 284 75 | 4,013 | 14,425 | 2,106 | 900 | 1 | 148 84 | .869 | 28.3 | 26.7 | 235 95 |
| 39 30 | 355 37 | 3,485 | 15,390 | 2,346 | ..... | 1 | 122 51 | .961 | 25.1 | 39.9 | 232 86 |
| 28 82 | 310 49 | 2,664 | 11,785 | 2,378 | ..... | 1 | 102 04 | 1.18 | 23.6 | 41.4 | 208 45 |
| 35 81 | 320 92 | 3,101 | 10,785 | 2,486 | ..... | 1 | 113 33 | 1.06 | 25.8 | 39.2 | 207 59 |
| 34 80 | 328 02 | 3,418 | 9,900 | 2,160 | ..... | 2 | 121 63 | 1.197 | 26.9 | 38.1 | 206 39 |
| 35 33 | 326 89 | 3,488 | 12,630 | 2,412 | 900 | 2 | 125 60 | 1.10 | 28.7 | 36.3 | 201 29 |
| 39 66 | 304 11 | 3,131 | 9,650 | 2,148 | ..... | 1 5/6 | 113 05 | 1.103 | 27.7 | 37.3 | 191 06 |
| 28 86 | 282 72 | 2,780 | 12,565 | 2,478 | 900 | 1 | 112 06 | 1.30 | 28.6 | 36.4 | 170 66 |
| 31 45 | 260 92 | 3,256 | 8,115 | 1,986 | 900 | 1 | 91 54 | .98 | 25.9 | 39.1 | 169 38 |
| 30 49 | 282 78 | 3,318 | 10,670 | 2,175 | 900 | 1 | 121 45 | 1.34 | 30.1 | 34.9 | 161 30 |
| 33 16 | 310 20 | 3,706 | 19,510 | 3,654 | ..... | 1 | 149 44 | 1.51 | 35 | 30 | 160 76 |
| 35 52 | 327 17 | 4,012 | 22,860 | 3,198 | 900 | 1 | 167 30 | 1.578 | 37.2 | 27.8 | 159 87 |
| 23 92 | 265 94 | 2,706 | 11,870 | 2,010 | 900 | 1 | 107 92 | 1.50 | 28.9 | 36.1 | 158 02 |
| 22 29 | 224 31 | 2,302 | 8,430 | 1,830 | ..... | 1 | 85 41 | 1.287 | 27.4 | 37.6 | 138 90 |
| 25 53 | 244 82 | 2,808 | 10,818 | 1,943 | 900 | 1 | 106 73 | 1.43 | 31.3 | 33.7 | 138 09 |
| 23 56 | 227 97 | 2,310 | 12,850 | 1,434 | ..... | 1 | 92 14 | 1.327 | 29.3 | 35.7 | 135 83 |
| 22 99 | 231 91 | 2,532 | 9,540 | 2,196 | ..... | 1 1/2 | 96 10 | 1.43 | 29.8 | 35.2 | 135 81 |
| 20 48 | 224 78 | 2,296 | 9,205 | 2,266 | ..... | 1 1/2 | 89 03 | 1.455 | 28.3 | 36.7 | 135 75 |
| 29 62 | 237 16 | 3,038 | 8,380 | 1,636 | ..... | 1 | 104 85 | 1.20 | 32.8 | 32.2 | 132 31 |
| 21 80 | 215 81 | 2,510 | 7,280 | 1,648 | ..... | 1 | 88 60 | 1.36 | 29 | 36 | 127 21 |
| 24 18 | 216 74 | 2,728 | 9,503 | 2,156 | ..... | 1 | 97 00 | 1.228 | 32.7 | 32.3 | 119 74 |
| 19 45 | 187 07 | 1,814 | 5,530 | 1,109 | 900 | 1 | 68 79 | 1.19 | 26.6 | 38.4 | 118 28 |
| 21 99 | 191 67 | 2,124 | 8,935 | 2,174 | ..... | 1 | 82 54 | 1.269 | 31.6 | 33.4 | 109 13 |
| 18 84 | 185 12 | 2,437 | 6,985 | 1,482 | 900 | 1 | 89 59 | 1.43 | 34.9 | 30.1 | 95 53 |
| 16 46 | 165 04 | 1,830 | 7,225 | 1,650 | ..... | 1 | 69 84 | 1.425 | 30.6 | 34.4 | 95 20 |
| 19 52 | 192 17 | 2,643 | 9,573 | 2,187 | ..... | 1 | 97 88 | 2.05 | 36.8 | 28.2 | 94 29 |
| 20 92 | 190 99 | 2,628 | 10,970 | 1,974 | 900 | 1 | 103 97 | 1.67 | 39.7 | 25.3 | 87 02 |
| 13 90 | 144 68 | 1,498 | 6,490 | 1,612 | ..... | 1 1/2 | 58 71 | 1.417 | 29.1 | 35.9 | 85 97 |
| 19 32 | 172 38 | 2,316 | 9,500 | 1,830 | ..... | 1 | 87 42 | 1.52 | 36.8 | 28.2 | 84 96 |
| 18 24 | 171 10 | 2,256 | 9,640 | 1,740 | 900 | 1 | 89 99 | 1.66 | 38.2 | 26.8 | 81 11 |
| 18 42 | 155 09 | 1,900 | 7,205 | 1,370 | 900 | 1 | 74 85 | 1.37 | 36.9 | 28.1 | 78 24 |
| 17 05 | 147 75 | 1,980 | 6,380 | 1,284 | ..... | 1 | 71 30 | 1.46 | 34.9 | 30.1 | 76 45 |
| 21 08 | 180 55 | 2,754 | 12,100 | 2,180 | 900 | 1 | 109 83 | 1.76 | 44.3 | 20.7 | 70 72 |
| 10 81 | 96 21 | 1,175 | 5,820 | 1,362 | 900 | 1 | 52 75 | 1.647 | 40.1 | 24.9 | 43 46 |
| 9 14 | 9,481 | 1,382 | 7,735 | 1,638 | ..... | 1 | 63 34 | 2.307 | 48 | 17 | 31 47 |
| 1,179 05 | 11,136 26 | 121,906 | 470,450 | 90,603 | 14,400 | 46½ | 4,558 14 | 56.815 | 1302.9 | 1,427.1 | 6,577 43 |
| 28 07 | 265 14 | 2,902.5 | 11,201.19 | 2,157.21 | 342,86 | 1.11 | 108 53 | 1.35 | 31.02 | 33.97 | 156 60 |
| STEINS | | | | | | | | | | | |
| 58 81 | 517 82 | 5,088 | 22,235 | 2,562 | ..... | 1 | 192 89 | 1.10 | 27.3 | 37.7 | 324 93 |
| 51 88 | 487 56 | 5,153 | 21,315 | 3,070 | ..... | 1 | 191 88 | 1.246 | 28.6 | 36.4 | 295 68 |
| 45 52 | 451 16 | 4,782 | 20,276 | 3,720 | 900 | 1 | 184 19 | 1.35 | 29.5 | 35.5 | 266 97 |
| 47 21 | 396 86 | 4,367 | 12,635 | 2,476 | ..... | 1 | 141 28 | 1.01 | 26.2 | 38.8 | 255 58 |
| 43 73 | 384 75 | 4,013 | 14,425 | 2,106 | 900 | 1 | 148 84 | .869 | 28.3 | 36.7 | 235 95 |
| 49 43 | 447 63 | 4,680 | 18,177 | 2,786 | 360 | 1 | 171 81 | 1.117 | 27.9 | 37.0 | 275 82 |
| 32 60 | 296 33 | 3,271 | 12,292 | 2,126.3 | 360 | 1.04 | 118 47 | 1.238 | 30.1 | 34.3 | 176 87 |
| SHIRES | | | | | | | | | | | |
| 41 25 | 413 30 | 4,070 | 12,915 | 3,398 | ..... | 1 | 146 80 | 1.198 | 26.4 | 38.6 | 266 50 |
| 35 06 | 265 43 | 3,238 | 9,265 | 2,578 | ..... | 1 | 115 12 | 1.101 | 22.6 | 42.4 | 250 31 |
| 28 86 | 282 72 | 2,780 | 12,563 | 2,478 | 900 | 1 | 112 06 | 1.30 | 28.6 | 36.4 | 170 66 |
| 30 49 | 282 78 | 3,318 | 10,670 | 2,175 | 900 | 1 | 121 45 | 1.34 | 30.1 | 34.9 | 161 30 |
| 33 16 | 310 20 | 3,706 | 19,510 | 3,654 | ..... | 1 | 149 44 | 1.51 | 35 | 30 | 160 76 |
| 33 76 | 310 88 | 3,422.4 | 10,985 | 2,856.6 | 360 | 1 | 128 97 | 1.289 | 28.54 | 36.46 | 210 90 |
| 23 81 | 234 44 | 2,618.6 | 10,300.1 | 2,212.3 | 350 | 1.1 | 100 14 | 1.454 | 31.85 | 33.15 | 134 29 |
| CANADIANS | | | | | | | | | | | |
| 28 58 | 347 72 | 2,869 | 11,560 | 2,556 | ..... | 1 | 108 61 | 1.26 | 21.4 | 43.6 | 239 11 |
| 21 80 | 215 81 | 2,510 | 7,280 | 1,648 | ..... | 1 | 88 60 | 1.36 | 29 | 36 | 127 21 |
| 9 14 | 94 81 | 1,382 | 7,735 | 1,638 | ..... | 1 | 63 34 | 2.307 | 48 | 17 | 31 47 |
| 19 84 | 219 44 | 2,260[3] | 8,858[3] | 1,947[3] | ..... | 1 | 86 85 | 1.643 | 32.8 | 32.2 | 134 29 |
| AYRSHIRES | | | | | | | | | | | |
| 35 33 | 326 89 | 3,488 | 12,630 | 2,412 | 900 | 2 | 125 60 | 1.10 | 28.7 | 36.3 | 201 29 |

OFFICIAL RECORDS

In addition to the records kept by this division, a number of the dairy cattle of the different breeds are entered in the Record of Performance for Pure-bred Dairy Cattle conducted by the Live Stock Branch of the department. In addition, many Holstein cows have been put through the Holstein Record of Merit test. The following tables give the list of cows qualifying under each of these tests for the year. It is worthy of note that the Holstein cow "Grace Fayne Aaggie, No. 48612" besides making exceptionally good 7, 30 and 60-day records, also carried off the open championship at the Ottawa Winter Fair dairy test in 1921.

CANADIAN RECORD OF PERFORMANCE TESTS ON CENTRAL FARM, APRIL 1, 1920, TO MARCH 31, 1921

| Name and Number of Cow | Breed | Age at commencement of test | No. days milking | Pounds milk produced | Pounds fat produced | Average per cent fat |
|---|---|---|---|---|---|---|
| | | Years | | | | |
| Korndyke Canary Butter Maid, 49648 | Holstein | 2 | 294 | 10,328 | 371 | 3·59 |
| Bella Mercena Korndyke, 40063 | " | 4 | 365 | 13,431 | 452 | 3·37 |
| Canaan Beauty 2nd, 21172 | " | 7 | 350 | 17,306 | 539 | 3·11 |
| Oliva Schuiling DeKol, 14825 | " | 9 | 300 | 12,859 | 452 | 3·52 |
| Ruby Canary Posch, 60646 | " | 2 | 325 | 9,646 | 331 | 3·53 |
| Ottawa Woodcrest Lyn, 44975 | " | 2 | 365 | 12,801 | 440 | 3·44 |
| Ormsby Rhoda Maud, 44200 | " | 2 | 291 | 10,250 | 338 | 3·52 |
| Marjorie 9th of Ottawa, 55539 | Ayrshire | 2 | 313 | 6,178 | 271 | 4·39 |
| Primrose of Athens, 61606 | " | 3 | 309 | 7,153 | 309 | 4·32 |
| Sybil of Fieldhouse, 35074 | " | 8 | 342 | 11,387 | 447 | 3·92 |
| Flavia 2nd D., 52512 | " | 3 | 313 | 6,714 | 294 | 4·38 |
| Marjorie 8th of Ottawa, 41606 | " | 6 | 283 | 10,420 | 401 | 3·84 |
| Belle of Oban, 46711 (App.) | " | 8 | 365 | 9,500 | 370 | 3·90 |
| La Belle Denise, 3530 (App.) | Fr. Can. | 4 | 365 | 8,584 | 442 | 5·15 |

HOLSTEIN RECORD OF MERIT TESTS ON CENTRAL FARM, APRIL 1, 1920, TO MARCH 31, 1921

| Name and Number of Cow | Age at commencement of test | | | Number days on test | Pounds milk | Pounds fat | Pounds 80% Butter |
|---|---|---|---|---|---|---|---|
| | Years | Months | Days | | | | |
| Grace Fayne Aaggie, 48612 | 5 | 3 | 0 | 7 | 590·0 | 24·15 | 30·19 |
| | 5 | 3 | 0 | 30 | 2,485·5 | 99·80 | 124·76 |
| | 5 | 3 | 0 | 60 | 4,789·2 | 187·23 | 234·04 |
| Grace Allen Ormsby, 22333 | 8 | 6 | 1 | 7 | 565·5 | 16·63 | 20·80 |
| Helena Keyes Posch, 21376 | 7 | 10 | 10 | 7 | 608·0 | 21·06 | 26·33 |
| | 7 | 10 | 10 | 30 | 2,449·0 | 81·29 | 101·62 |
| Oliva Schuiling DeKol, 14825 | 9 | 6 | 11 | 7 | 544·5 | 19·05 | 23·82 |
| | 9 | 6 | 11 | 30 | 2,227·5 | 75·45 | 94·32 |
| Ottawa Pietertje Ormsby, 44451 | 3 | 5 | 1 | 7 | 439·0 | 15·93 | 19·92 |
| | 3 | 5 | 1 | 30 | 1,722·5 | 63·37 | 79·22 |
| Springbank Posch Canary, 39598 | 4 | 8 | 20 | 7 | 399·0 | 17·15 | 21·44 |
| | 4 | 8 | 20 | 30 | 1,770·5 | 67·33 | 84·17 |

CO-OPERATIVE MILK RECORDS

During the past year an increasing number of applications were received for milk and feed record forms—which are distributed free of charge upon application to this division. This is a gratifying indication of the rapidly improving methods being adopted by the dairy farmers in keeping records for the individual cows of their

herds. Apparently, however, there are still many farmers who are not aware of this free distribution of record forms. The following is a list of the forms for distribution:—

*Month long.*—Daily milk records suitable for herds numbering up to twenty-two cows.

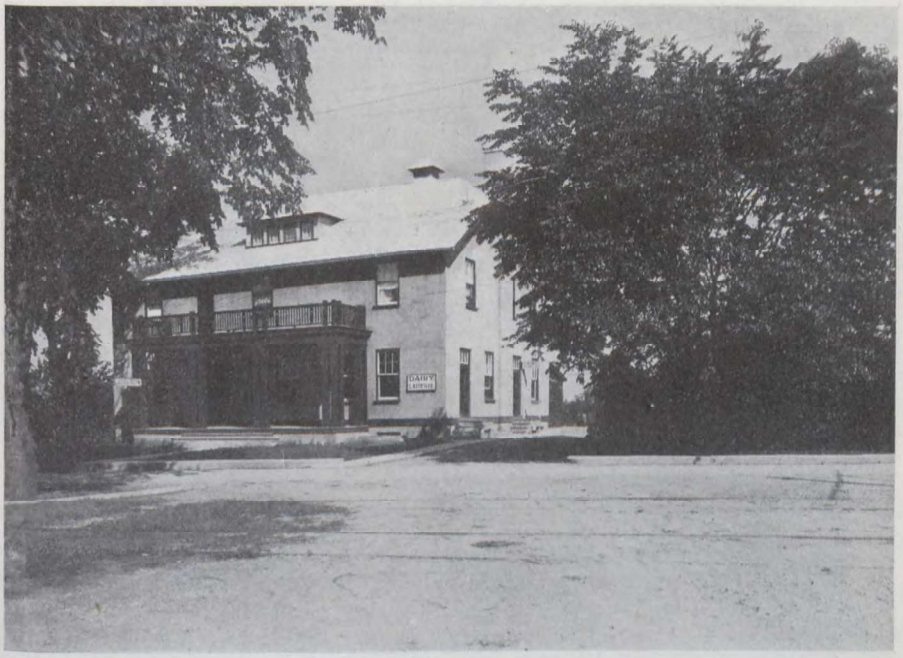
*Week long.*—Daily milk records suitable for herds numbering up to sixteen cows.

*Week long.*—Daily milk records suitable for herds numbering up to twenty-four cows.

Monthly summary records.

Yearly summary records.

Feed record forms.



New Dairy Building at the Central Experimental Farm.

It should be clearly understood that the object of this free distribution is not in any way to overlap the work of the Cow Testing Associations of the Dairy and Cold Storage Branch, Department of Agriculture; but rather to encourage individual farmers, especially in districts where cow-testing associations are not developed, so that these individuals may in turn eventually form the nuclei of record centres.

## DISPOSAL OF MILK

The milk produced on the Central Experimental Farm during the past year has been marketed almost wholly as butter and cream cheese, a very small amount of Coulommier and Cheddar cheese being made. In addition, a small quantity of whole milk, cream and buttermilk is sold to the farm officers and employees who have not the facilities of city distribution. Little work of an experimental nature was carried on,

owing to the fact that the old dairy did not have the requisite facilities and the new dairy, reported on elsewhere in this report, was not completed. It is now finished, and considerable work of an experimental nature with small cheese of Cheddar and other types has been started.

## THE NEW DAIRY

During the past years opportunities for experimental work in dairy lines have been greatly hampered by lack of suitable quarters. In the spring of 1920, however, work was commenced on a new building which was completed in the fall of the same year. After finally becoming settled in this building little other than routine work was attempted during the balance of the year. It is proposed during the coming

Work Room, Dairy Building, Central Experimental Farm.

year to put this equipment to profitable use, as follows: Arriving at accurate cost of farm dairy products; manufacturing varieties of cured and fresh cheese such as might be made in the farm dairy; attempting to produce palatable variations thereof, or new kinds; testing farm dairy machinery and appliances.

The accompanying photographs show interior and exterior views of this building.

The basement is taken up with boiler room, curing rooms, storage and lavatories.

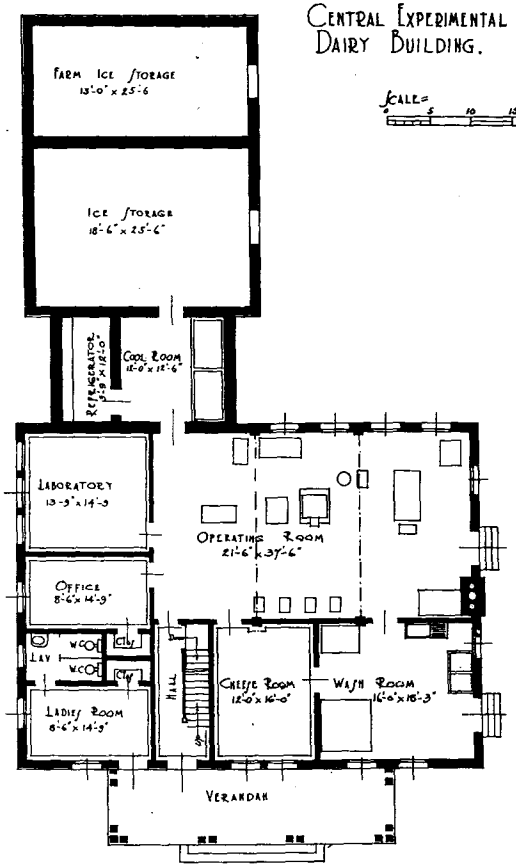
The ground floor is given over largely to working space; operating room; wash room; cheese room; office; laboratory; and waiting room.

The first floor is taken up by the dairyman's residence and the second by storage space.

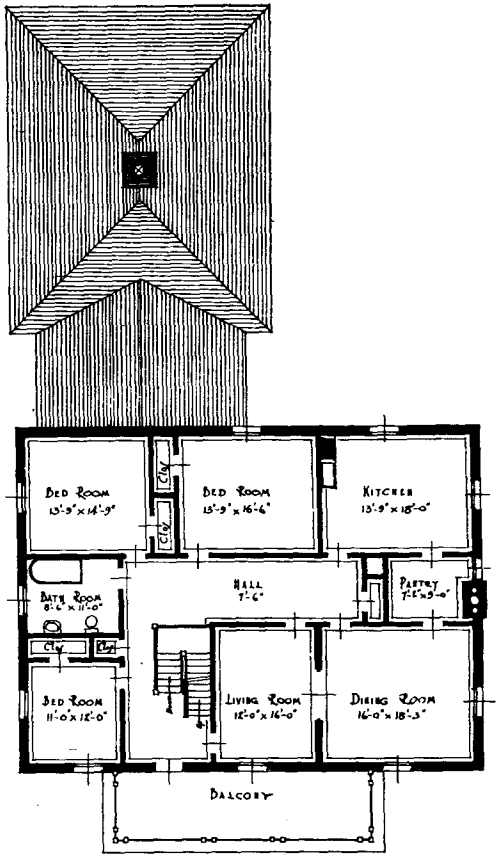
Two ice storages are included, one of which cools, by convection, the milk room and refrigerator, the second being for domestic ice supply.

# CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.
## DAIRY BUILDING.

SCALE= 0 5 10 15 20 25 30




GROUND FLOOR PLAN.




FIRST FLOOR PLAN.

All machinery is modern, including special installations to insure effective pasteurizing of milk and pressure steam sterilization of utensils. Electricity is used as the motive power, with steam only for heating, sterilizing and pasteurizing.

It is hoped to equip a laboratory for dairy test and research work, and for bacteriological studies of milk and milk products.

*Revenue Returns.*—Although, perforce, dairy work on this Farm has been largely of a routine or commercial nature, it is, nevertheless, interesting to note that in spite of occasional shortage of milk, the yearly revenue returns for 1920-21 have totalled $13,871.66, made up by sales of milk, butter, cheese and by-products. The revenue for the past three years has totalled nearly $41,000 or an average of $13,645.12.

## SHEEP

This class of live stock has increased very considerably in both numbers and quality. The flock now numbers two hundred and fifty-four head, made up as follows:—

| | | |
|---|---|---|
| *Leicesters:* | Breeding stock | 89 head |
| | Spring lambs | 62 " |
| *Shropshires:* | Breeding stock | 66 " |
| | Spring lambs | 37 " |
| | Total | 254 " |

In the past these two breeds of sheep have been kept in about equal number, but the increase in Leicesters this year is due in part to an importation from Scotland of twelve yearling ewes. These sheep were imported at the same time as the Ayrshire cattle and were selected by Robert Cunningham, of this Division. They are an exceptionally fine bunch of ewes, and should help very materially in the improvement of the Farm flock.

A fairly successful year can be reported in breeding operations with sheep. During the past summer it was possible, for the first time, to give the Farm sheep almost unlimited range of good quality. This was made possible through the acquiring of the pasture rights on a portion of Connaught Rifle Ranges. As a consequence, the sheep did especially well, and came into their winter quarters in good condition. Owing undoubtedly to the complete change of pastures, very little trouble was experienced with intestinal worms of any kind.

Owing to the drop in the price of wool and mutton, the trade in pure-bred rams dropped off considerably, the season's crop of rams not all being disposed of. A number of the best are being held over for sale as yearlings, and are available to farmers at most reasonable prices. This year again the ewes were bred quite early, and, as a consequence, practically all had lambed before April 1, 1921. In the case of Shropshires, 41 ewes lambed a total of 60 lambs, or 150 per cent increase. Of these, 48 survived the critical period in their lives, giving 120 per cent increase at the close of the fiscal year. The Leicesters were a trifle more prolific. Fifty ewes lambed a total of 81 lambs, or 160 per cent increase. Of these 68 survived, giving 130 per cent living increase. This is a very creditable showing, and the same is due quite largely to the practice of "flushing" the ewes; that is, getting them in high condition just before breeding them. The losses in lambs are partly due to the fact that they are lambed so early in the season, and are consequently subject to rather severe weather conditions at times.

The 1920 wool clip yielded 830 pounds of wool from 112 fleeces, or an average of 7.4 pounds per fleece. It was marketed through the Canadian Co-operative Wool Growers, Limited, Lennoxville Branch. The wool graded very well, only two fleeces

going in the reject class and these because they were "cotted." The "Medium Combing," "Low Combing" and "Coarse Combing" grades accounted for 42, 29, and 22 fleeces respectively. There were no burry, seedy, or chaffy fleeces, which speaks well for the manner in which the sheep are handled both on the range and in winter quarters. In the latter case special feed troughs and racks are used to prevent the pollution of the fleece with seeds, chaff, etc. The average price per pound received

Shropshire and Leicester Flocks, March, 1921.

for the wool, other than for the rejects, was 30 cents. While not as high as in recent years, still, this figure represents a profitable return, and in view of the poor condition of the wool market throughout the entire season it is indicative of the wisdom of grading and selling co-operatively, for the prices offered by local buyers did not nearly approach the above figure.

## SWINE

A material reduction was made in the herd of swine during the past year, to conform more to the carrying capacity of the quarters allotted to swine. Considerable experimental work was carried on under the following headings:—

1. Comparisons of Commercial Hog Meals.
   (*a*) for weaning pigs.
   (*b*) for growing pigs.
2. Comparisons of Commercial vs. Home Mixed Meals for weaning and fattening pigs.
3. Inside vs. Outside for Summer Feeding of Growing Pigs.
4. Yorkshire vs. Berkshire.
5. The Economy of the Self-Feeder.

## SUMMER EXPERIMENTS, 1920-21

Projects Nos.—

6 A (Home Mixed vs. Commercial Meals.)

6 D (Weaning Mixtures.)

### PROJECT NO. 6 D

*Supplements for the Sucking and Weaning Pig*

To obtain figures bearing upon the projects mentioned, eight litters of pigs were used. The little pigs were supplied with a creep where feeding was started as soon as they showed a disposition to supplement the mother's milk. The rations used were as follow: Middlings and finely ground, sifted oats, equal parts; middlings and oats with 5 per cent blood meal; middlings and oats with 5 per cent fish meal; middlings and oats plus molasses; middlings and oats plus 5 per cent ground flax.

TABLE No. 1.—SUMMARY.

| Lot | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| Weaning Experiment. | | Middlings and Oats equal parts and Milk. | Middlings and Oats equal parts, 5% Bld. Meal and Milk. | Middlings and Oats equal parts, 5% Fish Meal and Milk. | Middlings and Oats equal parts with Molasses and Milk. | Middlings and Oats equal parts, 5% Flax and Milk. | Blatchford's Pig Meal and Milk. | Gardiner's Pig Meal and Milk. | Monarch Pig Meal and Milk. |
| Number of animals in each group | | 7 | 9 | 10 | 7 | 8 | 8 | 7 | 8 |
| First weight, gross | lbs. | 79·0 | 109·0 | 117·0 | 127·0 | 105·0 | 152·0 | 76·00 | 123·0 |
| First weight, average | " | 11·3 | 12·1 | 11·7 | 18·1 | 13·1 | 19·0 | 10·9 | 16·1 |
| Finished weight, gross | " | 241·0 | 258·0 | 304·0 | 232·0 | 242·0 | 292·0 | 202·0 | 261·0 |
| Finished weight, average | " | 34·4 | 28·7 | 30·4 | 33·1 | 30·3 | 36·5 | 28·9 | 32·6 |
| Number days in experiment | | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 |
| Total gain for period | lbs. | 162·0 | 149·0 | 187·0 | 105·0 | 137·0 | 140·0 | 126·0 | 138·0 |
| Average gain per animal | " | 23·1 | 16·6 | 18·7 | 15·0 | 17·1 | 17·5 | 18·0 | 17·3 |
| Average daily gain for group | " | 3·86 | 3·55 | 4·45 | 2·50 | 3·26 | 3·33 | 3·00 | 3·29 |
| Average daily gain per animal | " | 0·551 | 0·393 | 0·445 | 0·357 | 0·408 | 0·416 | 0·429 | 0·411 |
| Quantity meal eaten group for period | " | 80·0 | 69·0 | 91·0 | 77·0 | 78·0 | 83·0 | 44·0 | 75·0 |
| Quantity molasses eaten group for period | " | | | | 31 | | | | |
| Quantity Skim-milk eaten group for period | " | 405·0 | 390·0 | 452·0 | 380·0 | 390·0 | 405·0 | 325·0 | 395·0 |
| Pounds meal eaten per pound gain | " | 0·494 | 0·463 | 0·487 | 0·733 | 0·569 | 0·593 | 0·349 | 0·544 |
| Total cost of feed | $ | 3·18 | 3·13 | 3·72 | 3·97 | 3·26 | 6·78 | 2·98 | 3·68 |
| Cost of feed per head | " | 0·454 | 0·348 | 0·372 | 0·567 | 0·408 | 0·848 | 0·426 | 0·460 |
| Cost of feed per head per day | " | 0·01081 | 0·00829 | 0·00886 | 0·01350 | 0·00971 | 0·02019 | 0·01014 | 0·01095 |
| Cost of feed to produce one pound gain | " | 0·01963 | 0·02100 | 0·01989 | 0·03781 | 0·02380 | 0·04843 | 0·02365 | 0·02667 |

PRICE OF FEEDS.

| | | | |
|---|---|---|---|
| Middlings | $60 00 per ton. | Blatchford's Pig Meal | $ 7 20 per cwt. |
| Oats | 58 53 per ton. | Gardiner's Pig Meal | 5 30 per cwt. |
| Blood meal | 12 00 per cwt. | Monarch Hog Feed | 77 12 per ton. |
| Fish meal | 104·00 per ton. | | |
| Molasses | 60 00 per ton. | Milk | 0 20 per cwt. |
| Flax | 0 07 per lb. | | |

*Conclusions*

*Project No. 6 D.*—In this particular test the addition of the various supplements to the basal ration did not give better results; in fact the best gains were made by the lot receiving middlings, oats and skim-milk. The little pig before weaning is supplied largely by the dam with the essential elements. As an easily digestible ration calculated to start the pig feeding and to grow muscle and bone, the latter mixture is excellent. Sifted oats or feeding oatmeal are recommended.

PROJECT NO. 6A.—COMMERCIAL VS. HOME MIXTURES

(FOR THE FATTENING HOG)

It will be noted (Table No. 1) that the main point of difference in the results shown by the various lots is in the *cost per pound gain.* As to average gain per animal and costs to produce, the following comparison is afforded:—

| | Home-Mixed Average of 5 Mixtures | Commercial Average of 3 Mixtures |
|---|---|---|
| Average daily gain per pig | 0.43 lb. | 0.41 lb. |
| Average cost per pound gain | 2.4 c. | 3.2 c. |

TABLE II—HOME MIXED VS. COMMERCIAL FEEDS

| Lot | 1 | 2 | 3 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|
| | Fed in shed | Fed in shed | Fed in shed | Fed in shed | Fed in small piggery | Fed in small piggery |
| —— | Monarch and Milk. Green feed, 1st 8 weeks | Home mixed and Milk. Green feed, 1st 8 weeks | Blatchfords and Milk. Green feed, 1st 8 weeks | Home mixed and Milk. 5 per cent Fishmeal. Green feed, 1st 6 weeks | Schumacher and Milk. Green feed, 1st 6 weeks | Purina and Milk. Green feed 1st 6 weeks |
| Number of hogs in each group | 9 | 9 | 9 | 10 | 11 | 11 |
| First weight, gross Lbs. | 286·0 | 377·0 | 327·0 | 370·0 | 488·0 | 499·0 |
| First weight, average " | 31·8 | 41·9 | 36·3 | 37·0 | 44·4 | 45·4 |
| Finished weight, gross " | 1,604·0 | 1,834·0 | 1,531·0 | 1,851·0 | 1,947·0 | 2,083 |
| Finished weight, average " | 178·2 | 203·8 | 170·1 | 185·1 | 177·0 | 189·4 |
| Number of days in experiment | 126 | 126 | 126 | 112 | 98 | 112 |
| Total gain for period Lbs. | 1,318·0 | 1,457·0 | 1,204·0 | 1,481·0 | 1,459·0 | 1,584·0 |
| Average gain per animal " | 146·4 | 161·9 | 133·8 | 148·1 | 132·6 | 144·0 |
| Average daily gain for group " | 10·5 | 11·6 | 9·6 | 11·8 | 14·9 | 14·1 |
| Average daily gain per animal " | 1·17 | 1·29 | 1·07 | 1·18 | 1·35 | 1·29 |
| Quantity meal eaten, group for period " | 3,600·0 | 4,130·0 | 3,927·0 | 4,156·0 | 4,815·0 | 5,865·0 |
| Quantity green feed eaten, group for period " | 315·0 | 315·0 | 315·0 | 190·0 | 345·0 | 345·0 |
| Quantity skim milk, group for period " | 4,202·0 | 4,738·0 | 4,447·0 | 3,943·0 | 3,423·0 | 4,168·0 |
| Lbs. meal eaten, per lb. gain " | 2·73 | 2·83 | 3·26 | 2·81 | 3·30 | 3·70 |
| Total cost of feed $ | 148·00 | 145·52 | 190·32 | 148·25 | 185·26 | 258·46 |
| Cost of feed per head $ | 16·44 | 16·17 | 21·15 | 14·83 | 16·84 | 23·50 |
| Cost of feed per head per day $ | 0·13 | 0·128 | 0·168 | 0·132 | 0·172 | 0·216 |
| Cost of feed to produce 1 lb. gain $ | 0·112 | 0·10 | 0·158 | 0·10 | 0·127 | 0·163 |

Price of Feeds,—

| | | | |
|---|---|---|---|
| Monarch | $77 12 per ton | Purina Pig Chow | $85 00 per ton |
| Blatchford's Bar-Nun | 92 00 " | Home mixed | 65 50 " |
| Schumacher | 73 75 " | Home mixed and fish meal | 67 32 " |

Here the commercial feeds prove not only high in cost, but showed no particular power to produce gains over the cheaper home-mixed meals. The home mixture used in all summer feeding work was as follows: middlings, 4 parts; oats, 2 parts; corn, 1 part; barley, 1 part; and oilmeal, 10 per cent.

COMPARISON OF AVERAGES

| | Commercial Average of 4 | Home-Mixed Average of 2 |
|---|---|---|
| Average gain per animal per day | 1.22 lb. | 1.23 lb. |
| Average cost per pound gain | 0.14 c. | 0.10 c. |

While the subject is being treated more with reference to commercial feeds as a class than with specific intent to ascertain the merits of any one feed, it may be stated that from the standpoint of gains alone, with one exception, all commercial feeds proved satisfactory. From past satisfactory results, two feeds might be mentioned in particular, viz., Monarch and Schumacher. Both of these are well known, are fair priced and productive.

To the farmer who, through lack of knowledge or from carelessness, or who, owing to isolation or other reasons, has difficulty in obtaining feeds, the ready-mixed meal is, with few exceptions, to be highly recommended. However, in the main, commercial hog feeds have been considerably higher in price than home-made rations compounded in part, at least, of home-grown feeds, and this condition is likely to apply.

### *Winter Feeding (further re Project 6a)*

In order to give the two highest priced feeds another test under pen-feeding conditions during the winter, several lots of hogs were fed during the winter of 1920-21. To the commercial feeds already tested (Blatchford's Bar-Nun Hog Meal and Purina Pig Chow) was added another, Pioneer Hog Feed, concerning which more or less inquiry had been raised. Four lots were fed straight through a seventy-day period, as per the following table. The home-mixed ration was as follows: shorts, 4 parts; corn, 3 parts; oats, 3 parts; and ground flax, 5 per cent. Buttermilk was fed in all cases.

### *Experiment No. 1—Winter, 1920-21*

TABLE III—COMMERCIAL VS. HOME MIXED FEEDS
(Same feed throughout period)

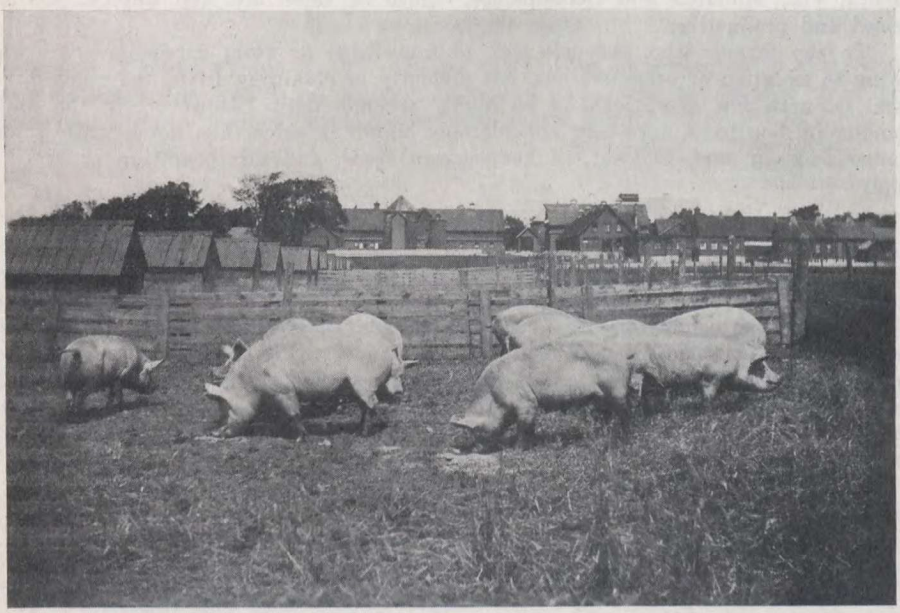
| Lot | | 4 | 5 | 6 | 8 |
|---|---|---|---|---|---|
| Breed | | Yorks. | Berks. | Yorks. | Yorks. |
| —— | | Home mixed and Milk | Home mixed and Milk | Purina and Milk | Pioneer and Milk |
| Number of hogs in each group | | 5 | 6 | 4 | 4 |
| First weight, gross | lbs. | 533·0 | 672·0 | 409·0 | 283·0 |
| First weight, average | " | 106·6 | 112·0 | 102·3 | 70·8 |
| Finished weight, gross | " | 1,044·0 | 1,276·0 | 793·0 | 564·0 |
| Finished weight, average | " | 208·8 | 212·7 | 198·3 | 141·0 |
| Number of days in experiment | | 70 | 70 | 70 | 70 |
| Total gain for period | lbs. | 511·0 | 604·0 | 384·0 | 281·0 |
| Average gain per animal | " | 102·2 | 100·7 | 96·0 | 70·3 |
| Average daily gain for group | " | 7·3 | 8·6 | 5·5 | 4·0 |
| Average daily gain per animal | " | 1·46 | 1·43 | 1·37 | 1·00 |
| Quantity meal eaten by group for period | " | 1,643·0 | 1,912·0 | 1,565·0 | 925·0 |
| Quantity skim-milk eaten by group for period | " | 2,132·0 | 2,608·0 | 1,428·0 | 1,353·0 |
| Lbs. meal eaten per lb. gain | " | 3·22 | 3·17 | 4·08 | 3·29 |
| Total cost of feed | $ | 42·22 | 49·19 | 67·02 | 34·62 |
| Cost of feed per head | $ | 8·44 | 8·20 | 16·76 | 8·66 |
| Cost of feed per head per day | $ | 0·121 | 0·117 | 0·239 | 0·124 |
| Cost of feed to produce 1 lb. grain | $ | 0·083 | 0·081 | 0·175 | 0·123 |

Cost of Feed,—

| | |
|---|---|
| Home mixed | $46 00 per ton |
| Purina | 82 00 " |
| Pioneer | 69 00 " |
| Milk | 0 20 " |

Unfortunately such disastrous results were obtained from the Blatchford-fed lots that their feed was of necessity changed in the middle of the feeding period, a tabulation of the results of which follows this. In the foregoing table only Purina, Pioneer, and the home-mixed rations are comparable. As will be seen, in both average gains and cost to produce, the commercial feeds were low in comparison with the home-mixed ration.

The conclusions with reference to comparisons afforded between Yorkshires and Berkshires will be discussed later under the latter project.



Yorkshire Brood Sows, Central Experimental Farm, Ottawa.

In the next table further information is given concerning comparative values of commercial and home-mixed rations. Three lots of hogs were fed on Blatchford's Bar-Nun Hog Meal, with the intention of allowing two of them to finish on this ration. At the end of twenty-eight days, however, three individuals died, out of the total fifteen fed, and the remainder were in such poor shape that a change was imperative. A two-week interval elapsed, during which time these hogs were specially fed and put in shape for a twenty-eight-day feeding period on the home-mixed ration.

## TABLE IV.—A COMPARISON OF COMMERCIAL *vs.* HOME MIXTURES

Rations Changed at Middle of Feeding Period

WINTER 1920–21

| Lot | 1 | | 2 | | 3 | | Averages | | 7 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| Breed | Berks. | Berks. | Yorks. | Yorks. | Yorks. | Yorks. | Lots 1, 2 and 3. | | Yorks. | Yorks. |
| Feeds. | Blatchford's | Home-Mixed | Blatchford's. | Home-Mixed. | Blatchford's. | Home-Mixed. | Blatchford's. | Home-Mixed. | Purina. | Home-Mixed. |
| Number of hogs in each group | 3 | 3 | 4 | 4 | 4 | 4 | 3·6 | 3·6 | 4 | 4 |
| First weight, gross ..... lbs. | 356·0 | 497·0 | 472·0 | 637·0 | 401·0 | 572·0 | 409·6 | 568·6 | 379·0 | 559·0 |
| First weight, average ..... " | 118·7 | 165·7 | 118·0 | 159·3 | 100·3 | 143·0 | 112·3 | 156·0 | 94·8 | 139·8 |
| Finished weight, gross ..... " | 410·0 | 628·0 | 552·0 | 898·0 | 506·0 | 821·0 | 489·4 | 782·4 | 559·0 | 730·0 |
| Finished weight, average ..... " | 136·7 | 209·3 | 138·0 | 244·5 | 126·5 | 205·3 | 133·4 | 219·7 | 139·8 | 182·5 |
| Number of days in experiment | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 35 | 35 |
| Total gain for period ..... lbs. | 54·0 | 131·0 | 80·0 | 261·0 | 105·0 | 299·0 | 79·6 | 210·3 | 180·0 | 171·0 |
| Average gain per animal ..... " | 18·0 | 43·7 | 20·0 | 65·3 | 26·3 | 74·8 | 21·4 | 61·2 | 45·0 | 42·8 |
| Average daily gain for group ..... " | 1·93 | 4·68 | 2·86 | 9·32 | 3·75 | 10·68 | 2·84 | 8·22 | 5·14 | 4·89 |
| Average daily gain per animal ..... " | 0·64 | 1·56 | 0·72 | 2·33 | 0·94 | 2·67 | 0·76 | 2·18 | 1·29 | 1·22 |
| Quantity meal eaten by group for period ..... " | 390·0 | 390·0 | 470·0 | 711·0 | 545·0 | 643·0 | 435·0 | 548·0 | 605·0 | 770·0 |
| Quantity skim-milk eaten by group for period ..... " | 658·0 | 525·0 | 538·0 | 1,020·0 | 713·0 | 680·0 | 636·3 | 741·6 | 748·0 | 680·0 |
| Pounds meal eaten per pound gain ..... " | 7·22 | 2·98 | 5·88 | 2·72 | 5·19 | 2·15 | 6·09 | 2·61 | 3·36 | 4·50 |
| Total cost of feed ..... $ | 15·75 | 10·02 | 18·47 | 18·39 | 21·59 | 16·15 | 18·60 | 14·85 | 26·30 | 19·07 |
| Cost of feed per head ..... $ | 5·25 | 3·34 | 4·62 | 4·60 | 5·40 | 4·04 | 5·09 | 3·99 | 6·58 | 4·77 |
| Cost of feed per head per day ..... $ | 0·188 | 0·119 | 0·165 | 0·164 | 0·193 | 0·144 | 0·182 | 0·142 | 0·188 | 0·136 |
| Cost of feed to produce 1 pound gain ..... $ | 0·292 | 0·076 | 0·231 | 0·070 | 0·206 | 0·054 | 0·243 | 0·066 | 0·146 | 0·112 |

COST OF FEED.

| | |
|---|---|
| Home Mixed | $46 00 per ton. |
| Blatchford's | 74 00 per ton. |
| Purina | 82 00 per ton. |
| Milk | 0 20 per cwt. |

Home Mixture—

| | |
|---|---|
| Corn, 300 lbs. at | $42 00 per ton. |
| Shorts, 400 lbs. at | 45 00 per ton. |
| Oats, 300 lbs. at | 0 65 per bush. |
| Flaxseed (ground) 5% at | 0·065 c. per lb. |

### *Conclusions*

Although no defect was discovered in the Blatchford mixture, the results would indicate something seriously wrong. The affected lots when placed on the home mixture made exceedingly high gains at low cost.

The same result was by no means apparent in the case of Purina Pig Chow. This meal is palatable, and the hogs so fed developed particularly well in bone, muscle and frame generally. In daily gains per animal for the twenty-eight days they were very slightly ahead of the home-mixed ration, but made these gains at a higher cost. It will be noted, too, that on the change the hogs ate a much greater quantity of the home-mixed meal. In both cases a self-feeder was used, Purina Pig Chow being of a nature difficult to fed as a slop.

### *Project No. 6a*

Further information with reference to the economy of inside versus outside feeding of young growing pigs.

*Plan.*—Fifty-five pigs were divided into six lots, three fed indoors in a large shed, and supplied with green cut clover; and three lots fed exactly similar rations, in paddocks with clover pasture. Portable cabins were used for shelter. Comparison was made for eight weeks.

TABLE V.—INSIDE *vs.* OUTSIDE FOR 8 WEEKS.

| —— | | Inside | | | Outside | | |
|---|---|---|---|---|---|---|---|
| Lot | | 1 | 2 | 3 | 4 | 5 | 6 |
| —— | | Monarch and Milk. Green Feed First 8 weeks | Home-Mixed and Milk. Green Feed First 8 weeks | Blatch-ford and Milk. Green Feed First 8 weeks | Home-Mixed and Milk. Clover Pasture | Monarch and Milk Clover Pasture | Blatch-ford and Milk. Clover Pasture |
| Number of hogs in each group | | 9 | 9 | 9 | 9 | 9 | 10 |
| First weight, gross | lbs. | 286·0 | 377·0 | 327·0 | 437·0 | 255·0 | 408·0 |
| First weight, average | " | 31·8 | 41·9 | 36·3 | 48·6 | 28·3 | 40·8 |
| Finished weight, gross | " | 712·0 | 893·0 | 768·0 | 854·0 | 682·0 | 838·0 |
| Finished weight, average | | 79·1 | 99·2 | 85·3 | 93·9 | 75·8 | 83·8 |
| Number of days in experiment | | 56 | 56 | 56 | 56 | 56 | 56 |
| Total gain for period | lbs. | 426·0 | 516·0 | 441·0 | 417·0 | 427·0 | 430·0 |
| Average gain per animal | " | 47·3 | 57·3 | 49·0 | 46·3 | 47·4 | 43·0 |
| Average daily gain for group | " | 7·61 | 9·21 | 7·88 | 7·45 | 7·63 | 7·68 |
| Average daily gain per animal | " | 0·845 | 1·02 | 0·875 | 0·828 | 0·848 | 0·768 |
| Quantity meal eaten group for period | " | 825·0 | 1,000·0 | 967·0 | 1,031·0 | 992·0 | 1,135·0 |
| Quantity green feed eaten group for period | " | 315·0 | 315·0 | 315·0 | ..... | ..... | ..... |
| Quantity skim-milk eaten group for period | " | 1,889·0 | 2,220·0 | 2,084·0 | 2,225·0 | 2,134·0 | 1,710·0 |
| Pounds meal eaten per pound gain | " | 1·94 | 1·94 | 2·19 | 2·47 | 2·32 | 2·64 |
| Total cost of feed | $ | 36·38 | 37·98 | 49·44 | 38·21 | 42·52 | 55·63 |
| Cost of feed per head | $ | 4·04 | 4·22 | 5·49 | 4·25 | 4·74 | 5·56 |
| Cost of feed per head per day | $ | 0·072 | 0·075 | 0·098 | 0·076 | 0·085 | 0·099 |
| Cost of feed to produce one pound gain | $ | 0·085 | 0·074 | 0·112 | 0·092 | 0·10 | 0·129 |

COST OF FEEDS

| | |
|---|---|
| Monarch | $77 12 per ton. |
| Blatchford's | 92 00 per ton. |
| Home Mixed | 65 50 per ton. |

While the information desired in this project has to do with the economy of inside-soiling vs. outside-pasture methods of feeding, a further comparison was made possible with reference to commercial vs. home-mixed meals. It will be noted that in both inside and outside lots cheapest gains were made with the home-mixed rations.

As to the economy of *inside versus outside feeding,* the following direct comparison of the most salient points is illustrative:—

| | Home-Mixed | | Monarch | | Blatchford's | |
|---|---|---|---|---|---|---|
| | Inside | Outside | Inside | Outside | Inside | Outside |
| Gain per pig per day.....lb. | 1·02 | 0·825 | 0·845 | 0·848 | 0·875 | 0·768 |
| Cost per pound gain.....c. | 7·4 | 9·2 | 8·5 | 10·0 | 10·0 | 12·9 |

1. On the average, more feed was consumed outdoors.
2. In only one case were the outside gains equal to those made inside. In all others the outside gains were lower.
3. The quality of the indoor-fed pigs was greatly superior, those fed outdoors being sunburned, dry in the hair and skin, and generally less thrifty.

PROJECT NO. 6G—OUTSIDE VS. INSIDE FEEDING FOR THE GROWING FATTENING HOG

PLAN

Three lots of pigs were fed outdoors for fifty-six days, then brought to indoor quarters with small yards adjacent. With one exception, the feeds were the same in both cases. The exception refers to the lot fed Blatchford's Bar-Nun Hog Feed, which was in such condition as to indicate the advisability of some change in ration. This lot on being taken indoors was fed the home-mixed ration with 5 per cent fish meal.

TABLE VI.—INSIDE *vs.* OUTSIDE, SAME LOTS.

| | Outside* | | | Inside* | | |
|---|---|---|---|---|---|---|
| Lot..... | 4 | 5 | 6 | 4 | 5 | 6 |
| | Home-Mixed and Milk | Monarch and Milk | Blatchford's and Milk | Home-Mixed and Milk | Monarch and Milk | Home-Mixed and Milk, 5% Fish Meal |
| Number of hogs in each group..... | 9 | 9 | 10 | 9 | 9 | 10 |
| First weight, gross.....lbs. | 437·0 | 255·0 | 408·0 | 854·0 | 682·0 | 838·0 |
| First weight, average..... " | 48·6 | 28·3 | 40·8 | 94·9 | 75·8 | 83·8 |
| Finished weight, gross..... " | 854·0 | 682·0 | 838·0 | 1,554·0 | 1,281·0 | 1,631·0 |
| Finished weight, average..... " | 93·9 | 75·8 | 83·8 | 172·7 | 142·3 | 163·1 |
| Number of days in experiment..... | 56 | 56 | 56 | 56 | 56 | 56 |
| Total gain for period.....lbs. | 417·0 | 427·0 | 430·0 | 700·0 | 599·0 | 793·0 |
| Average gain per animal..... " | 46·3 | 47·4 | 43·0 | 77·8 | 66·6 | 79·3 |
| Average daily gain for group..... " | 7·45 | 7·63 | 7·68 | 12·5 | 10·7 | 14·2 |
| Average daily gain per animal..... " | 0·828 | 0·848 | 0·768 | 1·39 | 1·19 | 1·42 |
| Quantity meal eaten group for period " | 1,031·0 | 992·0 | 1,135·0 | 2,212·0 | 2,151·0 | 2,660·0 |
| Quantity skim-milk eaten, group for period..... " | 2,225·0 | 2,134·0 | 1,710·0 | 1,648·0 | 1,633·0 | 2,158·0 |
| Pounds meal eaten per pound gain.. " | 2·47 | 2·32 | 2·64 | 3·16 | 3·59 | 3·35 |
| Total cost of feed..... $ | 38·21 | 42·52 | 55·63 | 75·74 | 86·21 | 93·85 |
| Cost of feed per head..... $ | 4·25 | 4·74 | 5·56 | 8·42 | 9·58 | 9·39 |
| Cost of feed per head per day..... $ | 0·076 | 0·085 | 0·099 | 0·15 | 0·17 | 0·168 |
| Cost of feed to produce 1 pound gain $ | 0·092 | 0·10 | 0·129 | 0·108 | 0·144 | 0·118 |

*Lot 6.—Changed the ration from Blatchford's to Home-Mixed Meal with 5% Fish meal.

PRICE OF FEEDS

| | |
|---|---|
| Monarch | $77 12 per ton. |
| Blatchford's Bar-Nun | 92 00 per ton. |
| Home-Mixed | 65 50 per ton. |
| Home-Mixed (with fish meal) | 67 32 per ton. |

*Conclusions*

The two most important points of comparison may be concentrated as follows:—

| Feed | Home-Mixed | | Monarch | | Blatchford's and Home-Mixed | |
|---|---|---|---|---|---|---|
| | Outside | Inside | Outside | Inside | Outside (Blatchford's) | Inside (Home-Mixed) |
| Gains per pig per day.....lb. | 0·828 | 1·39 | 0·848 | 1·19 | 0·768 | 1·42 |
| Cost per pound gain.....c. | 9·2 | 10·8 | 10·0 | 14·4 | 12·9 | 11·8 |

With these lots the main item of interest was the increased food consumption and very materially increased gains resulting in increased cost per pound gain during the inside feeding period. The rapidity of growth, and the striking improvement in these lots when moved indoors, were the remarkable features. Incidentally, the rise from 0·76 pounds to 1·42 daily gain in the case of a change from Blatchford's Bar-Nun Hog Feed fed outdoors to a more palatable ration indoors is worthy of mention.

PROJECT NO. 5B—THE SELF-FEEDING METHOD VS. TROUGH FEEDING

The self-feeder has been in use at the Central Experimental Farm for several years. The following tables illustrate the results obtained from certain routine tests afforded.

At the request of one of the Blatchford Company's representatives a test of this meal was made in a self-feeder for forty-two days, when this meal was supplanted by a home-mixed meal ration.

TABLE VII—BLATCHFORD'S VS. HOME-MIXED IN A SELF-FEEDER

| Lot | 7 | 7 |
|---|---|---|
| — | Blatchford's and Milk | Home-Mixed and Milk |
| Number of hogs in each group | 17 | 17 |
| First weight, gross.....lbs. | 563·0 | 1,078·0 |
| First weight, average..... " | 33·1 | 63·4 |
| Finished weight, gross..... " | 1,078·0 | 1,889·0 |
| Finished weight, average..... " | 63·4 | 111·1 |
| Number of days in experiment | 42 | 42 |
| Total gain for period.....lbs. | 515·0 | 811·0 |
| Average gain per animal..... " | 30·3 | 47·7 |
| Average daily gain for group..... " | 12·4 | 19·3 |
| Average daily gain per animal..... " | 0·729 | 1·14 |
| Quantity meal eaten, group for period..... " | 1,390·0 | 2,760·0 |
| Quantity skim-milk eaten, group for period..... " | 1,595·0 | 1,373·0 |
| Lbs. meal eaten per lb. gain..... " | 2·7 | 3·4 |
| Total cost of feed..... $ | 67·13 | 93·14 |
| Cost of feed per head..... $ | 3·95 | 5·48 |
| Cost of feed per head per day..... $ | 0·094 | 0·13 |
| Cost of feed to produce 1 lb. gain..... $ | 0·13 | 0·115 |

Price of Feeds,—
Blatchford's..... $92 00 per ton
Home-mixed..... 65 50 "

As in previous trough feeding tests, the main point of note is the much greater gains shown after the change at considerably lower costs, and with the consumption of larger quantities of meal.

An eighty-four day test of trough vs. self-feeder was made as shown in the following table, the same feed being, of course, used in all lots.

TABLE VIII—SELF-FEEDER VS. TROUGH-FED

| Lot | | Yorkshires and Berkshires 7 | Yorkshires 8 | Berkshires 11 |
|---|---|---|---|---|
| —— | | Self-fed Home-mixed and Milk | Trough-fed Home-mixed and Milk | Trough-fed Home-mixed and Milk |
| Number of hogs in each group | | 17 | 10 | 10 |
| First weight, gross | lbs. | 1,078·0 | 794·0 | 626·0 |
| First weight, average | " | 63·4 | 79·4 | 62·6 |
| Finished weight, gross | " | 2,729·0 | 2,089·0 | 1,651·0 |
| Finished weight, average | " | 160·5 | 208·9 | 165·1 |
| Number of days in experiment | | 84 | 84 | 84 |
| Total gain for period | lbs. | 1,651·0 | 1,295·0 | 1,025·0 |
| Average gain per animal | " | 97·1 | 129·5 | 102·5 |
| Average daily gain for group | " | 19·7 | 15·4 | 12·2 |
| Average daily gain per animal | " | 1·16 | 1·54 | 1·22 |
| Quantity meal eaten, group for period | " | 6,653·0 | 4,326·0 | 2,713·0 |
| Quantity skim-milk eaten, group for period | " | 3,358·0 | 3,308·0 | 3,335·0 |
| Lbs. meal eaten per lb. gain | " | 4·03 | 3·34 | 2·65 |
| Total cost of feed | $ | 224·60 | 152·23 | 95·52 |
| Cost of feed per head | $ | 13·21 | 15·22 | 9·55 |
| Cost of feed per head per day | $ | 0·157 | 0·181 | 0·114 |
| Cost of feed to produce 1 lb. gain | $ | 0·136 | 0·118 | 0·093 |

Price of Feeds,—
Home-mixed ..... $65 50 per ton

*Conclusions*

The self-feeder has consistently shown itself to be an economical accessory to hog feeding. While the amount of feed consumed to produce one pound gain, and the cost per pound gain, run slightly higher in previous tests, there has been a consistent saving of labour; and, more important, a saving in time to finish. In the above table, however, the self-feeder makes a poor showing on comparison, due, in part, to the fact that several of the self-fed hogs were "poor doing" pigs, apparently owing to causes other than the method of feeding.

PROJECT No. 1D.—YORKSHIRES VS. BERKSHIRES

*Economy of Production.*—The following table affords an opportunity of comparing these two breeds.

TABLE IX—YORKSHIRES VS. BERKSHIRES

| Lot | | 1 Berkshires | 5 Yorkshires | 2 Yorkshires | 11 Berkshires |
|---|---|---|---|---|---|
| —— | | Monarch and Milk. Green feed, 1st 8 weeks | Monarch and Milk. Fed in field, 1st 8 weeks | Home-mixed and Milk. Green feed, 1st 8 weeks | Home-mixed and Milk. Green feed, 1st 6 weeks |
| Number of hogs in each group | | 9 | 9 | 9 | 10 |
| First weight, gross | lbs. | 286·0 | 255·0 | 377·0 | 384·0 |
| First weight, average | " | 31·8 | 28·3 | 41·9 | 38·4 |
| Finished weight, gross | " | 1,604·0 | 1,417·0 | 1,834·0 | 1,651·0 |
| Finished weight, average | " | 178·2 | 157·4 | 203·8 | 165·1 |
| Number of days in experiment | | 126 | 126 | 126 | 126 |
| Total gain for period | lbs. | 1,318·0 | 1,162·0 | 1,457·0 | 1,267·0 |
| Average gain per animal | " | 146·4 | 129·1 | 161·9 | 126·7 |
| Average daily gain for group | " | 10·5 | 9·2 | 11·6 | 10·1 |
| Average daily gain per animal | " | 1·17 | 1·02 | 1·29 | 1·01 |
| Quantity meal eaten, group for period | " | 3,600·0 | 3,625·0 | 4,130·0 | 3,238·0 |
| Quantity green feed eaten, group for period | " | 315·0 | ..... | 315·0 | 315·0 |
| Quantity skim-milk eaten, group for period | " | 4,202·0 | 3,872·0 | 4,738·0 | 4,540·0 |
| Lbs. meal eaten per lb. gain | " | 2·73 | 3·12 | 2·83 | 2·56 |
| Total cost of feed | $ | 147·98 | 147·52 | 145·52 | 115·91 |
| Cost of feed per head | $ | 16·44 | 16·39 | 16·17 | 11·59 |
| Cost of feed per head per day | $ | 0·13 | 0·13 | 0·128 | 0·092 |
| Cost of feed to produce 1 lb. gain | $ | 0·112 | 0·127 | 0·10 | 0·091 |
| Profit over cost of feed per head on gain | $ | 9·92 | 6·85 | 12·97 | 11·21 |

Pork at 18c. per lb.
Cost of Feeds,—
Monarch ..... $77 12 per ton
Home-mixed ..... 65 50 "

*Conclusions*

Possibly the more accurate comparison is afforded by lots 2 and 11, where the conditions applying were identical. Here the Berkshires have the advantage in cost of production and meal consumption per pound gain, but lose out in the profits over cost of feed. A comparison of lots 1 and 5 on Monarch Hog Feed shows a decided advantage in favour of the black pigs, owing, in this case, to their being better able to stand the effects of sun than the white skinned hog. Throughout it will be noted that in the essential feature, "Pounds of meal eaten per pound gain," the Berkshire claim of economy of production would seem to have some foundation.

For further comparison of Yorkshires and Berkshires from the standpoint of economy of gains see table III, Winter experiments, 1920-21, from which the following more important points of comparison are taken:—

| | Yorks. | Berks. |
|---|---|---|
| Average daily gain per animal ..... lb. | 1.46 | 1.43 |
| *Lbs. meal eaten per lb. gain* ..... " | 3.22 | 3.17 |
| Cost to produce 1 lb. gain ..... c. | 8.3 | 8.1 |

The slight difference is in favour of the Berkshires, mainly through their apparent ability, in this case, to produce practically similar gains with a little less meal.

*Yorkshires vs. Berkshires (continued) (Project 1 a-b, etc.)*

*Prolificacy, Mothering Qualities. Condition of Litters at Birth and at Weaning time.*—The following tables are in reality an analysis of the results obtained in a fairly large herd during a successful year. Aside from any question of breed comparison, the actual and percentage losses during the first six or seven weeks of the life of the little pigs, as shown, are rather staggering. The columns showing the "total numbers fit for breeding" and again "for feeding purposes" were obtained from figures so closely approximate as to be considered definite.

TABLE X.—A COMPARISON OF YORKSHIRES VS. BERKSHIRES AS AFFORDED BY YEARLY HERD BOOKS.

BIRTH STATISTICS.

| Breeds | Total number sows | Total number in litters | Average number of pigs in litter at birth | Total number pigs dead at birth | P.c. dead pigs | Total number of small and weak pigs at birth | P.c. weak and small pigs | Total number living normal pigs at birth | P.c. normal pigs |
|---|---|---|---|---|---|---|---|---|---|
| Yorkshire | 35 | 402 | 11·48 | 14 | 3·4 | 93 | 23·13 | 295 | 73·3 |
| Berkshire | 8 | 74 | 9·25 | 0 | 0 | 21 | 28·37 | 53 | 71·6 |

TABLE XI.—A COMPARISON OF YORKSHIRES VS. BERKSHIRES AS AFFORDED BY YEARLY HERD BOOKS.

STATISTICS AT SEVEN WEEKS OF AGE.

| Breeds | Total number of live pigs at birth | Total losses during first 7 weeks | Total normal pigs at 7 weeks | P.c. losses in 7 weeks | Average litter at birth | Average litter at 7 weeks | Total number fit for breeding purposes | P.c. fit for breeding purposes | Total number fit for feeding purposes only | P.c. fit for feeding |
|---|---|---|---|---|---|---|---|---|---|---|
| Yorkshire | 388 | 133 | 255 | 34·2 | 11·48 | 7·28 | 182 | 71·4 | 73 | 28·6 |
| Berkshire | 74 | 22 | 52 | 29·7 | 9·25 | 6·5 | 39 | 75·0 | 13 | 25·0 |

*Deductions for the Year 1920*

1. The claim that the Yorkshire excels in prolificacy would appear to be borne out. The effect of the breeding and individuality of the boar must not be forgotten, however.

2. Other than a complete absence of dead pigs at birth in the case of Berkshires, no other striking difference is disclosed in table X.

3. Table XI shows the comparative shrinkage in litters from birth to weaning. While the Berkshire sow may not be so prolific as the Yorkshire, she has in the past demonstrated that she is, in the main, an excellent mother, even up to seven or eight years of age. This fact was evidenced during the past year in lower percentage losses during the nursing period with the Berkshire litters.

PROJECT NO. 8—FEED REQUIREMENTS AND COSTS

The average cost of pork production during 1920 has been as follows. The average figures used have been obtained from a combination of herd and experimental feeding records. It will be understood that these figures are available from pigs the progeny of sows bred in the fall of 1919 and farrowing early in 1920.

| | | |
|---|---|---|
| *Cost of the Pig at Ten Weeks of Age—* | | |
| (*a*) Service of boar | | $ 1 00 |
| (*b*) Feed cost of dam during gestation— | | |
| 672 lb. meal at $40 per ton | 13 44 | |
| (Bran and shorts) | | |
| 900 lb. roots at $3 per ton | 1 35 | |
| 50 lb. clover hay at $7 per ton | 0 15 | |
| | | 14 94 |
| (*c*) Farrowing to weaning— | | |
| 357 lb. meal at $50 per ton | $ 8 93 | |
| (Shorts, oats and middlings) | | |
| 400 lb. skim-milk at 20 cents cwt | 0 80 | |
| | | 9 73 |
| (*d*) Feed cost of weaned litter (7) from 7 to 10 weeks (including all feed eaten by little pigs while with sow)— | | |
| 80 lb. meal at $50 per ton | $ 2 00 | |
| (Middlings, fine gr. oats or oat flour, oil meal) | | |
| 420 lb. skim-milk at 20 cents cwt | 0 84 | |
| | | 2 84 |
| | | $28 51 |
| *Summary—* | | |
| Cost of sow breeding to weaning | | $25 67 |
| Cost 7 pigs weaning to 10 weeks | | 2 84 |
| Total cost of 7 pigs | | $28 51 |
| Cost per pig to 10 weeks | | 4 07 |
| Average feeding cost per pig from 10 weeks to finish. (Average results of 80 hogs on same ration in experiments) | | 15 52 |
| *Final Summary—* | | |
| Cost of pig to 10 weeks of age | | $ 4 07 |
| Cost of pig from 10 weeks to finish (181 lb.) | | 15 52 |
| | | $19 59 |
| 181 lb. pork at 16 cents live weight | | $28 96 |
| Total feed cost | | 19 59 |
| Profit over feed | | $ 9 37 |

Some interesting data were collected by weighing all pigs and all feeds consumed in all experimental lots at two-week intervals. While the complete mass of figures cannot be here given, the following table is an average of six lots of some sixty pigs in all, these lots being fed similar feeds under similar conditions. The pigs averaged ten weeks of age, and the cost per pig up to that age is given in the preceding cost figures.

TABLE XII.—HOG-FEEDING EXPERIMENTS.

AVERAGE COST TO PRODUCE AT 2 WEEK INTERVALS

| — | 1st 2 weeks | 2nd 2 weeks | 3rd 2 weeks | 4th 2 weeks | 5th 2 weeks | 6th 2 weeks | 7th 2 weeks | 8th 2 weeks | 9th 2 weeks | Average |
|---|---|---|---|---|---|---|---|---|---|---|
| Initial weight.....lbs. | 351·4 | 458·0 | 573·4 | 693·6 | 813·2 | 978·2 | 1132·8 | 1336·2 | 1532·8 | 874·4 |
| Two weeks weight..... " | 458·0 | 573·4 | 693·6 | 813·2 | 978·2 | 1132·8 | 1336·2 | 1532·8 | 1746·6 | 1029·4 |
| Gain..... " | 106·6 | 115·4 | 120·2 | 119·6 | 165·0 | 154·6 | 203·4 | 196·6 | 213·8 | 155·0 |
| Meal consumed..... " | 151·0 | 224·4 | 359·6 | 344·8 | 457·8 | 533·2 | 631·2 | 700·2 | 820·6 | 469·2 |
| Milk consumed..... " | 549·6 | 544·0 | 513·0 | 337·0 | 337·0 | 276·6 | 485·0 | 756·4 | 705·0 | 500·4 |
| Pounds meal eaten per pound gain..... " | 1·46 | 1·96 | 2·60 | 2·89 | 2·83 | 3·61 | 3·14 | 3·51 | 3·96 | 2·88 |
| Pounds milk eaten per pound gain..... " | 5·37 | 4·88 | 4·72 | 2·85 | 3·67 | 1·58 | 2·34 | 3·89 | 3·45 | 3·61 |
| Total cost..... $ | 6·38 | 8·95 | 11·40 | 11·95 | 16·68 | 19·30 | 23·06 | 26·16 | 30·09 | 17·10 |
| Cost per pound gain..... $ | 0.062 | 0.098 | 0.102 | 0.128 | 0.104 | 0.130 | 0.115 | 0.135 | 0.146 | 0.112 |

The feature that must impress itself upon the reader is the economy of gain shown. In the ninth period, when meal consumption was naturally at its highest, the meal eaten per pound gain was under 4 pounds, with an average for the period of under 3 pounds. The reason for this low meal consumption is apparent in the next line, where it will be noted that the average skim-milk or buttermilk consumption per pound gain was 3·61.

PROJECT NO. 7 A, B, AND C

During the previous year a severe outbreak of internal parasites was experienced. Treatment was applied, but at the time of reporting not all sows had farrowed. The parasites encountered were the ascarid, or common round worm, and the lung worm. The treatment applied in the case of the former was mainly that manufactured by the Funk Hog Farm of Bloomington, Illinois, U.S.A., and administered in capsule form. The sows were farrowed in specially disinfected pens. Subsequent developments showed no setback in the litters at the time when the larval stage is reached, and when this stage is passed in the lungs. The youngsters throve well throughout.

The only treatment which has been applied with the hope of controlling lung worm infestation has been careful disinfection of the farrowing quarters with creolin and dehydrated lime. Lime has been sprinkled freely in the straw of the pens from time to time. At the same time the greatest care has been taken to keep up the vigour of the litters by careful feeding of the sow, exercising both mother and little pigs, and using supplementary feeds as soon as indicated. Although no special treatment other than that of a precautionary nature has been given during the past fall or winter, there is no sign of parasitism in any of the litters on hand at writing.

*Improvements in the Herd*

1. The herd has been considerably cut down during the past year.
2. Three choice individuals have been added to the Berkshire herd.
3. A high-class Yorkshire boar was imported by a neighbouring breeder, from the herd of Lord Rosebery of Dalmeny, Scotland. This boar, by the well-known Jellicoe, and out of the great breeding sow Dalmeny Maple, was bred to a select few sows with resultant excellent litters, members of which are being distributed to a number of the Branch Farms.

FINANCIAL STATEMENT FOR SWINE, 1920-21

| | | |
|---|---|---|
| Value herds, 1920 (April 1) | $12,296 00 | |
| Value herds, 1921 (April 1) | 10,830 00 | |
| Decrease | | $ 1,466 00 |
| Expenditures— | | |
| Feeds, 1920-21 | $ 6,670 68 | |
| Labour, 1920-21 | 2,756 55 | |
| Purchases | 625 00 | |
| | | 10,052 23 |
| Gross expenditure | | $11,518 23 |

| | | |
|---|---|---|
| Revenue— | | |
| Sales pork | $11,669 89 | |
| Sales breeders | 1,873 00 | |
| Value of manure | 480 00 | |
| Gross returns | | $14,022 89 |
| Gross expenditures | | 11,518 23 |
| Profit | | $ 2,504 66 |

## MISCELLANEOUS

### BRANCH FARMS

The Dominion Animal Husbandman has had the opportunity of visiting the eastern Farms and Stations twice during the past year, and the western Farms were covered in the fall, 1920. Every effort has been made toward the assistance of superintendents in matters pertaining to live stock policy, practice and experimental work. A considerable part of the purchase of feeds for the eastern Farms has been made from Ottawa together with purchase from breeders and transfer from various farms and stations of live stock.

A settled policy of live stock specialization has been adopted in which the special adaptation of the district and the popularity of breeds and classes of stock, have been the deciding factors.

### BUILDING PLANS

Building has been almost at a standstill on the Farm System, except that, as already described, a useful dairy building was built at Ottawa.

As in the past, the distribution of plans, blue-prints and specifications has been carried on with results indicating that a much greater scope is possible in this direction with increased help. Some 654 plans have been forwarded to farmers, besides innumerable letters relative to farm buildings of all kinds.

### FEDERAL LIVE STOCK EXHIBITS

The policy of exhibiting live stock from the Central Farm at various exhibitions has been continued. A recapitulation in brief of show ring activities, with a few outstanding winnings, is as follows:—

Toronto, Canadian National Exhibition.—Clydesdales and Ayrshires. (Won Junior and Grand Championship in Ayrshire bulls.)

Ottawa, Central Canada Exhibition.—Clydesdales, Ayrshires. (Repeated above winning; first in important breeding classes.)

Guelph, O.P.W.F.—Clydesdales.

Chicago, International.—Clydesdales.

Ottawa, Winter Fair.—Clydesdale horses, Holstein and Ayrshire cattle, Yorkshire and Berkshire swine, Shropshire and Leicester sheep. (Won Sweepstakes in Dairy Test and Sweepstakes in dressed carcase competition).

Possibly the live stock work of this Farm has received more publicity through this work than through any other medium during the past several years. It is not, however, the intention to adopt a continuous policy in this connection, but rather to take up different classes of stock from time to time.

The Staff of the Animal Husbandry Division has during the year visited a large number of exhibitions, shows, meetings, demonstrations, short courses, etc. Judging work has been undertaken at a number of exhibitions.