DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

ANIMAL HUSBANDRY DIVISION

REPORT OF THE DOMINION ANIMAL HUSBANDMAN

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

FOR THE YEAR ENDING MARCH 31, 1925

SHEEP ON PASTURE AT THE CENTRAL EXPERIMENTAL FARM

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ANIMAL HUSBANDRY DIVISION

BEEF CATTLE

Breeding beef cattle are not maintained on the Central Experimental Farm, Ottawa, work with beef cattle being confined to experimental steer-feeding and experimental shipments of store cattle to Great Britain. During the past year, no feeding experiments were conducted, but two experimental shipments of cattle to Great Britain were made, one in May, 1924, and the other in October, 1924. Reports of these shipments are being published separately, and may be had upon application to the Animal Husbandry Division, Experimental Farm, Ottawa.

DAIRY CATTLE

As in former years, the breeding of dairy cattle forms one of the main features of the live stock work at the Central Experimental Farm.

At the close of the fiscal year, March 31, 1925, there were on hand 184 head, made up as follows:—

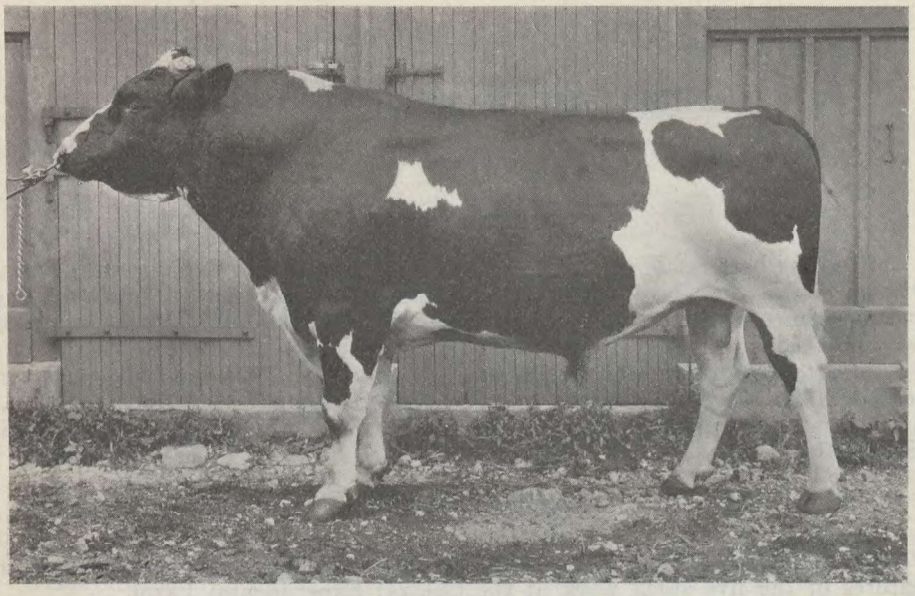
PURE-BRED BREEDING CATTLE				Total
Ayrshires	35 milch cows,	26 heifers,	20 bulls	81
Holsteins	32 "	30 "	11 "	73
Jerseys	13 "	8 "	3 "	24
GRADE COWS				
Ayrshires—1 milch cow				1
Holsteins—3 milch cows, 2 heifers				5
Total				184

These herds are kept to facilitate the carrying on of breeding, experimental, demonstrational and cost of production work. Needless to say, the animals retained in the herd serve these purposes admirably.

It will be noticed that the French Canadian breed of cattle has been dropped. This is in accordance with the policy of keeping on the Experimental Farms and Stations only those breeds of cattle well suited to and common in the district in which the particular Farm or Station is situated. French Canadian cattle are not particularly suited to the district surrounding Ottawa, and they are not at all common in the district, consequently there was very little interest in or inquiry for them at Ottawa. The interests of the breed, in so far as its being sponsored by the Federal Department of Agriculture is concerned, are being taken care of at the Cap Rouge, Quebec, Experimental Station, where a large and exceptionally high-quality herd is maintained.

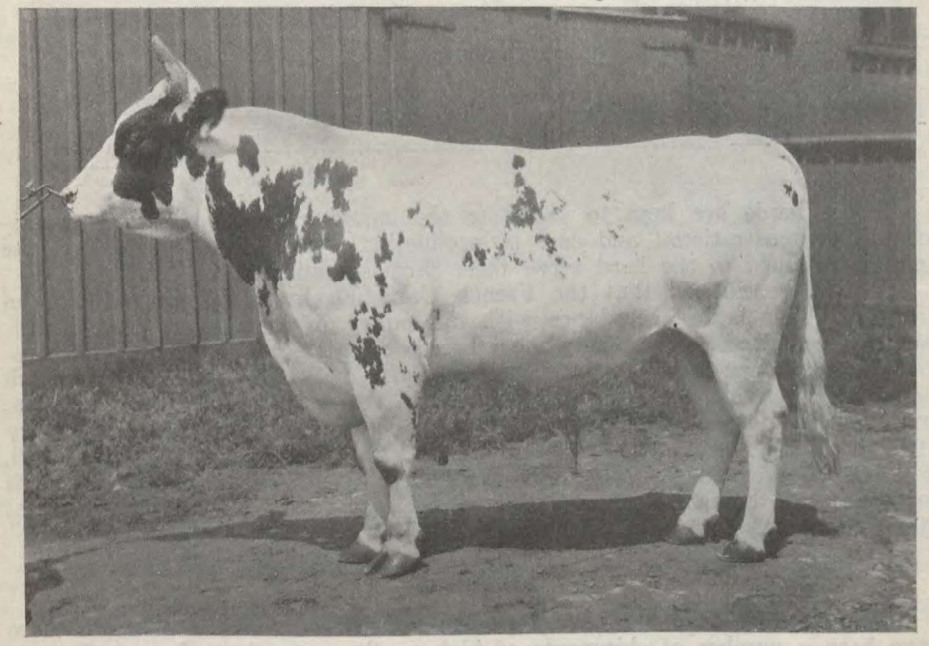
AYRSHIRES

The Ayrshire herd has been kept well weeded out, and in addition there have been a number of shipments of high-quality animals to branch Experimental Stations. This has been responsible for a reduction in the size of the herd, but nevertheless the quality has been well maintained. A draft from the herd was shown at the National Dairy Show, Milwaukee, Wisconsin, in



SENIOR HOLSTEIN HERD SIRE

Agassiz Sir Pietje—51064—Advanced registration No. 5, Class AA. Record of dam, 15,556 pounds of milk and 681.25 pounds of butter.



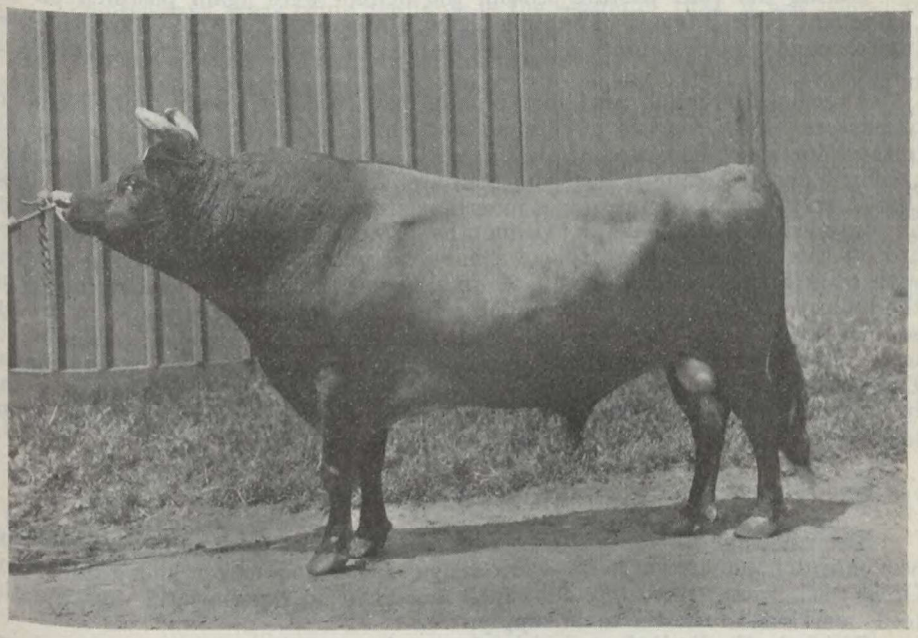
SENIOR AYRSHIRE HERD SIRE

Ottawa Lord Kyle 2nd—77050—Advanced registration No. 9, Class A. Record of dam, 10,315 pounds of milk and 438 pounds of fat in 365 days. Record of sire's dam, 8,510 pounds of milk and 329 pounds of fat in 280 days.

October, 1924. A very creditable showing was made. No importations or other additions to the herd took place during the year. The animals imported in 1923 have done exceptionally well, proving most valuable additions to the herd. Taking the average production of the five best cows of each breed as a basis, Ayrshires take second place in economy of milk-production, third place in economy of fat-production, and second place in profit over feed consumed.

HOLSTEINS

The Holstein herd shows continued improvement in quality, which should be even more marked in the future, for, during the year, a new herd-sire, "Agassiz Sir Pietje"—51064—, has been obtained. Bred at the Experimental Farm, Agassiz, B.C., and developed there and at the Experimental Station, Rosthern, Sask., this bull is practically ideal in type, besides being well backed by breeding and milk records. During the year, some exceptionally high records have been made, as will be seen by referring to the milk-production records further on in this report. Rating the Holsteins on the same basis as the Ayrshires, they take first place in economy of milk-production, fat-production and profit over feed.



SENIOR JERSEY HERD SIRE

Castlehill Sybil's Gamboge (imp.)—12271—Advanced registration No. 1, Class A. Record of dam, 9,201 pounds of milk, and 447 pounds of fat in 288 days. Sire has over forty qualified daughters from different dams.

JERSEYS

The Jersey herd is much improved in quality and increased in numbers. Part of the increase is natural in the shape of a good percentage of heifer calves from the excellent herd sire "Castlehill Sybil's Gamboge," procured the previous year. These are a very promising lot, both in Jersey type and evidences of milk-production. The remainder of the increase in the herd was made up by the purchase of three exceptionally good cows, this purchase being

made so as to get the greatest possible use of the excellent bull heading the herd. Judging them on the same basis as the other breeds, Jerseys stood third in economy of milk-production, second in economy of fat-production, and third in profit over feed consumed.

SALES OF BREEDING STOCK

The policy of the Division in regard to sales of breeding stock from the dairy herds is to sell high-class bulls with a very occasional female at very reasonable prices, and preferably to parties purchasing pure-bred sires for the first time. This policy has a tendency to develop the breeding of high-grade dairy cattle in outlying districts, and, at the same time, does not interfere materially with sales by private breeders, but rather has a tendency to open up new markets for their pure-bred breeding stock. During the year, a large number of bulls, mostly of Holstein and Ayrshire breeding, were disposed of under this policy. These were all of good type, well grown, with excellent milk-record backing.

SUMMER FEEDING

During the 1924 pasture season, the heifers were again pastured on the Connaught Rifle-Ranges. The area being quite large, they had excellent pasture throughout the summer and were stabled in particularly good condition in the fall.

As usual, the milch cows in the main herd received a very limited amount of pasture. This consists of a small portion of the new meadow, the seeding mixture for which consisted of alfalfa, alsike, red clover and timothy. It makes excellent pasture while it lasts, but the area is so small and the herd so large that it only acts as pasture for a month or six weeks; therefore the milch cows are only charged with one or two months' pasture, depending on how long they are on this ground. The dry cows have a separate pasture and are charged with what time they spend on it. Corn silage of the previous year's crop forms the bulk of the roughage for the milch cows. The remainder is made up of hay, soiling crops, etc. They are fed grain throughout the summer, consisting of bran, oats, brewers' or distillers' grains and cotton-seed meal or oil-cake meal. During the early and late seasons, the cows are turned out during the day, and in the heat of the summer and fly season they are turned out during the evenings only. They are sprayed regularly for protection from the flies.

WINTER FEEDING

The roughage for the winter season consisted largely of those valuable and economical home-grown feeds—corn silage, roots, and clover and alfalfa hay. Other feeds were fed at different times, mostly in an experimental way, but the feeds mentioned form the main supply.

Owing to the limited area of land available, insufficient grain for the dairy cattle is grown on the Central Experimental Farm, consequently considerable concentrates must be purchased. The market for mill-feeds was slightly higher in 1924 than during the previous year, consequently the average cost of the meal ration was slightly higher. Bran formed the basis of the ration, while other grains, mill-feeds and factory by-products, such as ground oats, oat scalpings, brewers' grains, distillers' grains from rye, distillers' grains from corn, oil-cake meal, etc., were used to balance up the ration. An experiment comparing the different kinds of distillers' grains and oat scalpings is reported elsewhere in this report. One per cent each of salt, charcoal, and edible steamed bone meal was added to the mixture, the salt to provide the necessary salt allowance, the charcoal as a corrective and purifier of the digestive tract, and the bone meal

as a mineral supplement. Latterly the bone meal and charcoal have been replaced by what is known as "spent bone dust", a by-product of sugar refineries. This material is quite similar to bone meal in composition and in availability of mineral matter which it contains, and it also carries some charcoal. It has the additional advantage of being much cheaper than the edible steamed bone meal.

The average rate of feeding the grain mixture is one pound for every three and one-half pounds of milk produced, the fresh cows getting somewhat more and the cows well on in their lactation period somewhat less. Dry cows receive grain if needed to put them in good condition for calving. Dry two-year-olds and yearling heifers are cheaply wintered on silage and range hay. This ration was sufficient to keep them in high condition so that they went to grass in excellent shape. Heifers six to fifteen months of age received a light grain ration to keep them growing well while still young, when the cheapest gains can be made.

EXPERIMENTAL FEEDING WITH MILCH COWS

SWEET CLOVER PASTURE EXPERIMENT

The necessary areas being available in the season of 1924, it was considered advisable to conduct a trial to determine the value of sweet clover pasture. Four acres of sweet clover and a similar area of new meadow, resulting from the seeding of a mixture of alfalfa 6 pounds, timothy 6 pounds, alsike clover 2 pounds, and red clover 8 pounds, were fenced off. These had both obtained a rank growth before the cattle were turned in on them on June 14. Nine head were placed on each lot. All of those on the regular pasture were milking throughout the test. Three of those on the sweet clover pasture were dry at the start, one calving towards the latter part of the test. Five of the cows in each group were carried on the same pasture throughout. The other four in each group were interchanged at two-week intervals. The experiment was continued for six weeks. The cattle were fed a meal ration throughout the test, the ration remaining constant in quantity and quality.

Four sets of figures were thus obtained, i.e.:—

1. Results from cows on mixed pasture continually.

2. Results from cows on mixed pasture, then sweet clover pasture, and back to mixed pasture.

3. Results from cows on sweet clover pasture throughout.

4. Results from cows on sweet clover pasture, then mixed pasture, and back to sweet clover pasture.

The data are given herewith.

MILK PRODUCTION ON REGULAR AND SWEET CLOVER PASTURE.

Name of Cow	Experimental Ration	Period 1 June 14 to 27		Period 2 June 28 to July 11		Period 3 July 12 to 26		Average Periods 1 and 3	
		1st week	2nd week	1st week	2nd week	1st week	2nd week	1st week	2nd week
Starlight of Fredericton	Regular pasture	455·5	441·0	404·5	405·5	383·0	409·0		
Johanna Helena Keyes		469·5	447·0	495·0	467·0	448·5	440·5		
Midnight Jewel De Kol		491·5	534·5	520·5	444·5	462·0	468·0		
Sarah Ann Pontiac		470·0	472·5	484·0	433·0	433·5	395·0		
Lady Segis Jewel		431·0	440·0	407·5	465·0	499·0	485·5		
		2,317·5	2,365·0	2,311·5	2,215·0	2,226·0	2,198·0	2,271·75	2,286·5
Morningside Bessie	Regular pasture, 1st 2 weeks; sweet clover pasture, 2nd 2 weeks; regular pasture 3rd 2 weeks	313·5	314·5	319·0	308·5	317·5	307·5		
Helena Keyes Posch		633·0	644·5	679·0	638·0	639·0	613·0		
Ottawa March Posch		451·5	457·0	462·0	449·5	434·0	433·5		
Korndyke Canary Butter Maid		399·5	383·5	398·0	415·0	411·5	409·5		
		1,797·5	1,799·5	1,858·0	1·811·0	1·802·0	1·763·5	1,799·75	1,781·50
Catlinn's Barbara	Sweet clover pasture	172·5	183·5	182·5	179·5	178·5	170·0		
Dunlop Betsy		.....	.....	.....	.....	.....	.....		
Lyon Segis Helena Keyes		199·0	182·0	180·0	165·0	111·5	138·0		
Lula Posch Regina		165·0	178·5	165·0	160·5	153·5	149·5		
		536·0	544·0	527·5	505·0	443·0	457·5	489·5	500·75
Lady Hartog Burke	Sweet clover pasture, 1st 2 weeks; regular pasture, 2nd 2 weeks; sweet clover pasture, 3rd 2 weeks	317·5	295·5	291·5	297·5	290·5	269·0		
Old Hall Maggie 9th		294·0	275·0	291·5	281·0	264·5	223·5		
Maud of Fernbrook 5th		215·5	211·5	216·0	206·5	182·5	174·0		
Lady Plus Burke		.....	.....	.....	.....	.....	.....		
		827·0	782·0	799·0	785·0	737·5	666·5	782·25	724·25

From the table it will be noted that the cows on the regular pasture throughout produced consistently and steadily, there being only a slight natural decline in milk-flow.

Those on the regular pasture, then sweet clover pasture, and back to regular pasture, showed a slight increase in milk-production when on the sweet clover and a falling off when they went back to the regular mixture.

Those on sweet clover pasture throughout showed a similar gradual but more rapid decline than those on regular pasture throughout.

Those on sweet clover pasture, then regular pasture, and back to sweet clover pasture, showed a slight decrease in milk-production when shifted from sweet clover to regular pasture, but a still greater decrease when shifted back to sweet clover pasture, so that, on the whole, regular pasture gave the best results.

Throughout the whole experiment, in so far as milk-production was concerned, there was little to choose between either pasture.

In carrying capacity per acre, the regular pasture made the best showing, in that at the end of the six weeks, the regular pasture was still fairly good, while the sweet clover pasture was practically done. There were, however, certain circumstances mitigating against the sweet clover, i.e., being an early crop, it was further developed than the regular pasture when the cattle were first turned on it, consequently it was not eaten off in time to start the proper second growth.

Both crops were on heavy clay land that baked badly during the dry period early in July. Whether this had a greater effect on the sweet clover pasture than on the regular pasture is hard to say.

This work is being repeated as a check during the season of 1925.

CORN SILAGE VS. ROOTS (MANGELS) FOR DAIRY COWS

This experiment constitutes a repetition of somewhat similar experimental work conducted during the two previous winters. In this instance, a group of twenty cows, Ayrshires, Holsteins and Jerseys, was used for this work. The experiment was divided into five strictly consecutive two-week periods during which the following average daily experimental rations were fed:—

	Pounds
Period 1—Corn silage	30·0
Period 2—Mangels	50·0
Period 3—Corn silage	30·0
Period 4—Corn silage	15·0
Mangels	26·0
Period 5—Corn silage	30·0

This arrangement made it possible to make two comparisons, i.e., replacing corn silage entirely with mangels and replacing one-half the corn silage with mangels. This makes this year's work comparable to that along the same lines reported upon in our 1922 report, but not strictly comparable with that in the 1923 report of this Division.

The grain and hay rations remained as constant as it was possible to keep them during the whole of the experiment.

As usual, data were taken during the final week in each period, the first week in each period being treated as one of transition from one feed to another. By averaging data from periods 1 and 3, and comparing with period 2, the relative value of corn silage and mangels is obtained. The average of periods 3 and 5 compared with period 4 gives the relative value of corn silage alone, and corn silage and mangels in conjunction.

The data covering both phases of this experiment are submitted in the two tables following.

CORN SILAGE VS. MANGELS

Experimental Ration		Period 1	Period 2	Period 3	Average of Periods 1 and 3
		Corn Silage Only	Mangels Only	Corn Silage Only	Corn Silage Only
Number of cows in test	No.	20	20	20	20
Number days in test per period	"	7	7	7	7
Pounds milk produced	lbs.	4,133·00	4,140·00	3,715·00	3,924·00
Average milk per cow per day	"	29·52	29·57	26·55	28·03
Average per cent fat in milk	%	3·79	4·61	4·10	3·95
Total pounds fat produced	lbs.	156·65	178·48	153·49	155·07
Total meal consumed	"	1,291·00	1,291·00	1,291·00	1,291·00
Total hay consumed	"	959·00	959·00	959·00	959·00
Total corn silage consumed	"	4,207·00	.....	4,207·00	4,207·00
Total mangels consumed	"	.....	7,350·00	.....	.....
Findings from Experiment—					
Silage consumed per 100 lbs. milk produced	lbs.	101·80	.....	113·24	107·21
Silage consumed per 100 lbs. fat produced	"	2,686·00	.....	2,740·00	2,713·00
Mangels consumed per 100 lbs. milk produced	"	.....	177·53	.....	.....
Mangels consumed per 100 lbs. fat produced	"	.....	4,118·00	.....	.....
Hay consumed per 100 lbs. milk produced	"	23·20	23·16	25·81	24·50
Hay consumed per 100 lbs. fat produced	"	612·00	537·00	625·00	618·00
Cost of meal fed at $30. per ton	$	19·37	19·37	19·37	19·37
Value of silage fed at $3.10 per ton	$	6·52	.....	6·52	6·52
Value of mangels fed at $4.10 per ton	$	.....	15·07	.....	.....
Value of hay fed at $6.70 per ton	$	3·21	3·21	3·21	3·21
Total cost of feed	$	29·10	37·65	29·10	29·10
Feed cost to produce 100 lbs milk	$	·70	·91	·78	·74
Feed cost to produce 100 lbs. fat	$	18·57	21·10	18·95	18·76

CORN SILAGE VS. CORN SILAGE AND MANGELS

Experimental Ration		Period 3	Period 4	Period 5	Average of Periods 3 and 5
		Corn Silage Only	Corn Silage and Mangels	Corn Silage Only	Corn Silage Only
Number cows in test	No.	19	19	19	19
Number days in test	"	7	7	7	7
Pounds milk produced	lbs.	3,676·50	3,718·00	3,394·00	3,535·00
Average milk per cow per day	"	27·64	27·94	25·52	26·58
Average per cent fat in milk	%	4·11	4·12	4·08	4·11
Total pounds fat produced	lbs.	152·16	153·23	138·57	145·36
Total meal consumed	"	1,235·00	1,235·00	1,235·00	1,235·00
Total hay consumed	"	903·00	903·00	903·00	903·00
Total corn silage consumed	"	3,962·00	2,079·00	3,962·00	3,962·00
Total mangels consumed	"	.....	3,465·00	.....	.....
Findings from Experiment					
Silage consumed per 100 pounds milk produced	lbs.	107·76	56·00	116·73	112·24
Silage consumed per 100 pounds fat produced	"	2,604·00	1,356·00	2,859·00	2,731·00
Mangels consumed per 100 pounds milk produced	"	.....	93·20	.....	.....
Mangels consumed per 100 pounds fat produced	"	.....	2,261·00	.....	.....
Hay consumed per 100 pounds milk produced	"	24·56	24·29	26·60	25·58
Hay consumed per 100 pounds fat produced	"	593·00	589·00	651·00	622·00
Cost of meal fed at $30 per ton	$	18·52	18·52	18·52	18·52
Value of silage fed at $3.10 per ton	$	6·14	3·22	6·14	6·14
Value of mangels fed at $4.10 per ton	$	.....	7·10	.....	.....
Value of hay fed at $6.70 per ton	$	3·03	3·03	3·03	3·03
Total cost of feed	$	27·69	31·87	27·69	27·69
Feed cost to produce 100 pounds milk	$	·75	·86	·82	·78
Feed cost to produce 100 pounds fat	$	18·20	20·75	20·00	19·10

From the first table it will be noted that the straight root ration produced slightly more milk and considerably more fat than the straight silage ration. The higher percentage of fat in the milk when roots were fed is contrary to results obtained in two previous years' experiments, consequently is rather hard to explain. It will be noted, however, that the increased production in both milk and fat when roots were fed was not sufficient to offset the increased feed cost, so that corn silage produced the cheapest milk and fat, consequently making considerably greater profit over cost of feed. On a milk production basis, 4,438 pounds silage, 53 pounds hay, and 69 pounds of meal replaced 7,350 pounds of mangels, giving mangels a valuation of $2.20 per ton, with other feeds at prices charged. Reversing the calculation and placing the cost of production value on roots gives corn silage a value of $6.22 per ton.

In Table II it will be noticed that corn silage and mangels produced more milk and fat than corn silage alone, but in this case also the extra production was at increased cost, so much so, in fact, that even though only half as much roots was fed in the first phase of the experiment, still corn silage made the greatest profit over feed. On a milk production basis, 2,089 pounds corn silage, 64 pounds hay and 46 pounds meal proved equal to 3,465 pounds of mangels, giving mangels a valuation of $2.51 per ton in this experiment, with other feeds at prices charged. Reversing the calculation and putting the cost of production value on roots gives corn silage a valuation of $5.78 per ton, with other feeds at prices charged.

THREE-YEAR AVERAGE OF COMPARISON OF CORN SILAGE AND ROOTS

There now being two years' work comparing corn silage and roots, and three years' work comparing a combination of corn silage and roots with roots, it has been deemed advisable to present the results in summarized form. In all cases, corn silage is taken as a standard, then the corn silage is valued at cost and the value of roots is figured as comparative to that of corn. This procedure gives the following relative values for a comparison of straight silage and root rations.

CORN SILAGE VS. ROOTS

	Cost of silage per ton	Cost of Roots per ton	Value of roots as compared to corn at cost price per ton
	$	$	$
1923 results	2 95	2 50	1 47
1925 results	3 10	4 10	2 20
Average	3 02	3 30	1 83

In other words, roots are only sixty per cent as valuable as corn silage for milk production.

When roots are used in conjunction with silage, i.e., replacing a part only of the silage in the ration, they attain a higher value, as the following table will show:—

CORN SILAGE VS. ROOTS AND CORN SILAGE

	Cost of silage per ton	Cost of Roots per ton	Value of Roots per ton
1923 results	$2 95	$2 50	$2 24
1924 results	3 15	3 35	1 96
1925 results	3 10	4 10	2 51
Average	3 07	3 32	2 24

In other words, when fed in limited quantities as a supplement to corn silage, roots are 73 per cent as valuable as corn silage for milk production, a gain of 13 per cent in value compared to when they are fed alone.

A comparison of these two crops on a dry-matter basis is interesting. Taking the 1923 and 1925 results, when straight comparisons of corn silage were made, the following are the results:—

		1923		1925	
		Roots	Silage	Roots	Silage
Percentage dry matter	%	10·9	23·4	11·7	19·7
Amount dry matter per ton	lbs.	218·0	468·0	234·0	394·0
Relative value dry matter per ton	$	1·47	2·95	2·20	3·10

Calculated on this basis, averaging the two years' work, the dry matter in corn silage is worth 70 cents per one hundred pounds, while the dry matter in roots is worth 81 cents per hundred pounds. That is, the dry matter in roots is worth 15 per cent more than the dry matter in corn silage.

Taking the 1923, 1924 and 1925 results, when a mixture of corn silage and roots was compared to straight corn silage, we find the following results to obtain:—

		1923		1924		1925	
		Roots	Silage	Roots	Silage	Roots	Silage
Percentage dry matter	%	10·9	23·4	10·9	23·75	11·7	19·7
Amount dry matter per ton	lbs.	218·0	468·0	218·0	475·0	234·0	394·0
Relative value dry matter per ton	$	2·24	2·95	1·96	3·15	2·51	3·10

Calculated on the above basis, averaging the results of the three years' work, the dry matter in corn silage is worth 68·8 cents per hundred pounds, while the dry matter in roots is worth 85·2 cents per hundred pounds. That is, when fed as a supplement to corn silage, the dry matter in roots is worth 23·8 per cent more than the dry matter in corn silage. In other words, the dry matter in roots is 8·8 per cent more valuable when fed in limited quantities as a supplement to corn silage than when the roots are fed as a straight ration of themselves.

GROUND VS. WHOLE ROUGHAGE FOR DAIRY COWS

There being considerable request for information as to the economy of cutting and grinding coarse roughage for dairy cattle, this experiment was undertaken to compare the relative economy of cut, ground hay with the same hay fed long, i.e., to test the efficacy of grinding roughage.

One row of Ayrshire cows was used for this experiment. The basic ration used consisted of corn silage, roots, hay, and a well-balanced grain-mixture. This ration was fed during the first and third periods of the experiment. During the second period the ration was changed by substituting the cut ground hay for the long hay. In addition, the method of feeding was changed. Ordinarily silage was fed first with the meal on top, the hay being fed later by itself. During the period in this experiment that cut ground hay was being fed, the ground hay was fed on top of the silage, the meal on top of that, and the whole ration mixed up together.

Data were taken during the final week of each period only, the first two weeks in each case being considered as a transition period. By averaging data from periods 1 and 3 and comparing it with that from period 2, a comparison

of the palatability and feeding value of long hay and cut ground hay is obtained. The following table presents the data obtained:—

LONG VS. CUT, GROUND HAY

Experimental Ration		Period 1	Period 2	Period 3	Average Period 1 and 3
		Long hay	Cut, ground hay	Long hay	Long hay
Number cows in test	No.	8	8	8	8
Number days in test per period	No.	7	7	7	7
Milk produced	lb.	1,602·00	1,364·00	1,174·00	1,388·00
Average milk per cow per day	lb.	28·60	24·36	20·96	24·80
Average per cent fat in milk	%	3·70	3·75	3·66	3·69
Total pounds fat produced	lb.	59·97	51·18	42·49	51·23
Total meal consumed	lb.	546·00	546·00	546·00	546·00
Total hay consumed	lb.	392·00	504·00	392·00	392·00
Total corn silage consumed	lb.	1,512·00	1,512·00	1,512·00	1,512·00
Total mangels consumed	lb.	1,050·00	1,050·00	.....	525·00
Findings from experiment					
Long hay consumed per 100 lbs. milk produced	lb.	24·47	.....	33·39	28·93
Cut, ground hay consumed per 100 lbs. milk produced	lb.	.....	36·20	.....	.....
Cost of meal fed at $30 per ton	$	8 19	8 19	8 19	8 19
Value of silage fed at $3.10 per ton	$	2 34	2 34	2 34	2 34
Value of roots fed at $4.10 per ton	$	2 15	2 15	.....	1 07
Value of long hay fed at $6.70 per ton	$	1 31	.....	1 31	1 31
Value of cut, ground hay fed at $11.70 per ton	$	.....	2 95	.....	.....
Total cost of feed	$	13 99	15 63	11 84	12 91
Feed cost to produce 100 lbs. milk	$	0 87	1 15	1 01	0 94
Feed cost to produce 100 lbs. fat	$	23 33	30 54	27 87	25 60

From the foregoing table it will be noticed that cutting and grinding the hay caused considerably more hay to be eaten; also that no roots were fed during the third period, the supply having run out after the second period was over. Such being the case, the period when cut ground hay was fed had quite an advantage in that more hay was consumed and a full ration of roots was fed, whereas the average of periods 1 and 2 shows a lower consumption of hay and only half as much roots being fed.

In spite of this increased consumption, the cut ground hay ration failed to produce as much milk or fat as the long hay ration. Furthermore, the cost of production of milk with the cut ground hay ration was 21 cents per 100 pounds higher than with the long hay ration. It would seem, therefore, that the cost of cutting and grinding the hay was a total loss. However, the above is the result of only one brief experiment and should not be taken as conclusive. This particular line of work is being continued.

CORN DISTILLERS' GRAINS VS. RYE DISTILLERS' GRAINS VS. OAT SCALPINGS FOR DAIRY COWS

An experiment was conducted to obtain information *re* the relative feeding value of distillers' grains from corn as compared to distillers' grains from rye. At the same time it was desired to determine the feeding value of the elevator by-product oat scalpings, so it was tested out against the rye grains.

A group of sixteen cows, consisting of Holsteins and Ayrshires, was used and the experiment was divided into five periods of two weeks each. Rye grains were fed during the first, third and fifth periods, corn grains during the second period and oat scalpings during the fourth period. The grain ration consisted of bran, 4 parts; oats, 1 part; and oil meal, 2 parts; plus 3 parts of whatever

experimental grain was being fed. By averaging the results of periods one and three and comparing with period two, a comparison of rye and corn grains is obtained. Similarly, by averaging the results of periods three and five and comparing with period four, a comparison of rye grains and oat scalpings is obtained.

The following is the analysis, made by Division of Chemistry, of the three experimental grains:—

	Distillers' Grains (Rye)	Distillers' Grains (Corn)	Oat Scalpings
Moisture	9·35	3·58	6·35
Protein	20·82	28·61	13·70
Fat	8·28	11·06	5·96
Carbohydrates	45·78	37·53	53·46
Fibre	12·77	16·90	15·43
Ash	3·00	2·32	5·10
	100·00	100·00	100·00

The most noticeable differences in the composition of these three grains is in the protein content; that of the corn grains being very high and of the oat scalpings comparatively low. According to tables in "Feeds and Feeding" by Henry and Morrison, there is a considerable difference in the digestibility of distillers' grains from rye and corn, the difference being in favour of the corn grains. According to their figures, 100 pounds of rye grains of the above composition would contain only 46.5 pounds of digestible nutrients, while 100 pounds of corn grains of the above composition would contain 76.8 pounds of digestible nutrients. In other words, rye distillers' grains contain 39.5 per cent less digestible nutrients than corn distillers' grains. No figures are available for the digestibility of oat scalpings. The following prices were charged for the various grains:—

Bran	$ 29 25	per ton
Oats	40 00	"
Oil cake	42 60	"
Corn grains	35 00	"
Rye grains	27 50	"
Oat scalpings	20 00	"

The following tables give the data obtained in the various phases of the experiment:—

CORN DISTILLERS' GRAINS VS. RYE DISTILLERS' GRAINS FOR DAIRY COWS

Experimental Ration		Period 1	Period 2	Period 3	Average Periods 1 and 3
		Rye Distillers' Grains	Corn Distillers' Grains	Rye Distillers' Grains	Rye Distillers' Grains
Number cows in test	No.	16	16	16	16
Number days in test per period	No.	7	7	7	7
Milk produced	lb.	3,236·50	3,191·00	2,718·00	2,977·5
Average milk per cow per day	lb.	28·89	28·49	24·27	26·58
Average per cent fat in milk	p.c.	3·54	3·51	3·48	3·51
Total pounds fat produced	lb.	114·42	111·87	94·49	104·45
Total experimental meal consumed	lb.	366·30	366·30	366·30	366·30
Total other meal consumed	lb.	854·7	854·7	854·7	854·70
Total hay consumed	lb.	840·00	840·00	840·00	840·00
Total corn silage consumed	lb.	3,640·00	3,640·00	3,640·00	3,640·00
Findings from experiment					
Meal consumed per 100 lbs. milk produced	lb.	37·72	38·26	44·92	41·32
Meal consumed per 100 lbs. fat produced	lb.	1,068·00	1,091·00	1,292·00	1,180·00
Cost of meal fed at $32.47 per ton	$	19 77	.....	19 77	19 77
Cost of meal fed at $34.72 per ton	$	.....	21 20	.....	.....
Value hay fed at $6.70 per ton	$	2 81	2 81	2 81	2 81
Value of silage fed at $3.10 per ton	$	5 64	5 64	5 64	5 64
Total cost of feed	$	28 22	29 65	28 22	28 22
Feed cost to produce 100 lbs milk	$	0 87	0 93	1 04	0 95
Feed cost to produce 100 lbs. fat	$	24 66	26 50	29 86	27 26

RYE DISTILLERS' GRAINS VS. OAT SCALPINGS FOR DAIRY COWS

Experimental Ration		Period 3	Period 4	Period 5	Average Periods 3 and 5
		Rye Distillers' Grains	Oat Scalpings	Rye Distillers' Grains	Rye Distillers' Grains
Number of cows in test	No.	14	14	14	14
Number of days in test per period	No.	7	7	7	7
Milk produced	lb.	2,524·5	2,463·0	2,237·0	2,380·75
Average milk per cow per day	lb.	25·76	25·13	22·83	24·30
Average per cent fat in milk	%	3·46	3·66	3·57	3·51
Total pounds fat produced	lb.	87·33	90·17	79·90	83·61
Total experimental meal consumed	lb.	336·90	336·90	336·90	336·90
Total other meal consumed	lb.	786·10	786·10	786·10	786·10
Total hay consumed	lb.	735·00	735·00	735·00	735·00
Total corn silage consumed	lb.	3,185·00	3,185·00	3,185·00	3,185·00
Findings from Experiment					
Meal consumed per 100 lb. milk produced	lb.	44·49	45·59	50·20	47·34
Meal consumed per 100 lb. fat produced	lb.	1,286·00	1,245·00	1,406·00	1,346·00
Cost of meal fed at $32·47 per ton	$	16 98	.....	16 98	16 98
Cost of meal fed at $20 per ton	$	.....	11 23	.....	.....
Value of silage fed at $3.10 per ton	$	4 93	4 93	4 93	4 93
Value of hay fed at $6.70 per ton	$	2 46	2 46	2 46	2 46
Total cost of feed	$	24 37	18 62	24 37	24 37
Feed cost to produce 100 lbs. milk	$	0 97	0 76	1 09	1 03
Feed cost to produce 100 lbs. fat	$	27 90	20 65	30 50	29 20

From the first table it will be noted that the ration containing distillers' grains from corn produced 213.5 pounds more milk and 7.42 pounds more fat than the ration containing distillers' grains from rye. The average percentage fat in the milk was the same with both rations. In cost of production of milk and fat the ration containing distillers' grains from corn led over the ration containing distillers' grains from rye, in spite of the fact that the former ration was the most expensive. In this case, 366.3 pounds of corn grains replaced 392.4 pounds rye grains, 69.6 pounds of balance of meal mixture, 60 pounds of hay and 262 pounds of silage giving rye grains a value of $24.80 per ton with other feed at prices charged. In other words, rye grains are 29.14 per cent (in this case $10.20 per ton) less valuable than corn grains. Note that the difference in value put on these grains by the vendor is only $7.50 per ton, which apparently, is not sufficient. Note, also, that these figures agree fairly closely with the values as based on total digestible nutrient content of the two feeds given by Henry and Morrison, proving that the factor of digestibility in a feed is a very important one.

From the second table it will be noted that the ration containing oat scalpings produced 82.25 pounds more milk and 6.56 pounds more fat than the ration containing distillers' grains from rye. The average percentage fat in the milk was slightly higher when the former ration was being fed. In cost of production of milk and fat, the former ration led the latter by quite a large margin. In this case 336.9 pounds of oat scalpings proved equal to 348.6 pounds of distillers' grains from rye, 27.3 pounds of balance of meal mixture, 25 pounds of hay and 111 pounds of silage, giving rye grains a value of $16 per ton in this ration with other feeds at prices charged. In other words, rye grains are 20 per cent ($4 per ton in this case) less valuable than oat scalpings. Having in mind the somewhat higher protein content of the rye grains, the superior showing of the oat scalpings can only be accounted for by a higher percentage of digestibility.

FEEDING EXPERIMENTS WITH CALVES

CALF-MEALS, HOME-MIXED AND COMMERCIAL

The main object of this experiment was to determine the value of hulless oats when fed in the meal mixture supplemented with skim-milk for the feeding of dairy calves.

This experiment was run as a check to a similar experiment reported last year, and was undertaken to determine whether the results could be duplicated this year when similar meal mixtures were fed to a number of different lots of calves.

At this Farm the method of feeding calves is to give them whole milk until between four and five weeks of age, after which skim-milk is fed. The butterfat removed is replaced by a meal mixture which is prepared by scalding. This meal then possesses a jelly-like consistency. The regular meal mixture consists of 2 parts of ground oats, 2 parts of ground corn, and 1 part of ground linseed meal.

In this experiment as in the test conducted last year, hulless oats were used in the meal mixture to replace a part or all of the oats or corn. This year two lots were fed somewhat differently, one receiving milk albumen at the rate of 10 per cent of the total mixture in addition to the regular meal mixture. This milk albumen is a by-product obtained from the manufacture of powdered milk and is rich in protein and minerals as will be seen from the chemical analysis, which is submitted later in this report. This milk albumen was fed with the idea of determining its value as a feed for calves, but it was found that the quantity fed was too small to affect the results to any great extent.

Another lot of calves was fed a commercial meal mixture, this mixture being fed in about the same manner and amount as the home-mixed meal.

The following mixtures were used for the six different lots:—

Lot 1—Check Lot—Ground oats, 2 parts; ground corn, 2 parts; ground flax seed, 1 part.
Lot 2—Hulless oats, 2 parts; ground corn, 2 parts; ground flax seed, 1 part.
Lot 3—Ground oats, 1 part; hulless oats, 1 part; corn, 2 parts; ground flax seed, 1 part.
Lot 4—Ground oats, 2 parts; hulless oats, 2 parts; grround flax seed, 1 part.
Lot 5—Ground oats, 2 parts; ground corn, 2 parts; ground flax seed, 1 part; milk albumen, 10 p.c.
Lot 6—Commercial meal.

Following is a chemical analysis of the various mixtures fed to the different lots during the experiment. As will be seen the addition of hulless oats to the mixture increased the fat and protein and reduced the fibre content. This analysis was made by the Division of Chemistry.

CALF-MEALS—ANALYSIS

Lab'y No.	Manufacturer	Ingredients	Moisture	Protein	Fat	Carbohydrates	Fibre	Ash	
			p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	
71690	C.E.F.	Corn, 2 parts; oats, 2 parts; linseed, 1 part	9·31	13·02	11·00	58·02	5·74	2·91	Lot I
71691	"	Corn, 2 parts; hulled oats, 2 parts; linseed, 1 part	8·79	13·85	12·63	59·40	2·93	2·40	Lot II
71692	"	Corn, 2 parts; hulled oats, 1 part; linseed, 1 part; oats, 1 part	8·13	14·22	11·58	59·50	4·21	2·36	Lot III
71693	"	Oats, 2 parts; hulless oats, 2 parts; linseed, 1 part	7·10	15·31	13·36	55·73	5·61	2·89	Lot IV
71696	Cummings, W. R. Ottawa.	Gold Dollar Calf Meal	8·55	17·55	6·32	60·37	4·75	2·46	Lot V
71697	C.E.F.	Corn, 2 parts; oats, 2 parts, linseed, 1 part; milk albumen, 10 per cent	8·97	16·32	11·35	53·70	5·36	4·30	Lot VI

The meal mixtures were prepared by scalding with boiling water and the jelly so formed was mixed with the milk in the proportion of one-half cup twice daily at the beginning of the test, then increased gradually so that at the end of the experiment the calves were getting a cup full twice a day with an allowance of 15 pounds of milk per day during the whole experiment.

In addition dry meal was supplied and this was composed of a mixture of ground oats, bran, distiller's grain and oil meal. The hay was good alfalfa hay.

CALF-FEEDING EXPERIMENT

Meal Mixture		Lot I	Lot II	Lot III	Lot IV	Lot V Corn 2 Oats 3 lin seed 1 Milk Albumen 10 %	Lot VI Commercial Meal
Number of Calves	No.	2	4	3	4	4	4
Length of feeding period	dys.	136·0	136·0	136·0	136·0	136·0	136·0
Gross initial weight	lbs.	417·0	717·0	488·0	577·0	710·0	738·0
Average initial weight	"	208·5	179·2	162·7	144·2	177·5	184·5
Gross finished weight	"	890·0	1,532·0	1,120·0	1,300·0	1,457·0	1,490·0
Average finished weight	"	445·0	383·0	373·0	325·0	364·2	372·5
Av. gain per calf for period	"	236·5	203·8	210·6	180·8	186·7	188·0
Av. daily gain per calf	"	1·74	1·49	1·54	1·33	1·37	1·38
Amt. of skim-milk fed per group	"	4,080·0	8,160·0	6,120·0	8,160·0	8,160·0	8,160·0
Amt. of skim-milk fed per calf	"	2,040·0	2,040·0	2,040·0	2,040·0	2,040·0	2,040·0
Amt. dry meal fed per lot	"	246	492	369	492	492	492
Dry meal per calf	"	123	123	123	123	123	132
Amt. of meal in milk per lot	"	156	312	234	312	312	312
Meal in milk per calf	"	78	78	78	78	78	78
Amt. hay per lot	"	790	1,580	1,185	1,580	1,580	1,580
Amt. hay per calf	"	395	395	395	395	395	395
Total cost of feed per lot	$	17·30	34·99	26·12	34·37	35·61	39·83
Cost of feed per calf	$	8·65	8·75	8·71	8·59	8·90	9·96
Cost of feed per pound of gain	cts.	3·61	4·29	4·08	4·69	4·77	5·29

PRICE OF FEEDS

Skim-milk	$ 0·20 per cwt.
Dry meal mixture	1·50 "
Meal mixture in milk.—	
Lot I	1·85 "
Lot II	1·95 "
Lot III	1·90 "
Lot IV	1·75 "
Lot V	2·15 "
Lot VI	3·50 "
Hay, at cost of production	6·60 per ton

Again in this experiment hulless oats proved to be an excellent feed for growing calves.

The calves in the check-lot made the largest gains at the lowest cost of any lot in this experiment. Last year the calves on the No. 4 mixture had made the largest gains, but this year this lot stood last in total gains, due probably to the fact of being made up of smaller calves rather than the ration being poorer.

Lot 6 on commercial meal did not make as large gains as the first three, and these gains were made at a higher cost per pound.

From these results it would seem that the home-mixed ration can be utilized to better advantage and more economically than commercial calf meals.

Calves in this test made good gains but did not do quite as well as in last year's experiment although the difference is small.

Lot 5 which was fed milk albumen in addition to the regular mixture did not show any larger gains than the other lots. The fact that the quantity fed may not have been sufficient and also that it has been utilized in a single test only does not give sufficient information to draw any definite conclusions as to the value of this by-product for the feeding of calves.

COST OF REARING CALVES

The cost of raising a calf from birth until twenty-five weeks or a little less than six months of age was computed from the average cost of raising these twenty-one calves as shown in the preceding table.

These calves received whole milk during the first four or five weeks according to their size, the stronger calves being started on skim-milk at four weeks and the others at five weeks of age.

Following is the average amount of feed and the average cost of feeding a single calf from birth to twenty-five weeks of age.

COST OF RAISING A CALF

Feed	Amount of feed	Cost of feed
	lbs.	$ c.
Whole milk at $2.00 per cwt	340	6 40
Skim-milk at $0.20 per cwt	2,040	4 08
Dry meal at $1.50 per cwt	123	1 84
Meal in milk at $2.18 per cwt	78	1 70
Hay at $6.60 per ton	395	1 30
Total cost	.....	15 72

The average cost of raising a calf from birth to twenty-five weeks of age or a little less than six months is found to be $15.72 and the average weight of the calves at that age was 371 pounds.

CALF-MEAL AND SKIM-MILK

During the winter of 1924-25 two lines of calf-feeding experiments were undertaken.

1.—A comparison of home-mixed calf-meals and a commercial calf-meal, a check on work previously carried on.

2.—A study of the most economical amount of skim-milk to feed with a calf-meal.

Each line of work will be dealt with separately.

Calf-Meals, Home-Mixed and Commercial (1924-25)

On January 15, 1925, fourteen calves were divided into five lots of three calves each with the exception of Lot 2, which only contained two calves. These lots were fed the calf-meal mixtures outlined in the second table following. In addition, they received a dry grain ration composed of bran, distillers' grains, oats and oil cake and all the second-cut alfalfa hay they would eat. The calves were fed as outlined in the previous section of this report on calf-feeding experiments. The following table gives the analysis of the various meals used in this experiment.

CALF-MEALS:—ANALYSIS

Lab'y No.	Particulars	Moisture	Protein	Fat	Carbo-hydrates	Fibre	Ash
		p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
78778	Lot 1. Grd. oats, 2 parts; grd. corn, 2 parts; grd. flax seed, 1 part; 1 p.c. salt, 1 p.c. bone meal	11·51	13·85	10·15	54·82	6·29	3·38
78779	Lot 2. Hulless oats, 2 parts; grd. corn, 2 parts; grd. flax seed, 1 part; salt, 1 p.c.; bone meal, 1 p.c.	7·30	15·70	12·06	59·67	2·05	3·22
78780	Lot 3. Grd. oats, 2 parts; hulless oats, 2 parts; grd. flax sesd, 1 part; salt, 0·5 p.c.; bone meal, 1 p.c.	11·77	18·80	13·75	44·71	6·27	4·70
78781	Lot 4. Oat flour, 2 parts; hulless oats, 2 parts; grd. flax seed, 1 part; salt, 0·5 p.c. bone meal, 1 p.c.	9·43	16·64	9·71	59·14	2·45	2·63
78782	Lot 5 A. "Gold Dollar"	8·46	18·17	6·53	59·64	4·17	3·03

CALF-MEALS

Calf-Meal Mixture		Lot 1 Gr. oats 2 parts. Gr. corn 2 parts. Gr. flaxseed 1 part. Salt ½%. Bonemeal 1%	Lot 2 Hulless oats 2 parts. Gr. corn 2 parts. Gr. flaxseed 1 part. Salt ½%. Bonemeal 1%	Lot 3 Gr. oats 2 parts. Hulless oats 2 parts. Gr. flaxseed 1 part. Salt ½%. Bonemeal 1%	Lot 4 Oat flour 2 parts. Hulless oats 2 parts. Gr. flaxseed 1 part. Salt ½%. Bonemeal 1%	Lot 5 Commercial "Gold Dollar" Calf Meal
Number of calves	No.	3	2	3	3	3
Average age at start of experiment	days	46	67	66	69	64
Length of feeding period	"	105	105	105	105	105
Gross initial weight	lbs.	355	350	550	425	470
Average initial weight	"	118·3	175·0	183·3	141·7	156·7
Gross finished weight	"	790·0	755·0	1,167·0	996·0	999·0
Average finished weight	"	263·3	377·5	389·0	332·0	333·0
Total gain per group	"	435·0	405·0	617·0	571·0	529·0
Average gain per calf	"	145·0	202·5	215·6	190·3	176·3
Average daily gain per calf	"	1·38	1·93	2·05	1·81	1·68
Amount of skim milk fed per group	"	4,725·0	3,150·0	4,725·0	4,725·0	4,725·0
Amount of skim milk fed per calf	"	1,575·0	1,575·0	1,575·0	1,575·0	1,575·0
Amount of meal in milk fed per group	"	509·0	339·4	509·0	509·0	509·0
Amount of meal in milk fed per calf	"	169·7	169·7	169·7	169·7	169·7
Amount of dry meal fed per group	"	439·0	292·6	439·0	439·0	439·0
Amount of dry meal fed per calf	"	146·3	146·3	146·3	146·3	146·3
Amount of hay fed per group	"	630·0	420·0	630·0	630·0	630·0
Amount of hay fed per calf	"	210·0	210·0	210·0	210·0	210·0
Total cost of feed per group	$	31·96	21·61	30·50	32·81	36·82
Cost of feed per calf	$	10·65	10·81	10·17	10·94	12·27
Cost of feed per pound gain	cts.	7·35	5·33	4·94	5·75	6·96

From a study of the second table it will be noted that Lot III on a calf-meal made up of ground oats, hulless oats and flaxseed meal plus salt and bone-meal made the largest and cheapest gains.

Lot II on hulless oats, corn and flaxseed meal made the next largest and, also, cheapest gains.

Lot IV on oat flour, hulless oats and flaxseed meal stood third in both gains and cost of gain.

Lot V on "Gold Dollar" calf-meal stood fourth in both gains and cost of gain.

Lot I on corn, oats and flaxseed mixture stood last, making a rather poor showing, which is, no doubt, due in part to the fact that the calves in this lot went on experiment when 20 days younger than the average of the calves in the other pens, which would affect their rate of gain considerably.

However, all of these mixtures made satisfactory and economical gains and if a farmer had not all the ingredients for one he would be well advised to take another. This work is being continued and a summary will be given in the next report of this division.

Skim-Milk in the Ration of the Dairy Calf

This experiment was conducted to determine, if possible, the optimum and minimum amounts of skim-milk to feed to calves. Three lots of calves were put on experiment at birth. Lot 6 received whole milk for the first five weeks, then gradually changed to skim-milk and meal mixture, all whole milk being eliminated at the end of another three weeks, at which time the calves received 15 pounds of skim-milk and their regular ration of calf-meal in milk and dry meal daily.

Lot 7 was fed in a similar manner, except that when on skim-milk alone they only received 7½ pounds per day, water being used to make up the 15 pounds.

Lot 8 was fed new milk for the first five weeks, then the new milk was gradually reduced and water and skim-milk added to make up the 15 pounds. However, in this case, the very minimum of skim-milk was fed, amounting to approximately 1¼ pounds per calf per day, i.e., just enough to colour and flavour the drink to get the calves to take it. This lot received extra dry grain feed during the last six weeks of the experiment to make up for the shortage of skim-milk.

Apart from these differences in feeding methods, the calves were all fed alike and received roughages and other treatment alike.

The meal mixture used was similar in composition and analysis to that used with Lot 4 in the previous experiment. The following table gives the data obtained.

SKIM-MILK FOR DAIRY CALVES

—		Lot 6	Lot 7	Lot 8
		Oat flour, 2 parts; hulless oats, 2 parts; ground flaxseed, 1 part; Salt, ½ %; bonemeal 1 %; whole milk, 41 days; skim-milk, 112 days	Same meal mixture; whole milk, 45 days; skim-milk, 112 days	Same meal mixture; whole milk, 39 days; skim-milk, 43 days
Number of calves	No.	2	3	2
Length of feeding period	dys.	153	157	159
Gross initial weight	lbs.	190	259	191
Average initial weight	"	95	86·3	95·5
Gross finished weight	"	720	1,031	728
Average finished weight	"	360	343·6	364
Total gain per group	"	530	772	537
Average gain per calf	"	265	257·3	268·5
Average daily gain per calf	"	1·73	1·64	1·69
Amount of whole milk per group	"	746	1,239	762
Amount of whole milk per calf	"	373	413	381
Amount of skim-milk per group	"	3,564	2,826	274
Amount of skim-milk per calf	"	1,782	942	137
Amount of meal in milk per group	"	432	648	432
Amount of meal in milk per calf	"	216	216	216
Amount of dry meal per group	"	356	534	386
Amount of dry meal per calf	"	178	178	193
Amount of hay per group	"	480	720	480
Amount of hay per calf	"	240	240	240
Total cost of feed per group	$	38·50	54·50	32·68
Cost of feed per calf	$	19·75	18·17	16·34
Cost of feed per pound gain	cts.	7·26	7·06	6·09

From the table it will be noted that the gains per calf per day were not in the order of the amount of milk fed, Lot 7, receiving 7½ pounds of skim-milk per day, not making as much gain per day as Lot 8, receiving only a trace of skim-milk per day. This is to be accounted for almost entirely by the fact that

Lot 7 contained one Ayrshire calf, while all other calves in the experiment were Holsteins, which make somewhat more rapid gains. The cost of one pound gain was in order of the amount of skim-milk fed. In the case of Lot 7, the cost of one pound of gain would have been more proportionate to the amount of skim-milk fed had it not been for the Ayrshire calf included in this pen.

The results of this experiment go to show that good results can be obtained with a minimum amount of skim-milk, provided that proper substitutes are used and that the calves are carefully handled. In this case, Lot 8 made excellent gains but naturally were not in the same condition at the end of the experiment as Lots 6 or 7. However, they were in good growing condition for dairy-bred calves. This work is being enlarged upon and continued next season.

TUBERCULOSIS ERADICATION AND THE BANG HERD

During the year, two reactors to the tuberculin test were removed from the herd. One of them being a valuable breeding bull, he was removed to the Bang herd. The other, a milch cow, showed very slight infection. The Bang herd has been maintained, the health of the animals being all that could be expected and the percentage of calves saved good. The milk-production of the herd has again been notable, the highest record ever made at the Central Experimental Farm being made at the Bang herd by the Holstein cow " Lady Segis Jewel ", when she produced 26,290 pounds of milk and 833 pounds fat in 365 days. Incidentally, the highest record ever made by an Ayrshire cow at the Central Experimental Farm was made at the Bang herd by the cow "Starlight of Fredericton", when she produced 19,071 pounds of milk and 855 pounds of fat in 365 days. In addition to the reactor mentioned above, one other excellent cow, purchased after she had reacted, was added to the Bang herd, which is now made up of five Ayrshire cows and one Ayrshire bull and seven Holstein cows and one Holstein bull.

DAIRY HERD RECORDS OF PRODUCTION

On the following pages will be found tables giving the milk- and fat-production and feed-consumption records for all cows and heifers which have finished a lactation period during the year ending March 31, 1925, as well as the average production of the five best cows in each breed and the total herd of each breed for the same period.

In the case of heifers with their first calves, charges for feed include the consumption from a date approximately two months prior to parturition to the time of being dried off preparatory to their second calving. In the case of heifers and cows three years old or over, charges for feed include the period from the time of drying up of the previous lactation period to the end of the lactation period herein reported.

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

Pasture per month	$ 2 00	
Meal mixture	32 00	per ton
Hay	6 70	"
Roots	4 10	"
Silage (corn)	3 10	"
Green feed	6 75	"
Beet pulp	40 00	"

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

In calculating the value of products, the actual cash values were used, which amounted to 40 cents per pound for butter and 30 cents per hundredweight for skim-milk.

The labour cost of caring for the cattle, the manufacture of 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 these items, though not sufficiently to cover other overhead charges, such as interest, depreciation, etc.

Name and Breed of Cow	Age at Commencement of lactation period.	Date of dropping calf	Number of days in 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 40c. per pound	Value of skim milk at 30c. per cwt.
				lbs.	lbs.	p.c.	lbs.	$ cts.	$ cts.
Lady Segis Jewel.....H.	7	Dec. 9, 1923	408	27,097·5	66·42	3·34	1,065·68	426 27	78 58
Starlight of Fredericton.....A.	7	Mar. 5, 1924	388	19,641·0	50·62	4·45	1,028·83	411 53	56 30
Sarah Ann Pontiac.....H.	6	Dec. 3, 1923	329	21,805·5	66·28	3·55	910·76	364 30	63 09
Midnight Jewel Dekol.....H.	7	Feb. 21, 1924	372	19,878·5	53·44	3·87	904·80	361 92	57 33
Grace Fayne Aaggie.....H.	8	Jan. 15, 1924	316	16,837·5	53·28	3·82	756·26	302 50	48 58
Helena Keyes Posch.....H.	11	Mar. 23, 1924	282	19,834·0	70·33	3·26	760·18	304 07	57 56
Johanna Helena Keyes.....H.	3	Feb. 3, 1924	317	17,663·0	55·72	3·47	721·85	288 74	51 15
Lyon Segis Butter Girl.....H.	4	Mar. 17, 1924	285	15,459·5	54·24	3·62	657·65	263 06	44 70
Morningside Bessie.....H.	3	Jan. 14, 1924	307	12,229·5	39·84	4·14	595·29	238 12	35 17
Ottawa Lulu Posch.....H.	3	Dec. 2, 1923	427	12,578·0	29·46	3·96	586·44	234 58	36 24
Korndyke Canary Buttermaid.H.	7	Mar. 7, 1924	236	13,992·0	59·29	3·51	577·86	231 14	40 50
Korndyke Posch Canary.....H.	3	Jan. 24, 1924	332	13,547·5	40·81	3·67	584·24	233 70	39 15
Ottawa Francy Bos DeKol.....H.	3	Jan. 10, 1924	299	12,331·5	41·24	4·04	586·42	234 57	35 50
Auchinbay Mina 5th.....A.	6	Nov. 5, 1923	320	13,464·5	42·08	3·83	606·65	242 66	38 85
Allancroft Betsy 2nd.....A.	5	Nov. 11, 1922	396	12,137·5	30·65	3·95	564·04	225 62	34 97
Zaza Fille 5th.....Fr.Can	4	Dec. 21, 1923	326	9,137·0	28·03	4·66	500·91	200 36	26 13
Leila Mechthilde.....H.	9	June 15, 1924	271	11,656·5	43·01	3·87	530·59	212 24	33 61
Zorra Hengerveld.....H.	3	Oct. 19, 1923	408	12,542·0	30·74	3·58	528·04	211 22	36 28
Lyon Segis Helena Keyes.....H.	4	Oct. 26, 1923	517	12,387·0	23·96	3·53	514·09	205 64	35 85
Brampton Vinnie Beth.....J.	6	Feb. 7, 1924	314	7,186·0	22·89	5·51	466·13	186 45	20 37
Lyon Segis Bessie Ann.....H.	4	Oct. 28, 1923	332	12,852·5	38·71	3·17	479·62	191 85	37 33
Old Hall Maggie 9th.....A.	11	Feb. 13, 1924	306	10,657·0	34·83	3·84	481·89	192 76	30 74
Biddy D.....Grade H	3	Oct. 12, 1923	371	12,296·0	33·14	3·3	476·94	190 78	35 67
Castlehill Strawberry.....A.	9	Mar. 20, 1924	299	10,187·0	34·07	3·68	440·82	176 33	29 44
Johanna Pietertje Ormsby.....H.	2	Oct. 15, 1923	533	11,562·0	21·69	3·48	473·78	189 51	33 48
Ottawa Burma Lady 2nd.....J.	4	Oct. 27, 1923	377	7,782·5	20·64	4·68	428·89	171 56	22 25
Ottawa March Posch.....H.	5	April 7, 1924	204	11,558·0	56·66	3·18	432·88	173 15	33 57
Francy Canaan Beauty.....H.	3	Nov. 24, 1923	302	11,388·5	37·71	3·2	439·36	171 74	33 07
Brampton Triumph 2nd.....J.	5	Feb. 22, 1924	284	6,183·5	21·77	5·39	392·16	156 86	17 55
Maud of Fernbrook 4th.....A.	9	Aug. 18, 1923	304	8,214·0	27·02	4·07	393·65	157 46	23 64
Ottawa Faforit Fayne.....H.	2	Nov. 4, 1923	322	9,780·0	30·37	3·41	391·84	156 74	28 34
Flora Dekol Korndyke.....H.	8	July 19, 1923	256	9,387·0	36·67	3·5	386·47	154 59	27 18
Hardcroft Dewdrop 3rd.....A.	8	Jan. 2, 1924	302	8,725·5	28·89	3·91	401·23	160 49	25 15
Allancroft Pansy.....A.	8	June 25, 1923	310	7,381·5	23·81	4·26	370·18	148 07	21 20
Merry Christmas.....A.	8	Nov. 8, 1923	308	9,283·0	30·14	3·58	391·08	156 43	26 85
Maud of Fernbrook.....A.	12	June 25, 1923	319	8,283·5	25·97	3·98	387·75	155 10	23 86
Ottawa March Francy.....H.	2	Oct. 19, 1923	439	8,797·5	20·04	3·6	372·48	148 99	25 44
Flavia 8th of Ottawa.....A.	4	Oct. 30, 1923	286	7,789·0	27·23	3·97	363·40	145 36	22 44
Johanna Butter Maid.....H.	3	Dec. 10, 1923	237	8,258·0	34·84	3·53	342·76	137 10	23 90
Bess Hengerveld.....H.	5	Dec. 14, 1923	282	9,450·5	33·51	3·27	363·65	145 46	27 42
Korndyke Bessie Ann.....H.	2	Nov. 27, 1923	340	7,690·5	22·62	3·83	346·08	138 43	22 19
Ottawa Beauty Maid 2nd.....J.	3	Jan. 22, 1924	282	6,150·5	21·81	4·63	335·09	134 04	17 60
Ottawa Bess Hengerveld.....H.	3	Oct. 15, 1923	342	8,001·0	23·39	3·42	322·31	128 92	23 18
Fanny of Oban.....A.	4	Dec. 9, 1923	357	7,388·0	20·69	3·99	346·78	138 71	21 28
Ottawa Tilly.....A.	3	July 10, 1923	296	7,295·5	24·65	4·0	343·28	137 31	21 01
Johanna Woodcrest Lyn.....H.	2	Aug. 24, 1923	507	8,468·5	16·7	3·69	367·27	146 91	24 47
Lyon Segis Keyes Lass.....H.	4	Oct. 23, 1923	374	9,061·5	24·23	3·57	380·58	152 23	26 21
Milly of Wishtonwish .....J.	6	Feb. 18, 1924	282	5,339·5	18·93	5·11	320·88	128 35	15 20
Allancroft Ada.....A.	9	Jan. 14, 1924	260	6,998·5	26·92	3·73	307·26	122 90	20 21
Ottawa Maud .....A.	2	Oct. 2, 1923	306	6,560·0	21·44	3·97	308·29	122 52	18 90
Helena Keyes Plus.....H.	8	Feb. 5, 1924	296	7,252·5	24·50	3·83	328·81	131 52	20 92
Johanna Helena Posch.....H.	2	Dec. 15, 1923	336	7,191·0	21·40	3·81	322·39	128 96	20 75
Marjorie of Ottawa 10th.....A.	3	Sept. 23, 1923	267	4,847·5	18·16	4·7	268·0	107 20	13 86
Dunlop Betsy.....A.	7	Aug. 2, 1923	255	5,826·0	22·85	4·77	327·18	130 87	16 64
Sweet Echo.....H.	2	Dec. 23, 1922	606	10,420·0	17·19	3·54	434·35	173 74	30 15
Catlin's Barbara.....A.	9	Feb. 1, 1924	339	7,912·5	23·34	3·4	322·60	129 04	22 91
Ottawa Lady 2nd.....A.	4	Jan. 12, 1924	243	5,462·5	22·49	4·05	260·44	104 18	15 72
Diamond A2.....Grade H.	4	Sept. 10, 1923	292	6,747·0	23·11	3·25	257·86	103 14	19 58
Ottawa Blossom.....A.	3	Dec. 23, 1923	273	6,378·5	23·36	3·39	254·48	101 79	18 49
Princess Ann 2nd.....A.	3	Oct. 22, 1923	366	5,022·0	13·72	4·35	256·73	102 69	14 41
Ottawa Flo.....A.	3	Oct. 29, 1923	368	4,702·0	12·78	4·47	247·35	98 94	13 48
Dunlop Stellite.....A.	3	Sept. 25, 1923	246	4,957·5	20·11	3·47	202·11	80 84	14 36
Lady Francy May.....H.	3	Nov. 20, 1923	255	5,932·0	23·26	3·48	242·70	97 08	17 18
Ottawa Ada.....A.	2	Jan. 4, 1923	273	4,151·5	15·21	4·36	213·08	85 23	11 91
Fairy's Fern.....J.	5	Dec. 25, 1923	239	3,626·5	15·17	5·18	221·09	88 44	11 32
Belle of Oban.....A.	12	Dec. 10, 1923	260	5,768·0	22·18	3·67	248·98	99 59	16 67
Jessie of Oaklawn.....A.	9	Jan. 4, 1924	264	5,254·0	19·90	3·81	235·44	94 18	15 16
Ottawa Victorine.....A.	2	Oct. 13, 1923	303	3,951·5	13·04	4·42	205·53	82 21	11 33
Francy Leila Posch.....H.	2	Oct. 25, 1923	290	5,407·5	18·65	3·22	204·54	81 82	15 70
Ottawa Dignity Dot.....A.	3	Oct. 13, 1923	272	4,077·5	14·99	4·03	193·15	77 26	11 74
Ottawa Lou.....J.	2	Oct. 23, 1923	303	3,735·0	12·33	4·15	183·13	73 25	10 74
Flavia of Ottawa 9th.....A.	4	Jan. 14, 1924	321	4,458·0	13·89	3·95	207·40	82 96	12 85
Ottawa Valentine.....A.	2	Nov. 15, 1923	323	3,710·5	11·49	4·38	191·08	76 43	10 64
Trilby.....A.	9	Oct. 23, 1923	198	2,725·5	13·77	3·84	123·05	49 22	7 86
Ottawa March Korndyke.....H.	3	Feb. 2, 1924	275	4,785·5	17·40	3·75	211·15	84 46	13 82
Francy Wayne Boon.....H.	2	Oct. 16, 1923	333	3,771·0	11·32	3·39	150·48	60 19	10 93
Ottawa Fanny.....A.	4	Nov. 20, 1923	215	1,975·5	9·19	4·43	102·93	41 17	5 66
Total for herd (77 cows).....	377	.....	24,580	704,224	.....	.....	31,439·39	12,575·74	2,032·46
Average for herd (77 cows)...	4·9	.....	319·22	9,145·76	28·65	3·79	408·30	163 32	26·40

DURING THE YEAR

Total value of product	Amount of meal eaten at $32 per ton	Amount of roots at $4.10 per ton and silage at $3.10 per ton	Amount of hay eaten at $6.70 per ton	Amount of green feed eaten at $6.75 per ton	Amount of beet pulp eaten at $40.00 per ton	Months on pasture at $2 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.	lbs.	lbs.	lbs.	lbs.	lbs.		$ cts.	$ cts.	cts.	cts.	$ cts.
504 85	6,736	14,060	2,848	.....	.....	3	145 91	0·54	13·7	26·3	358 94
467 83	6,094	11,720	2,912	.....	.....	3	131 83	0·67	12·8	27·2	336 00
427 39	5,038	11,190	2,192	.....	.....	3	113 68	0·52	12·5	27·5	313 71
419 25	6,294	13,948	2,904	.....	.....	1	134 62	0·68	14·9	25·1	284 63
351 08	4,874	12,900	2,397	.....	.....	1	108 00	0·64	14·2	25·8	243 08
361 63	6,294	10,005	2,440	.....	.....	3	130 38	0·66	17·2	22·9	231 25
339 89	5,758	13,065	2,632	.....	.....	3	127 97	0·72	17·7	22·3	211 92
307 76	4,696	13,605	2,397	.....	.....	1	106 52	0·69	23·5	16·5	201 24
273 29	3,466	8,220	2,155	.....	.....	3	81 42	0·66	13·7	26·3	191 87
260 59	3,741	18,730	2,439	720	484	1	104 77	0·86	18·6	21·4	155 82
270 82	3,836	14,155	3,019	.....	.....	3	99 43	0·79	16·9	23·1	171 39
271 64	4,262	10,585	2,119	.....	.....	3	101 37	0·72	17·5	22·5	170 27
272 85	4,059	17,485	2,493	.....	.....	1	104 32	0·77	17·9	22·1	168 53
270 07	3,850	19,110	2,397	.....	.....	1	104 28	0·85	17·8	22·2	165 79
281 51	3,978	23,530	2,847	.....	.....	5	123 68	0·92	20·4	19·6	157 83
226 49	2,422	13,730	2,397	.....	.....	1	71 08	0·78	14·2	25·8	155 41
245 85	3,888	10,915	2,001	.....	.....	1	97 83	0·84	18·4	21·6	148 02
247 50	4,054	17,625	2,763	.....	.....	1	105 41	0·84	20·0	20·0	142 09
241 49	4,286	14,875	3,400	.....	.....	1	105 03	0·85	20·4	19·6	136 46
206 82	2,625	12,955	2,457	.....	.....	1	73 11	1·02	15·7	24·3	133 71
229 18	3,886	17,655	2,523	.....	.....	1	102 13	0·79	21·2	18·8	127 05
223 50	4,304	10,050	2,396	.....	.....	3	98 47	0·92	20·4	19·6	125 03
226 45	4,060	18,110	2,583	.....	.....	1	105 82	0·86	22·9	17·1	120 63
205 77	3,731	12,010	2,317	.....	.....	1	88 22	0·87	20·0	20·0	117 55
222 99	4,058	17,100	3,595	.....	.....	1	105 48	0·91	22·2	17·8	117 51
193 81	2,540	15,810	2,523	.....	.....	1	77 62	1·00	18·1	21·9	116 19
206 72	4,122	8,225	1,880	.....	.....	3	90 99	0·79	21·0	19·0	115 73
204 81	3,562	15,945	2,187	.....	.....	1	93 30	0·82	21·7	18·3	111 51
174 41	2,304	12,450	2,457	.....	.....	1	66 86	1·08	17·0	23·0	107 55
181 10	2,744	11,780	1,935	.....	.....	2½	74 87	0·91	19·0	21·0	106 23
185 08	3,126	9,850	2,275	.....	.....	3	78 91	0·81	20·1	19·9	106 17
181 77	2,832	14,025	1,830	360	.....	1	78 20	0·83	20·2	19·8	103 57
185 64	3,108	15,350	2,403	.....	.....	1	85 39	0·98	21·3	18·8	100 25
169 27	2,597	11,110	2,202	450	.....	1	69 67	0·94	18·8	21·2	99 60
183 28	2,852	13,060	2,031	.....	.....	5	84 27	0·91	21·5	18·5	99 01
178 96	3,122	14,515	2,371	726	.....	1	85 96	1·04	22·2	17·8	93 00
174 43	3,026	13,640	2,971	.....	.....	1	81 51	0·93	21·9	18·1	92 92
167 80	2,684	13,840	2,217	.....	.....	1	75 34	0·91	20·7	19·3	92 46
161 00	2,569	12,515	1,899	.....	.....	1	70 22	0·85	20·5	19·5	90 78
172 88	3,280	13,115	2,031	.....	.....	1	82 79	0·88	22·8	17·2	90 09
160 62	2,677	10,545	2,383	.....	.....	2	71 15	0·93	20·5	19·5	89 47
151 64	2,160	11,910	2,021	.....	.....	1	62 93	1·02	18·8	21·2	88 71
152 10	2,692	11,085	2,461	.....	.....	3	64 49	0·81	20·0	20·0	87 61
159 99	2,496	14,160	2,403	.....	.....	1	73 17	0·99	21·1	18·9	86 82
158 32	2,536	12,815	1,979	450	.....	1	71 81	0·98	20·9	19·1	86 51
171 38	2,792	16,275	3,589	.....	.....	2	85 93	1·01	23·4	16·6	85 45
178 44	3,420	17,210	2,403	.....	.....	1	93 53	1·03	24·6	15·4	84 91
143 55	2,048	10,980	2,103	.....	.....	1	59 47	1·11	18·5	21·5	84 08
143 11	2,206	12,970	2,091	.....	.....	1	65 80	0·94	21·4	18·6	77 31
141 42	2,380	9,725	2,037	.....	.....	3	65 54	1·00	21·4	18·6	75 88
152 44	2,506	16,030	2,583	.....	.....	1	76 70	1·06	23·3	16·7	75 74
149 71	2,589	11,595	2,597	.....	.....	3	74 07	1·03	23·0	17·0	75 64
121 06	1,726	10,620	1,700	.....	.....	2	55 01	1·13	20·5	19·5	66 05
147 51	2,320	18,240	4,440	.....	.....	1	82 26	1·41	25·1	14·9	65 25
203 89	3,764	23,425	3,675	.....	1,204	2	139 65	1·34	32·1	7·9	64 24
151 95	3,819	11,710	2,769	.....	.....	1	90 53	1·14	28·1	11·9	61 42
119 90	1,873	10,545	1,953	.....	.....	3	59 44	1·09	22·8	17·2	60 46
122 72	2,306	11,780	1,845	.....	.....	1	64 16	0·95	24·9	15·1	58 56
120 28	2,263	12,550	2,217	.....	.....	1	65 98	1·04	25·9	14·1	54 30
117 10	1,988	11,555	2,647	.....	.....	3	64 59	1·29	25·2	14·8	52 51
112 42	1,921	11,555	2,647	.....	.....	2	61 51	1·31	24·9	15·1	50 91
95 20	1,520	9,130	1,541	.....	.....	1	46 53	0·94	23·0	17·0	48 67
114 26	2,065	14,275	2,037	.....	.....	1	65 72	1·11	27·1	12·9	48 54
97 14	1,574	10,366	2,383	.....	.....	1	51 33	1·24	24·1	15·9	45 81
98 76	1,712	12,480	2,037	.....	.....	1	57 01	1·57	25·8	14·2	41 75
116 26	2,738	13,970	2,007	.....	.....	1	76 30	1·32	30·6	9·4	39 96
109 34	2,388	14,380	2,217	.....	.....	1	71 73	1·31	30·8	9·2	37 61
93 54	1,704	9,725	2,281	.....	.....	3	56 47	1·42	27·5	12·5	37 07
97 52	2,054	9,880	2,281	.....	.....	3	62 95	1·16	30·7	9·3	34 57
89 00	1,790	10,980	1,770	.....	.....	1	54 82	1·34	28·4	11·6	34 18
83 99	1,760	7,905	1,977	.....	.....	3	53 03	1·42	28·9	11·1	30 96
95 81	2,260	12,790	2,397	.....	.....	1	66 57	1·49	32·0	8·0	29 24
87 07	1,831	10,780	2,399	.....	.....	3	60 05	1·62	31·4	8·6	27 02
57 08	1,036	9,780	1,525	.....	.....	3	44 07	1·62	35·8	4·2	13 01
98 28	1,832	11,085	2,461	.....	.....	1	86 04	1·80	40·7	0·7	12 24
71 12	1,854	10,780	2,461	.....	.....	3	60 60	1·61	33·6	6·4	10 52
46 83	924	7,630	1,435	.....	.....	4	40 34	2 04	39·2	0·8	6 49
14,608 20	236,282	1,005,779	183,587	2,706	1,688	138½	6,367 94	78·67	1,727·5	1,355·7	8,240·26
189·72	3,068·6	13,062·06	2,384·2	35·14	21·92	1·8	82·70	1·02	22·4	17·6	107 02

AVERAGE PRODUCTION OF FIVE BEST COWS AND OF

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Name and Breed of Cow	Age at beginning of lactation period.	Date of dropping calf	Number of 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 40c. per pound	Value of skim milk at 30c. per cwt.
				lbs.	lbs.	p.c.	lbs.	$ cts	$ cts.
Lady Segis Jewel.....H.	7	Dec. 9, 1923	408	27,097·5	66·42	3·34	1,065·68	426 27	78 58
Sarah Ann Pontiac.....H.	6	Dec. 3, 1923	329	21,805·5	66·28	3·55	910·76	364 30	63 09
Midnight Jewel DeKol.....H.	7	Feb. 21, 1924	372	19,878·5	53·44	3·87	904·80	361 92	57 33
Grace Fayne Aggie.....H.	8	Jan. 15, 1924	316	16,837·5	53·28	3·82	756·26	302 50	48 58
Helena Keyes Posch.....H.	11	Mar. 23, 1924	282	19,834·0	70·33	3·26	760·18	304 07	57 56
Average of best cows (5).....	7·8	.....	341·4	21,091·0	61·95	3·57	879·54	351 81	61 03
Average of herd (35 cows).....	4·23	.....	344·77	11,738·7	34·05	3·57	493·24	197 30	33 96

AYR

Starlight of Fredericton.....	7	Mar. 5, 1924	388	19,641·0	50·62	4·45	1,028·83	411 53	56 30
Auchinbay Mina 5th.....	6	Nov. 5, 1923	320	13,464·5	42·08	3·83	606·65	242 66	38 85
Allancroft Betsy 2nd.....	5	Nov. 11, 1922	396	12,137·5	30·65	3·95	564·04	225 62	34 97
Old Hall Maggie 9th.....	11	Feb. 13, 1924	306	10,657·0	34·83	3·84	481·89	192 76	30 74
Castlehill Strawberry.....	9	Mar. 20, 1924	299	10,187·0	34·07	3·68	440·82	176 33	29 44
Average of best cows (5).....	7·6	.....	341·8	13,217·0	38·45	3·95	624·45	249 78	38 06
Average of herd (32 cows).....	5·84	.....	298·21	7,037·1	23·6	4·00	331·02	132 41	20 26

JER

Brampton Vinnie's Beth.....	6	Feb. 7, 1924	314	7,186·0	22·89	5·51	466·13	186 45	20 37
Ottawa Burma Lady 2nd	4	Oct. 27, 1923	377	7,782·5	20·64	4·68	428·89	171 56	22 25
Brampton Triumph 2nd.....	5	Feb. 22, 1924	284	6,183·5	21·77	5·39	392·16	156 86	17 55
Ottawa Beauty Maid 2nd.....	3	Jan. 22, 1924	282	6,150·5	21·81	4·63	335·09	134 04	17 60
Milly of Wishtonwish.....	6	Feb. 18, 1924	282	5,339·5	18·93	5·11	320·88	128 35	15 20
Average of best cows (5).....	4·8	.....	307·8	6,528·4	21·21	5·06	388·63	155 45	18 59
Average of herd (7 cows).....	4·43	.....	297·28	5,714·7	19·22	4·99	335·34	134 14	16 29

THE TOTAL HERD IN EACH BREED

STEINS

Total value of product	Amount of meal eaten at $32 per ton	Amount of roots at $4.10 per ton and silage at $3.10 per ton	Amount of hay eaten at $6.70 per ton	Amount of green feed eaten at $6.75 per ton	Amount of beet pulp eaten at $40.00 per ton	Months on pasture at $2 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.	lbs.	lbs.	lbs.	lbs.	lbs.		$ cts.	$ cts.	cts.	cts.	$ cts.
504 85	6,736·0	14,060·0	2,848·0	.....	.....	3	145 91	0·54	13·7	26·3	358 94
427 39	5,038·0	11,190·0	2,192·0	.....	.....	3	113 68	0·52	12·5	27·5	313 71
419 25	6,294·0	13,948·0	2,904·0	.....	.....	1	134 62	0·68	14·9	25·1	284 63
351 08	4,874·0	12,900·0	2,397·0	.....	.....	1	108 00	0·64	14·2	25·8	243 08
361 63	6,294·0	10,005·0	2,440·0	.....	.....	3	130 38	0·66	17·2	22·9	231 25
412·84	5,847·2	12,420·6	2,556·2	.....	.....	2·2	126 52	0·61	14·5	25·5	286 32
231 26	3,688·4	13,599·9	2,493·6	10·3	33·4	1·82	95 16	0·89	21·3	18·7	136 10

SHIRES

467·83	6,094·0	11,720·0	2,912·0	.....	.....	3	131·83	0·67	12·8	27·2	336·00
260 59	3,741·0	18,730·0	2,439·0	720·0	484·0	1	104 77	0·86	18·6	21·4	155 82
281 51	3,978·0	23,530·0	2,847·0	.....	.....	5	123 68	0·92	20·4	19·6	157 83
223 50	4,304·0	10,050·0	2,396·0	.....	.....	3	98 47	0·92	20·4	19·6	125 03
205 77	3,731·0	12,010·0	2,317·0	.....	.....	1	88 22	0·87	20·0	20·0	117 55
287 84	4,370·0	15,208·0	2,582·2	144·0	96·8	2·6	109 39	0·85	18·4	21·6	178 45
152 67	2,570·25	12,552·2	2,278·37	73·31	15·13	1·95	73 32	1·14	24·2	15·8	79 35

SEYS

206 82	2,625·0	12,955·0	2,457·0	.....	.....	1	73 11	1·02	15·7	24·3	133 71
193 81	2,540·0	15,810·0	2,523·0	.....	.....	1	77 62	1·00	18·1	21·9	116 19
174 41	2,304·0	12,450·0	2,457·0	.....	.....	1	68 86	1·08	17·0	23·0	107 55
151 64	2,160·0	11,910·0	2,021·0	.....	.....	1	62 93	1·02	18·8	21·2	88 71
143 55	2,048·0	10,980·0	2,103·0	.....	.....	1	59 47	1·11	18·5	21·5	84 08
174 04	2,335·4	12,821·0	2,312·2	.....	.....	1	68 40	1·05	17·6	22·4	106 04
150 43	2,262·0	12,070·0	2,225·0	.....	.....	1·29	64 29	1·17	20·4	19·6	86 14

OFFICIAL RECORDS

As usual, all normal milking cows and heifers that had not previously been tested or that looked like bettering previous records were entered in the Canadian Record of Performance for pure-bred dairy cattle conducted by the Live Stock Branch of the Department of Agriculture. Also, many of the Holstein cows and heifers have been entered in the Record of Merit test conducted by the Holstein Friesian Association.

The following tables give the lists of cows qualifying under each of these tests during the year, those marked " Bang " being from the Bang herd:—

HOLSTEIN RECORD OF MERIT TESTS ON CENTRAL EXPERIMENTAL FARM, APRIL 1, 1924, TO MARCH 31, 1925

Name and number of cow	Age at commencement of test			Number of days on test	Pounds milk	Pounds fat	Pounds 80 per cent butter
	years	months	days				
Korndyke Posch Canary—77745...	5	9	12	30	2,011·5	74·09	92·62
				7	490·0	18·97	23·72
Lady Segis Jewel (Bang)—51243....	8	5	24	7	716·3	22·23	27·79
Ottawa March Posch—60982.....	5	5	22	14	939·0	37·52	46·90
				7	493·6	18·78	23·48
Sarah Ann Pontiac (Bang)—58345..	7	1	27	7	661·9	21·88	27·35
				30	2,795·9	89·49	111·87

CANADIAN RECORD OF PERFORMANCE TESTS ON CENTRAL EXPERIMENTAL FARM, APRIL 1, 1924, TO MARCH 31, 1925

Name and Number of Cow	Breed	Age at Commencement of Test	Number of days Milking	Pounds milk	Pounds fat	Average per cent fat
Grace Fayne Aaggie—48612.....	Holstein....	8	305	16,785	629	3·75
Helena Keyes Posch (Bang)—21376...	"	11	282	19,834	624	3·15
Johanna Helena Keyes (Bang)—76334.	"	3	305	17,596	617	3·51
Johanna Pietertje Ormsby—90067.....	"	2	365	9,640	342	3·55
Korndyke Canary Butter-Maid—49648	"	7	236	13,992	508	3·63
Korndyke Posch Canary—77745.....	"	3	333	13,548	501	3·70
Lady Segis Jewel (Bang)—51243.....	"	7	365	26,290	833	3·17
Leila Posch Mechthilde—39673.....	"	8	361	16,538	624	3·77
Lyons Segis Bessie Ann—64286.....	"	4	333	12,863	412	3·20
Midnight Jewel Dekol (Bang)—46558.	"	7	365	20,785	788	3·79
Ottawa Faforit Fayne—82597—.....	"	2	305	9,548	314	3·29
Ottawa Francy Bos Dekol—75342....	"	3	301	12,332	515	4·18
Sarah Ann Pontiac (Bang)—58345.....	"	6	305	21,430	729	3·40
Zorra Hengerveld.....—77746.	"	3	365	12,118	447	3·69
Auchinbay Mina 5th—70080.....	Ayrshire...	6	305	13,117	479	3·65
Castlehill Strawberry—83931.....	" ...	9	299	10,187	384	3·77
Morningside Bessie (Bang)69567.....	" ...	3	305	12,225	506	4·14
Oldhall Maggie 9th (Bang)—70088....	...	11	305	10,657	413	3·88
Ottawa Tilly—66552.....	" ...	3	296	7,305	294	4·02
Starlight of Fredericton (Bang)—53712	" ...	7	365	19,071	855	4·48
Brampton Bangle—19737.....	Jersey.....	4	365	9,701	471	4·86
Brampton Erica's Pride—22428.....	"	2	365	9,324	496	5·31
Brampton Shortage—19178.....	"	2	305	9,013	528	5·86

CO-OPERATIVE MILK RECORDS

The demand for milk and feed record forms, which are distributed free of charge upon application to this division, has been on a par with that of previous years, showing that the practice of recording the milk-production of individual cows is being well kept up. It is possible, however, that many farmers are not aware of the fact that these milk-record forms can be had free upon application. The following is a list of the forms available:—

Month-long daily milk-record forms suitable for herds numbering up to twenty-two cows.
(Blue-prints of case for holding these forms may also be had on application.)
Week-long daily milk-record forms suitable for herds numbering up to sixteen cows.
Week-long daily record forms suitable for herds numbering up to twenty-four cows.
Monthly-summary forms.
Yearly-summary forms.
Feed-record forms.

As stated in previous reports, the object of this free distribution is not in any way to overlap the work of cow-testing associations now conducted by the Live Stock Branch of the Department of Agriculture, but rather to encourage individual farmers, in outlying districts that have not cow-testing associations, to start a good work.

HORSES

There are at present thirty-four horses at the Central Experimental Farm, fifteen geldings and mares, two general-purpose horses, two drivers and fifteen registered Clydesdales.

The work performed for the various divisions at the Central Experimental Farm has amounted to 7,815 days.

The cost of maintenance of twenty-three draught horses has been as follows:

Total feed	$ 2,299 00
Labour (stable attendance)	1,150 00
Interest on $5,200 at 6 p.c.	312 00
Shelter (estimated at $25 per horse)	575 00
Harness and repairs	433 14
Shoeing	448 82
Total yearly cost	$ 5,217 96
Cost per horse	226 86

The average yearly feed requirements per horse (grain and roughage) has been as follows:—

Hay	6,950·0 lbs.
Oats	4,816·5 "
Bran	500·0 "

HORSE-BREEDING

A small but excellent group of pure-bred Clydesdale mares is now on hand, which number it is hoped to supplement during the coming year. As commented on in previous reports, work in horse-breeding has been hampered through not having a high-class Clydesdale stallion. This want has been most admirably filled through the generosity of Sir James Calder, Bart., who previously had expressed a desire to present to the Dominion Government a high-class Clydesdale stallion to be maintained at the Central Experimental Farm. After a considerable survey of available sires, purchase was made from Mr. A. M. Montgomery, Netherhall, Castle Douglas, Kirkcudbright, Scotland, of the three-year-old stallion, Sandy Mac (imp.), formerly St. Louis (20816). This horse arrived in Canada in August, 1924.

Sandy Mac is sired by Carry On (19655), by Signet (16816) and his dam, Anita (47888) was by Baron's Stamp (17100) by the famous Baron's Pride (9122).

For a young horse, he demonstrated rather exceptional breeding powers in Scotland, besides gaining a high stand in the show ring. Since coming to Canada, although not brought out in high show fit, he won second in his class and later reserve Grand Champion at the Royal Agricultural Winter Fair, Toronto, 1924, and first and reserve at the Ottawa Winter Fair. Several mares are in foal to the service of this good young horse.

SANDY MAC (imp.) 24318 (20816)

A high-class imported stallion now at the head of the Clydesdale stud at the Central Experimental Farm. Presented to the Dominion Department of Agriculture by Sir James Calder, Bart.

FOAL-REARING

Referring to previous reports, there will be noted under this heading difficulties experienced in foal-rearing, due to joint-ill and the methods of prevention employed. All in-foal mares during the winter of 1923-24 were given small quantities of potassium iodide, beginning with the month of October. As formerly, the method employed was to administer on the first and fifteenth of each month one-eighth of an ounce (a level teaspoonful) of the crystals in drinking water. No vaccines were used. Of the three foals dropped, none showed joint-ill infection. All three were strong and rugged. Unfortunately lack of numbers and value of mares has prevented the trial of this preventive method with greater numbers and comparisons with mares left untreated. Nevertheless, results from branch Farms are practically similar to those obtained at Ottawa, and while not definitely proven as effective, the use of this simple, inexpensive and harmless treatment may be recommended to horsemen.

FEEDING CRUSHED OATS

Within the last two months, a medium-size oat-crusher or roller has been installed and henceforward all oats fed to horses will be crushed or rolled in an effort to reduce losses due to insufficient mastication of grain by certain individual horses, old horses, and young stock. Experimental work in this connection will be carried on during the coming year.

SHEEP

As in former years, flocks of Leicester and Shropshire sheep are maintained on the Central Experimental Farm. The close of the fiscal year, March 31, 1925, shows the flocks to be made up as follows:—

Leicester		Shropshire	
Breeding ewes	75	Breeding ewes	77
Yearling ewes	24	Yearling ewes	12
Rams	7	Rams	7

LEICESTERS

This flock has been somewhat reduced in numbers again this year, owing to a recurrence of the trouble which affected the flock in previous years. This has been diagnosed by the officers of the Health of Animals Branch to be an acute febrile disease in which respiratory symptoms predominate. It has been found to be a bacteriological disease, the causative agent being a hitherto undescribed micro-organism which has been named *Hemophilus ovis*. The principal symptoms of the disease are fever and great prostration, cyanosis of the skin and mucous membranes, difficult respiration, blood-stained catarrhal discharge from the nostrils, and expulsion of blood and mucous material from the anus. No treatment has as yet been recommended but work is being carried on with regard to finding a preventive to control the disease.

Apart from these losses, the Leicester flock has done very well throughout the year. The progeny of the rams imported in 1923 are showing considerable promise, many high-class ram lambs sired by them having been sold and a large number of ewes added to the flock. It is noticeable that there is not as great a demand for breeding stock of this breed as there is for the Shropshire, due to the demand for an early-finishing lamb that will meet present market regulations and such as is produced by the Shropshire or Shropshire cross or grade. The Leicester still enjoys an enviable reputation, however, for crossing on grade flocks which have deteriorated in size, the resulting lambs being good thrifty doers that finish up early without attaining to large size. Consequently, a draft of the best ewes in the flock will still be used to produce pure-bred Leicester rams for this purpose.

SHROPSHIRES

The flock of Shropshires is showing considerable improvement. Two lamb crops have been obtained from the Buttar rams imported in 1923. These are very typey lots, some excellent ewes having been added to the flock and many excellent rams shipped to branch farms and sold to surrounding breeders. The demand for both males and females of this breed for breeding purposes was quite heavy, showing that the public is rapidly becoming educated to the market requirements in both quality of wool and size of lamb or mutton carcass.

It is interesting to note that while a number of Leicester ewes have been lost each fall during the last three seasons from the disease previously described, the Shropshire flock has been remarkably free from attacks, only one ewe being lost from a cause in any way similar, and it is doubtful even in this case if the causes of death were identical.

GRADING AND CROSSING

In the fall of 1924, as in former years, both flocks of sheep have been severely graded. The very best ewes of each flock have been drawn out and bred to the best ram available of the same breed. The remainder of each flock, that is, the poorer pure-breds, was bred to a ram of the opposite breed, all of the lambs obtained from these crosses being sold for the market.

EXPERIMENTAL WORK

When the ewes were housed in the fall, each of these four lots was again subdivided into two lots. One sub-lot was housed outside in the steer-feeding sheds and one lot was housed inside in the regular winter sheep quarters. In addition to this, one lot housed outside was again subdivided, one-half being fed silage and one lot receiving no silage. It should be mentioned at this point that the ewes came in in the fall in extremely high condition, as result of the very luxuriant pasture, and the lambs having been weaned early.

Unfortunately, these experiments did not give very satisfactory results, for the reason that the whole flock was affected in some way, so that a large percentage of lambs were goitred, and many more were soft and weak, some being born without the natural wool covering. Whether this was due to the exceedingly high condition of the ewes early in the season, or to some seasonal variation, or to the fact that the range hay fed the ewes was not of a desirable quality, or to the fact that the ewes were all housed rather closely, is hard to state, but certainly some one of these conditions operated very much to the detriment of the lamb crop from all lots of sheep. The sheep could not be kept in the lots at first planned for them owing to changes made in an endeavour to save as many lambs as possible. Similarly the lambs had to be changed around from one pen to another and be brought in from outside housing conditions owing to not having the vitality usually to be found in new-born lambs. For this reason, it has been considered advisable not to present the data on the experiment as it could hardly be considered sufficiently reliable under the circumstances.

SWINE

The herd of swine numbered 264 head on March 31, 1925. Of this number 100 were Berkshires and included the herd boar, Blythwood Model Baron —64718—, fifteen brood sows, fifty feeders and thirty-four young pigs. Blythwood Model Baron has developed into a boar of outstanding quality, strength, and smoothness and possesses exceptional length, and combined with these good qualities he is an excellent breeder.

The Yorkshire herd totalled 157 head and included the two imported boars, Dalmeny A. R. —88840— and Culcairn Monarch 8—88845—, nineteen brood sows, seventeen gilts, twenty-four feeders and ninety-five young pigs. The relative breeding records of the two boars will be discussed further in this report.

In addition to these pure-bred hogs, the herd included seven pigs from a Tamworth-Berkshire cross and these pigs will be utilized for experimental feeding in comparison with Yorkshire and Berkshire crosses and pure-bred pigs of the latter two named breeds. Cross-bred females will also be selected for breeding work.

The sales of breeding stock during the year included sixty-eight Yorkshires and thirteen Berkshires, or a total of eighty-one head in all.

The sales of pork totalled 40,268 pounds, this figure not quite equalling the sales during the last fiscal year.

The experimental feeding tests conducted throughout the year included upwards of 175 pigs. These tests covered various periods from 30 to 165 days, depending on the nature of the test, and also on the age and ultimate development of the pigs.

Breed comparisons of Yorkshires and Berkshires were featured in two of the tests and also in farrowing and weaning records of these two breeds. A strain test was also conducted in which a litter of pigs from each of the two imported Yorkshire boars was compared on the basis of total gains and economy of gains.

These various tests are, herewith, discussed in detail.

MILK SUBSTITUTE EXPERIMENTS

ALLENBURY'S MILK FEED VS. SKIM-MILK FOR WEANED PIGS

Object of Experiment.—Comparison of Allenbury's feed vs. skim-milk as supplements to the meal rations of weaned pigs.

PLAN OF EXPERIMENT

Lot	Breed	Number of pigs	Meal Rations	Other Feeds
1	Yorkshire	5	*1 to 20 days (inclusive)*— Ground oats—1 part Middlings—1 part Linseed oil Meal, 3 p.c. *21 to 30 days (inclusive)*— Ground oats, 2 parts Middlings, 1 part Shorts, 1 part Barley, 1 part Linseed Oil Meal, 3 p.c.	Skim-milk. Skim-milk
2	Yorkshire	5	Same as Lot 1	Allenbury's Feed.

Prices Charged for Feeds

Oats, per bush	$ 0 52
Middlings, per ton	36 00
Barley, per ton	40 00
Shorts, per ton	25 00
Linseed Oil Meal, per ton	42 40
*Allenburys milk feed, per ton	35 00

*The price charged for this feed is an optional one, placed on same for purposes of comparison. No charge was made for this feed by the manufacturers.

The Allenbury feeds used in this test were described by the manufacturers as out-dated milk feeds, which although out-dated for human consumption, still contained all their usefulness when used as feed for calves and young pigs.

For purposes of comparison with skim-milk, two lots of five pigs of a single litter were selected, these being nearly as uniform as was possible to get them. One lot, however, was slightly better than the other and these were fed the Allenbury feed.

These pigs were farrowed on March 29, 1924, and the test was commenced when the pigs were fifty-eight days of age or approximately eight weeks old.

The Allenbury feed was prepared by dissolving it in water a few hours before feeding, at the rate of one pound of the feed to five pounds of water. This was then mixed with the meal ration to make a thin slop for feeding.

SKIM-MILK VS. ALLENBURY FEED

		Lot I Skim-milk	Lot II Allenbury
Number of pigs in lot	No.	5	5
Number of days on test	days.	30	30
Initial weight, gross	lbs.	97	118
Initial weight, average	lbs.	19·4	23·6
Finished weight, gross	lbs.	192	157
Finished weight, average	lbs.	38·4	31·4
Total gain for period	lbs.	95	39
Average daily gain per lot	lbs.	3·16	1·3
Average daily gain per hog	lbs.	0·632	·26
Amount of meal eaten per group	lbs.	109	72
Amount of skim milk eaten	lbs.	785	.....
Amount of Allen bury's food eaten	lbs.	.....	80
Amount of meal per pound of gain	lbs.	1·14	1·85
Amount of milk per pound of gain	lbs.	8·26	.....
Amount of Allenbury's per pound of gain	lbs.	.....	2·05
Total cost of feed	$	3·38	2·60
Cost of feed per head	$	0·68	0.52
Cost of feed per head per day	cts.	2·25	1·75
Cost of feed per pound of gain	cts.	3·55	6·66

Summary of Test.—The pigs on the meal ration supplemented with Allenbury's feed developed slowly, were pale and bloodless in appearance and lacked in thrift and vigour. They did not possess much appetite for their ration and towards the end of the test consumed very little of their feed and showed little relish for that which they did consume. As a result, the pigs on this feed showed an average daily gain per pig of only 0.26 of a pound or approximately a quarter of a pound per day, while the lot on a similar meal mixture and skim-milk averaged 0.63 of a pound gain per pig per day, which is considerably more than double the gains made by the lot on Allenbury's feed.

Because of the lack of thrift of the pigs on this feed, even although the total cost of feed was relatively low as compared to the skim-milk ration, when compared on the basis of cost of feed per pound of gain produced it showed a cost greatly in excess of the meal and skim-milk ration.

Deductions.—It may be assumed from this that Allenbury's out-dated milk feeds are not suitable for use as a milk substitute in the ration of weaned pigs, since it appears to lack the required food constituents supplied by skim-milk and which are obviously required by pigs of this age in order to encourage substantial gains in weight.

Extensive experimental work at this Farm with various commercial milk substitutes and protein supplements has demonstrated that it is exceedingly difficult to obtain a commercial product for use in the ration of newly weaned pigs to replace milk by-products when such are not available, and which at the same time can be justified from the standpoint of economy.

COMPARISON OF PRO-LAC MEAL VS. SKIM-MILK FOR NURSING SOWS, WEANED PIGS AND FEEDERS

In order to determine the value of Pro-lac meal as a milk substitute for the brood sow during the nursing period and also for the young pigs, two Yorkshire brood sows due to farrow at approximately the same time were selected. One sow was fed Pro-lac and meal, and the other was fed skim-milk and meal during the nursing period. The pigs were also carried along on these feeds after weaning for a period of 105 days. The meal ration for both sows was similar throughout the nursing period, and included shorts, 2 parts; bran, 2 parts; oats, 1 part; barley, 1 part; screenings, 1 part; oil meal, 3 per cent; and tankage, 3 per cent. The sow which was fed Pro-lac was started on this feed one week before farrow-

ing in order to allow her to become accustomed to it. This feed was prepared by mixing one pound of Pro-lac in eight gallons of water and then adding forty pounds of meal to this mixture. This was mixed from 24 to 36 hours before feeding in order to allow fermentation to set in. Skim-milk and water were added in about equal parts to the meal ration of the other sow in sufficient quantities to make a thick slop. The results at farrowing and until weaning at 60 days are recorded in the following table.

CONDITION OF LITTERS FROM BIRTH TO WEANING

		Pro-lac	Skim-milk
Sow	No.	36B	129
Date	Date	Aug. 30–25	Aug. 31–25
Number of pigs farrowed	No.	15	12
Condition of pigs at birth	"	12 good, 2 small,1 dead	10 good, 2 dead
Total weight of litter	lbs.	35	27
Average weight per pig	"	2·33	2·25
Number of pigs at 30 days	No.	7	10
Average weight at 30 days	lbs.	12·6	12·5
Number of pigs at 60 days	No.	7	10
Average weight at 60 days	lbs.	24·7	25·5
Total weight at 60 days	"	173	255
Average gain in 60 days	"	22·37	23·25
Condition of litters at 60 days		1 cull, 6 good	All good

COST OF FEEDING SOW AND PIGS FOR 60 DAYS

Pounds of meal consumed	lbs.	480	485
Pounds of Pro-lac consumed	"	12	.....
Pounds of skim-milk consumed	"	.....	520
Total cost of feed	$	7·34	7·73
Average cost per pig	$	1·05	·773

The fact that only two sows entered into this comparison makes it impractical to draw any definite conclusions from this part of the test, but it is worthy of note that the skim-milk-fed sow gave a greater supply of milk and that the pigs on this sow made the largest gains.

The feeding of Pro-lac and skim-milk to the young pigs was continued after the weaning of both litters. The cull pig was removed from the former lot as was also one good sow pig from the skim-milk lot. This left six good pigs in the Pro-lac lot and nine good pigs in the skim-milk lot.

PLAN OF EXPERIMENT

Lot	Duration of Test	Number of Hogs	Meal Ration Fed	Other Feeds
I	105 days...	6	Ground oats, 2 parts; ground barley, 1 part; shorts, 1 part; middlings, 1 part; tankage, 5%; oil meal, 5%....	Pro-lac.
II	105 days...	9	Same as Lot I.....	Skim-milk.

Housing.—The hogs were housed in pens about twelve feet square and did not have access to yards or runs at any time during the test.

VALUATION OF FEEDS

Mixed meal ration	$33 50 per ton
Pro-lac meal	6 00 per cwt
Skim-milk	0 20 "

COMPOSITION OF PRO-LAC

	Average of three samples	Guaranteed Analysis
	Per cent	Per cent
Moisture	11·65	.....
Protein	26·97	27·40
Fat	6·30	4·75
Carbohydrates	45·62	.....
Fibre	3·80	3·00
Ash	5·66	.....

Method of Feeding.—In this part of the test the Pro-lac was also mixed in water at the rate of one pound to eight gallons to which was added approximately 24 pounds of the basic meal ration. This feed was then allowed to ferment, the mixture being prepared from 24 to 36 hours before feeding in order to permit fermentation of the feed. This particular method of preparation is advocated by the manufacturers of this feed as it facilitates the digestion of the feed and renders the ingredients more readily assimilable.

RESULT OF FEEDING PRO-LAC FROM WEANING TO 105 DAYS

—		Pro-lac	Skim-milk
Number of pigs	No.	6	9
Initial weight, gross	lbs.	150	229
Initial weight, average	"	25	25·5
Final weight, gross	"	606	1,140
Final weight, average	"	101	126·6
Number of days on test	Days	105	105
Total gain per lot	lbs.	456	911
Average gain per hog	"	76	101·2
Average daily gain	"	·724	·964
Total meal consumed	"	1,205	2,045
Total Pro-lac consumed	"	51	.....
Total skim-milk consumed	"	.....	3,850
Pounds meal eaten per pound gain	"	2·64	2·24
Pounds milk eaten per pound gain	"	.....	4·22
Pounds Pro-lac eaten per pound gain	"	·112	.....
Total cost of feed	$	23·30	42·05
Cost of feed per head	$	3·88	4·67
Cost of feed per head per day	cts.	3·69	4·44
Cost of feed per pound of gain	"	5·11	4·60

Summary.—A study of the table will show that the pigs from the respective litters were of almost identical weight, there being only half a pound per pig in favour of the skim-milk-fed pigs when they were placed on this part of the test at 60 days of age. The skim-milk lot, however, made considerably larger gains from this time onwards and for the period of 105 days made an average daily gain per pig of .964 of a pound while the pigs of the Pro-lac lot averaged .724 of a pound, or almost a quarter of a pound less per day. Presented in another way, the average gain per pig in the Pro-lac lot was 76 pounds in 105 days, while the skim-milk lot made a gain of 101.2 pounds per pig in the same period.

The skim-milk-fed pigs consumed their feed with greater relish than the Pro-lac pigs and as a result consumed more feed, but because of the larger gains which were made, the skim-milk-fed pigs showed a feed cost of 4.60 cents per pound of gain, while the Pro-lac hogs made their gains at a cost of 5.11 cents per pound of gain in live weight.

Theoretically 102 pounds of Pro-lac and 365 pounds of meal were equal to 3,850 pounds of milk and at the prices charged for the other feed, Pro-lac would have a relative feeding value of $31 per ton.

At the end of the 105 days the Pro-lac was replaced by skim-milk and both lots were fed for a further period of 30 days, the object of this part of the test being to determine the relative feeding characteristics of the two lots when supplied similar feeds and fed in an identical manner.

The results obtained were as follows:—

		Lot I	Lot II
		Pro-lac Lot	Skim-milk Lot
Number of hogs	No.	6	9
Initial weight, gross	lbs.	606	1,140
Initial weight, average	"	101	126·6
Final weight, gross	"	933	1,495
Final weight, average	"	155·5	166·5
Number of days on test	dys.	30	30
Total gain for period	lbs.	327	355
Average gain per hog	"	54·5	39·5
Average daily gain per hog	"	1·81	1·32
Total meal consumed	"	770·0	1,060
Total skim-milk consumed	"	1,130	1,400
Pounds meal eaten per pound gain	"	2·35	2·98
Pounds milk eaten per pound gain	"	3·46	3·94
Total cost of feed	$	15·20	20·60
Cost of feed per hog	$	2·53	2·29
Cost of feed per hog per day	cts.	8·44	7·63
Cost of feed per pound of gain	"	4·65	5·80

Summary.—The No. 1 lot which originally had been raised on Pro-lac and meal to 165 days of age made a gain of 327 pounds in the subsequent thirty days when fed meal and skim-milk, an average daily gain per hog of 1·81 pounds, which is unusually high. The meal consumption during this period was 2·35 pounds and the skim-milk consumption 3·46 pounds, while the feed cost was 4·65 cents per pound of gain.

This in it self is indicative of the relative economy of feeding a ration supplemented with skim-milk as compared to one supplemented with Pro-lac. During this last period of thirty days the No. 2 lot, which had been fed meal and skim-milk for the full period gained 355 pounds, an average daily gain per pig of 1·32 pounds, and made these gains with a feed consumption of 2·98 pounds of meal and 3·94 pounds of milk, and a feed cost of 5·80 cents per pound of gain, which although slightly greater than required by the other lot is at the same time an economical food-consumption and cost.

Deductions.—1. The feeding of Pro-lac in the quantities used in this test failed to give as good gains as a ration supplemented with skim-milk.

2. The Pro-lac-fed pigs failed to consume their feed with as great relish as the skim-milk-fed pigs, this being particularly true towards the end of the feeding period.

3. The substitution of Pro-lac by skim-milk resulted in the daily gains being more than doubled during a period of thirty days.

PRO-LAC VS SKIM-MILK FOR FEEDERS

In order to further test the feeding value of Pro-lac meal three lots of hogs were selected, two of these being fed Pro-lac and meal while the other lot was given skim-milk and meal. One of the Pro-lac-fed lots was composed of cull pigs and these were placed on Pro-lac in order to test the value of this feed for unthrifty and inferior pigs.

OUTLINE OF EXPERIMENT

Lot	Breed	Condition of pigs	Days on test	Meal Ration	Other Feeds
1	Yorkshire.....	Good	90	*1st 30 days* Ground oats, 2 parts, ground barley, 1 part, shorts, 1 part; middlings, 1 part; tankage, 5 per cent; oil meal, 3 per cent.	Pro-lac.
				31 to 60 days Ground oats, 2 parts; ground barley, 2 parts; shorts, 1 part; middlings, 1 part; tankage, 5 per cent; oil meal, 3 per cent.	Pro-lac.
				61 to 90 days Ground barley, 3 parts; ground oats, 2 parts; shorts, 1 part; tankage, 5 per cent; oil meal, 3 per cent.	Pro-lac.
11	Yorkshire.....	Good	90	Same as Lot 1.....	Skim-milk.
111	Yorkshire.....	Culls	90	Same as Lot 1.....	Pro-lac.

The Pro-lac was mixed in water at the rate of one pound to eight gallons of water and to this solution was added approximately 29 pounds of meal. This feed was then allowed to stand in a feed-barrel from 24 to 36 hours before feeding in order to permit fermentation to set in.

Housing.—Lots 1 and 2 were housed in enclosed sheds with small runs attached, while the cull lot was housed in the main piggery and did not have access to a run or yard of any kind.

VALUATION OF FEEDS

Meal Ration—		
First 30 days	$33 50	per ton
Second 30 days	34 83	"
Third 30 days	35 37	"
Pro-lac*	6 00	Cwt.
Skim-milk	0 20	"

*An analysis of the Pro-lac feed appears in connection with another experiment in this section of the report and the reader is referred to this if an analysis is desired.

PRO-LAC VS. SKIM-MILK

		I Pro-lac	II Skim-milk	III Pro-lac
Number of pigs per lot	No.	9	9	7
Initial weight, gross	lbs.	381	374	254
Initial weight, average	"	42·3	41·5	36·3
Final weight, gross	"	987	1,135	697
Final weight, average	"	109·6	126·1	99·6
Total gain per lot	"	596	761	443
Number of days on test	days.	90	90	90
Average gain per hog	lbs.	66·22	84·55	63·6
Average daily gain per hog	"	.735	.938	·703
Amount of meal consumed	"	2,080	2,110	1,290
Amount of Pro-lac consumed	"	74	.....	46
Amount of milk consumed	"	.....	4,490	.....
Pounds of meal eaten per pound gain	"	3·49	2·77	2·91
Pounds of milk eaten per pound gain	"	.....	5·90	.....
Pounds of Pro-lac eaten per pound gain	"	0·124	.....	·104
Pounds meal eaten per hog	"	231·1	234·4	184·3
Pounds meal eaten per hog per day	"	2·56	2·60	2·40
Pounds milk eaten per hog per day	"	.....	5·54	.....
Pounds Pro-lac eaten per hog per day	"	·091	.....	.....
Cost of meal consumed	$	36·19	36·66	22·38
Total cost of feed	$	40·59	45·64	25·14
Cost of feed per head	$	4·51	5·07	3·59
Cost of feed per head per day	cts.	5·00	5·63	3·99
Cost of feed per pound of gain	"	6·81	5·99	5·68

Deductions.—The first two lots to be considered are Lots 1 and 2 which contain the good pigs. Both these lots included nine pigs and these were of almost identical condition and weight. At the end of 90 days, however, the Pro-lac-fed pigs averaged 16.5 pounds less than the skim-milk fed pigs or presented in another way, the Pro-lac fed hogs showed an average daily gain per hog of ·735 of a pound while the skim-milk fed hogs averaged ·938 of a pound, or approximately 20 per cent more.

The skim-milk lot consumed slightly more meal than the Pro-lac lot, but because of the larger gains made, when these two lots are compared on the basis of pounds of feed eaten per pound of gain, it was found that 3·49 pounds of meal and ·124 of a pound of Pro-lac were required to equal 2·77 pounds of meal and 5·90 pounds of skim-milk, while in the final analysis of cost of feed per pound of gain, the skim-milk lot averaged 5·99 cents, this being ·82 of a cent less than the average for the Pro-lac lot.

The cull pigs on the Pro-lac feed did relatively better than the good pigs on this feed and although their gains were slightly lower than those made by the other Pro-lac lot they showed a lower food consumption than either of the other lots and as a result they showed a lower cost of feed per pound of gain. This lower cost, however, is offset by the low gains which were made. For runty and inferior pigs Pro-lac would appear to possess some value since this lot of pigs improved under this feed and developed fairly well, although the gains were very low. These hogs stayed on their feet quite well and showed no sign of crippling even although rather closely confined during the test.

With meal at the prices quoted and skim-milk at 20 cents per hundred pounds, the Pro-lac meal fed to Lot 1 theoretically showed a minus value, while for Lot 3 it showed a value of $181.01 per ton. With skim-milk worth 30 cents, the Pro-lac meal fed to Lot 1 theoretically had a value of $84.40 per ton. It will be realized from this that the actual pecuniary value of this feed for feeding purposes when used in the quantities specified is subject to some fluctuations. This is frequently found to be the case when relatively small quantities of a feed are used in a ration.

A review of the work conducted last year shows that a lot of hogs on Pro-lac showed an average daily gain per hog of 1·4 pounds during a period of 30 days, and incidentally gave larger gains than a meal and milk ration. In this particular test Pro-lac theoretically had a value of $162.20 per ton with the mixed meal valued at $32.50 per ton and skim-milk at 20 cents per hundred. In a previous test under a similar basis of computation Pro-lac was found to have a value of $84.80 per ton.

FEEDING VALUE OF POTASSIUM IODIDE, COD-LIVER OIL AND YEAST IN THE RATION OF MARKET HOGS

Objects of Experiment.—1. To determine the economy of feeding potassium iodide, cod-liver oil, or Fleischmann's Yeast in the meal and milk ration of market hogs.

2. To determine whether it is beneficial or otherwise to add these supplements to the ration of market hogs.

Outline of Experiment

Lots	Number of hogs	Number of days fed	Meal ration fed	Other feeds
I and II.....	10	90	*First 30 days—* Ground oats, 2 parts..... Ground barley, 1 part..... Shorts, 1 part..... Middlings, 1 part..... Tankage, 5 p.c..... Oil meal, 3 p.c.....	Skim-milk.
			31 to 60 days— Ground oats, 2 parts..... Ground barley, 2 parts..... Shorts, 1 part..... Middlings, 1 part..... Tankage, 5 p.c..... Oil Meal, 3 p.c.....	Skim-milk.
			61 to 90 days— Ground oats, 3 parts..... Ground barley, 3 parts..... Shorts, 1 part..... Tankage, 5 p.c..... Oil Meal, 3 p.c.....	Skim-milk.
III.....	5	90	Same as Lot I.....	Skim-milk, Fleischman's Yeast.
IV.....	5	90	Same as Lot I.....	Skim-milk, Cod-Liver Oil.
V.....	5	90	Same as Lot I.....	Skim-milk, Potassium Iodide.

The Fleischmann's Pure Dry Yeast was fed at the rate of one ounce to twelve pounds of meal or eight and a third ounces to one hundred pounds of meal. It was prepared for feeding by first dissolving in water diluting, and then mixing with the meal and milk ration about twenty-four to thirty-six hours before feeding. The value claimed for yeast lies in its ability to predigest the grain by yeast fermentation so that on being consumed the feed may be assimilated more easily and quickly.

The cod-liver oil is of value principally because of its vitamin content. The exact function of the vitamins is not definitely known, but it has been demonstrated that they are of value in the digestion and assimilation of the food. This oil was fed at the rate of one tablespoonful per hog per day at the commencement of the test and gradually increased to twice this amount.

The potassium iodide was fed in a solution prepared by mixing one ounce of the drug in a gallon of water. A tablespoonful of this solution contains approximately two grains of the drug. It was mixed in the ration at the beginning of the test, at the rate of one tablespoonful twice daily to the lot of five pigs, and gradually increased until almost double this quantity was supplied. This material is of value because of its iodine content. This element is intimately associated with the functioning of the thyroid gland and when lacking in the ration, the conditions known as goitre, hairlessness of litters, and malformations frequently result.

Valuation of Feeds

Meal ration—		
(a) First 30 days.....	per ton.....	$ 33 50
(b) Second 30 days.....	per ton.....	34 83
(c) Third 30 days.....	per ton.....	35 38
Fleischmann's Pure Dry Yeast.....	per 2½ lb. tin.....	2 40
Cod-Liver Oil.....	per gal.....	1 80
Potassium Iodide.....	per pound.....	5 75

VALUE OF FEEDING YEAST, COD-LIVER OIL AND POTASSIUM IODIDE

—		Lots I and II	Lot III	Lot IV	Lot V
			Yeast	Cod Liver Oil	Iodide
Number of hogs	No.	10	5	5	5
Initial weight, gross	lbs.	510	218	217	274
Initial weight, average	lbs.	51	43·6	43·4	54·8
Final weight, gross	lbs.	1,551	717	763	780
Final weight, average	lbs.	155·1	143·4	152·6	156
Total gain per lot	lbs.	1,041	499	546	506
Number of days on test	days	90	90	90	90
Average gain per hog	lbs.	104·1	99·8	109·2	101·2
Average daily gain per hog	lbs.	1·16	1·108	1·21	1·12
Total meal consumed	lbs.	2,700	1,130	1,340	1,340
Total milk consumed	lbs.	5,970	2,800	2,985	2,985
Lbs. meal eaten per lb. gain	lbs.	2·59	2·26	2·45	2·65
Lbs. milk eaten per lb. gain	lbs.	5·74	5·63	5·46	5·89
Total Fleischmann's Yeast eaten	lbs.	.....	6	.....	.....
Total Cod-Liver Oil eaten	gal.	.....	.....	2·25	.....
Total Potassium Iodide eaten	ozs.	.....	.....	.....	4
Total cost of meal eaten	$	46·86	19·60	23·28	23·28
Total cost of feed	$	59·06	30·96	33·28	30·69
Cost of feed per head	$	5·90	6·19	6·65	6·14
Cost of feed per head per day	cts.	6·56	6·88	7·39	6·82
Cost of feed per pound gain	cts.	5·67	6·00	6·09	6·06

Summary.—The feeding of Fleischmann's Pure Dry Yeast at the rate of one ounce to twelve pounds of meal apparently reduced the food consumption by .33 of a pound of meal and .11 of a pound of milk per pound of gain, but because of the relatively high cost of this constituent in the ration the total cost of the ration was materially increased, and when compared in the final analysis of cost of feed per pound of gain the yeast-fed lot showed a cost of six cents per pound or a third of a cent higher cost per pound of gain than the average for the two control lots fed only meal and milk.

With other feeds at the prices quoted, the yeast in this ration had a theoretical value of approximately 45 cents per pound, which was less than half the price paid for this constituent.

The lot of hogs fed cod-liver oil made the largest gains of any lot in the test, these being 5.1 pounds more per hog in the period of 90 days than the gains made by the control lots. This lot made these gains with a meal consumption of 2.45 pounds and a milk consumption of 5.46 pounds per pound of gain, the cod-liver oil, therefore, apparently reducing the meal consumption by .14 of a pound and the milk consumption by .28 of a pound per pound of gain or presented in another way, the addition of cod-liver oil in the amounts fed in this test increased the gains and encouraged somewhat greater growth than the control rations, which in turn gave this ration a relatively higher value.

Because of the increased cost of the ration, however, when this oil was supplied, the cost of production was increased to 6.09 cents or 0.42 of a cent in excess of the cost shown by the control ration when compared in the final analysis of cost of feed per pound of gain.

The cod-liver oil had a theoretical value of $1.20 per gallon, with other feeds valued at the prices quoted in the outline. This value is exactly one-third less than the price which was paid for this oil.

The lot which was fed the potassium iodide gained, in the period of 90 days, an average of three pounds less per hog than the control lots, while it showed a meal consumption of 2.56 pounds and a milk consumption of 5.89

pounds per pound of gain, this being .06 of a pound more meal and .15 of a pound more milk than the control lots. In the analysis of cost of feed per pound of gain the lot receiving potassium iodide showed a cost of .39 of a cent more per pound of gain than the average for the control lots.

Theoretically the potassium iodide did not possess any value when added to a meal and milk ration, it, as a matter of fact showing a minus value in this ration.

The value of this material for market hogs is certainly more difficult to measure than when it is employed in the rations of brood sows during the gestation period for the control of hairlessness or goitre in the litters, since its value would be less likely to become apparent in a comparatively brief feeding period, than during the period of reproduction when there is a relatively heavy demand on the mineral reserve available in the body of the sow and which in certain localities and under adverse conditions is liable to become depleted.

Deductions.—1. While Fleischmann's yeast for feeding purposes undoubtedly has a value in the rations of market hogs, this test indicates that it is not worth more than half the price at which it is available on the market at the present time, and although it is capable of reducing the meal and milk required to make a certain gain in live weight, the price of 96 cents per pound is in excess of its value.

2. Cod-liver oil is capable of increasing the digestibility of a meal and milk ration, but it is not so valuable in this respect as to overcome the increased cost of the ration when fed to market hogs for a period of 90 days. In this test it possessed a theoretical value of two-thirds of its market price with other feeds at current prices.

3. Potassium iodide failed to demonstrate that it possessed any particular value in the ration of market hogs.

FEEDING OAT SCALPINGS TO MARKET HOGS

Objects of Experiment.—1. To determine the feeding value of oat scalpings as a constituent in the ration of market hogs.

2. To determine the quantity of oat scalpings that can be fed most profitably to hogs.

3. To determine the palatibility of oat scalpings.

Plan of Experiment

Lot	Breed	Number of Hogs	Days on Test	Meal Ration	Rate of Feeding Oat Scalpings	Other Feeds
*I	Berkshires.....	5	90	Oats, 1 part..... Barley, 1 part..... Shorts, 1 part..... Middlings, 1 part..... Oil Meal, 3%..... Tankage, 5%.....	....	Skim-milk
II	Berkshires.....	6	90	Same as Lot I.....	⅛	Skim-milk.
III	Berkshires.....	6	90	Same as Lot I.....	¼	Skim-milk
IV	Berkshires.....	6	90	Same as Lot I.....	⅜	Skim-milk.
V	Berkshires.....	6	90	Same as Lot I.....	½	Skim-milk.

*One hog in Lot I died at the end of 30 days. The ration, however was in no way to blame for this loss.

Weights.—The pigs were weighed individually at the commencement of the test and at the end of each period of 30 days. Feeds were weighed up separately for each individual lot at the time of mixing the different rations. Any portion of the ration which was not consumed by the respective lots was credited to that particular lot at the end of the test.

Housing.—The various lots of hogs were housed in separate pens without access to yards or runs and until the last few days of the test all hogs stood up well under these conditions without any sign of crippling.

Valuation of Feeds

Mixed meal	per ton	$ 39 90
Oat scalpings	per ton	20 00
Skim-milk	per cwt	0 20

Composition of Oat Scalpings

An analysis of the oat scalpings was made by the Chemistry Division, C.E.F., Ottawa, and showed the composition of this feed to be as follows:—

Moisture	6·35%
Protein	13·70%
Fat	5·96%
Carbohydrates	53·46%
Fibre	15·43%
Ash	5·10%
	100·00%

FEEDING OAT SCALPINGS TO MARKET HOGS

—		Lot I	Lot II	Lot III	Lot IV	Lot V
		Mixed meal	Mixed meal, 7 parts; Scalpings, 1 part	Mixed meal, 3 parts; Scalpings, 1 part	Mixed meal, 5 parts Scalpings, 1 part	Mixed meal, 1 part; Scalpings, 1 part
Number of hogs	No.	5	6	6	6	6
Initial weight, gross	lbs.	248	263	291	291	304
Initial weight, average	"	49·6	43·9	48·5	48·5	50·6
Final weight, gross	"	789	779	790	795	798
Final weight, average	"	157·8	129·8	131·6	132·5	133
Total gain per lot	"	541	516	499	504	494
Number of days on test	dys.	90	90	90	90	90
Average gain per hog	lbs.	108·2	86	83·2	84	82·3
Average daily gain per hog	"	1·20	·955	·924	·933	·914
Total meal consumed	"	1,116	1,230	1,230	1,200	1,315
Percentage of oat scalpings fed	%	.....	12·5	25	37·5	50
Total skim-milk consumed	lbs.	2,690	2,940	2,940	2,940	2,940
Pounds meal eaten per pound gain	"	2·06	2·38	2·46	2·38	2·66
Pounds milk eaten per pound gain	"	4·97	5·69	5·87	5·83	5·95
Total cost of feed	$	27·64	28·89	27·35	25·34	25·58
Cost of feed per head	$	5·53	4·81	4·56	4·22	4·26
Cost of feed per head per day	cts.	6·14	5·35	5·06	4·69	4·73
Cost of feed per pound gain	"	5·11	5·57	5·48	5·03	5·18

Deductions.—As will be observed from the table the four lots of hogs getting oat scalpings in various amounts from 12.5 per cent of the meal ration to 50 per cent, failed to make as large gains as Lot I which was supplied only the basic ration. Of the four lots on oat scalpings the greatest gains were made by the hogs getting the 12.5 per cent followed in turn by the 37.5 per cent ration, the 25 per cent ration and the 50 per cent ration of oat scalpings. These lots which were fed oat scalpings, however, showed little difference in the gains made, there being only 3.7 pounds per hog on the average for the 90 days between the 12.5 per cent ration and the 50 per cent ration, while the hogs on the 37.5 per cent ration showed an average of 2 pounds lower and on the 25 per cent ration 2.8 pounds lower gains per hog than the average for the hogs

on the 12.5 per cent ration. On the other hand the difference between the control lot which did not receive oat scalpings and the four lots which were fed scalpings, was considerable, this lot averaging more than a quarter of a pound greater daily gains per hog than any of the lots on oat scalpings.

The next consideration is the quantity of feed required to produce a pound of gain. Here again the different lots have the same relative standing as in the gains made, the control lot consuming a third of a pound less meal and almost three quarters of a pound less milk to produce a pound of gain than the 12.5 per cent lot which ranks second. The 37.5 per cent ration stands third with a similar meal consumption but with .14 of a pound more milk. Lot III which received the 25 per cent ration averaged .4 of a pound more meal and .9 of a pound more milk, while Lot V averaged .6 of a pound more meal and .98 of a pound more milk to produce a pound of gain than the control lot.

The addition of oat scalpings, therefore, resulted in slower gains, a greater meal and milk consumption per pound of gain, and with the exception of the lot on the 37.5 per cent ration, also increased the cost of production. This exception can be explained in part by the fact that the pigs on this ration were rather more thrifty than the pigs of Lots III and V, and as a result made relatively better gains than either of these lots.

In the 50 per cent oat scalpings ration, theoretically 719 pounds of oat scalpings, 720 pounds of mixed meal and 3,219 pounds of skim-milk were equal to the 1,116 pounds of mixed meal and 2,690 pounds of skim-milk consumed by the control lot or at the prices charged for the mixed meal and skim-milk, oat scalpings had a relative feeding value of $19.00 per ton. In the 37.5 per cent ration, 483 pounds of oat scalpings, 805 pounds of mixed meal, and 3,154 pounds of skim-milk theoretically proved equal to 1,116 pounds of mixed meal and 2,690 pounds of skim-milk and the oat scalpings in this ration had a feeding value of $21.90 per ton.

In the 25 per cent ration, 334 pounds of scalpings, 1,076 pounds of mixed meal and 3,189 pounds of skim-milk proved equal to 1,116 pounds of mixed meal and 2,690 pounds of skim-milk, and in this ration oat scalpings had a valuation of $7.92 per ton. In the 12.5 per cent ration 161 pounds of oat scalpings, 1,128 pounds of mixed meal, and 3,081 pounds of skim-milk were equivalent to 1,116 pounds of mixed meal and 2,690 pounds of skim-milk and in this ration the oat scalpings have a value of $12.68 per ton.

These results give oat scalpings a theoretical value of approximately $20.00 per ton in the 37.5 and the 50 per cent rations, while in the 25 per cent ration they showed a relative value of less than $8 per ton. In the 12.5 per cent ration they had a value of $12.68 per ton, which is about $7.30 less than was paid for this feed. From these figures it will be seen that with the mixed meal ration costing in the proximity of $40 per ton, oat scalpings are not worth more than $20 per ton as a supplement to the meal ration of hogs.

FEEDING OAT SCALPINGS TO YORKSHIRE HOGS

A further test of oat scalpings was conducted with two lots of Yorkshire hogs. Lot I in this test was fed a similar ration to that given Lot I in the former test and Lot II in this test was given a ration similar to Lot III in the first test, that is, a meal ration composed of 25 per cent of oat scalpings and 75 per cent mixed meal supplemented with skim-milk.

The results obtained from this test were as follows:—

VALUE OF OAT SCALPINGS FOR MARKET HOGS

Composition of meal ration		Lot I	Lot II
		Mixed meal	Mixed meal, 3 parts; Oat scalpings, 1 part
Number of hogs	No.	6	6
Initial weight, gross	lbs.	386	540
Initial weight, average	"	64·3	90
Final weight, gross	"	961	1,080
Final weight, average	"	160·1	180
Number of days on test	dys.	60	60
Total gain per lot	lbs.	375	540
Average gain per hog	"	95·8	90
Average daily gain per hog	"	1·59	1·5
Total meal eaten per lot	"	1,210	1,430
Total milk eaten per lot	"	2,405	2,540
Amount of meal eaten per pound gain	"	2·10	2·64
Amount of milk eaten per pound gain	"	4·18	4·69
Total cost of feed	$	28·95	30·05
Cost of feed per head	$	4·83	5·01
Cost of feed per head per day	cts.	8·04	8·35
Cost of feed per pound gain	"	5·03	5·56

Summary.—These hogs were more mature when placed in this test, and this in part, at least, will explain the larger gains which were made, these being 1.59 pounds per hog per day for the check or control lot and 1.5 pounds for Lot II, which received the meal ration composed of 25 per cent of oat scalpings and 75 per cent of mixed meal.

The food consumption of both lots was relatively low, the No. I lot consuming 2.1 pounds of meal and 4.18 pounds of skim-milk per pound of gain in live weight, while the No. II lot consumed approximately 25 per cent more meal and 12 per cent more skim-milk, while the former showed a cost of 5.03 cents and the latter lot a cost of 5.56 cents per pound of gain or approximately 10 per cent more. The replacement of one quarter of the mixed meal ration with oat scalpings, although reducing the cost of this ration about $5 per ton was unsuccessful in reducing the cost of production, as an increased food consumption was required to produce a given weight.

In this particular test the oat scalpings had a feeding value of only $4 per ton. This value is undoubtedly low and they are actually worth considerably more than this. It would seem, however, from this series of tests with oat scalpings, that this feed would find its chief use when used to give bulk to an otherwise heavy ration and is particularly useful for hogs that show a tendency to fatten before sufficient growth and scale has been attained, this condition being more common with hogs that are closely confined and insufficiently exercised, while at the same time they are fed rather too liberally.

INFLUENCE OF FEEDS AND METHODS OF FEEDING ON TYPE

Objects of Experiment.—1. To determine the influence of self-feeding, heavy hand-feeding and light hand-feeding on bacon type.

2. To determine the respective value of the above named methods of feeding when supplemented with pasture.

3. To determine the relative efficiency with which hogs will utilize O. P. V. pasture in conjunction with self-feeding and hand-feeding methods.

PLAN OF EXPERIMENT

Lot	Breed	Number of hogs	Number of days on test	How fed	Meal rations fed	Other feeds
I	Yorkshire..	6	95	Self-fed.....	*1 to 30 days* Ground oats, 2 parts; ground barley, 1 part; shorts, 1 part; middlings, 1 part; tankage, 5 per cent; oil meal, 3 per cent.	Skim-milk.
					31 to 60 days Ground oats, 2 parts; ground barley, 2 parts; shorts, 1 part; middlings, 1 part; tankage, 5 per cent; oil meal, 3 per cent.	Skim-milk.
					61 days to end of test Ground barley, 3 parts; ground oats, 2 parts; shorts, 1 part; tankage, 5 per cent; oil meal 3 per cent.	Skim-milk.
II	Yorkshire..	6	95	Light-hand feeding..	Same as Lot I.....	Skim-milk.
III	Yorkshire..	6	95	Heavy-hand feeding	Same as Lot I.....	Skim-milk.
IV	Yorkshire..	8	79	Self-feeding.....	Same as Lot I.....	Skim-milk and pasture.
V	Yorkshire..	8	79	Light-hand feeding..	Same as Lot I.....	Skim-milk and pasture.
VI	Yorkshire..	8	79	Heavy-hand feeding	Same as Lot I.....	Skim-milk and pasture.

Weights.—All feeds consumed were accurately weighed. The hogs were weighed individually when placed on test, at the end of each 30 day period and at the end of the test.

Housing.—Lots I, II and III were housed inside and had access to small runs. Lots IV, V and VI were fed on pasture and housed in small cabins approximately 6 by 8 feet in size, one of these cabins being available for each lot of eight hogs.

PRICES CHARGED FOR FEEDS

Ground oats	$30 59	per ton
Ground barley	40 00	"
Shorts	24 25	"
Middlings	36 00	"
Tankage	50 00	"
Oil Meal	42 40	"

NOTE—No charge was made for pasture.

The results of this test are presented in the following table, the method of feeding and also that of housing being indicated for the respective lot.

The heavily hand-fed lots were to be fed three times daily and the lightly hand-fed lots twice daily. This procedure was carried out in the case of the hogs fed inside, but the hogs (Lot VI) on pasture were incapable of handling three feeds per day and recourse was made to feeding only twice a day.

Method of feeding		Inside with small run			O. P. V. Pasture		
		Lot I	Lot II	Lot III	Lot IV	Lot V	Lot VI
		Self-fed	Light hand feeding	Heavy hand feeding	Self-fed	Light hand feeding	Heavy hand feeding
Number of hogs per lot	No.	6	6	6	8	8	8
Initial weight, gross	lbs.	267	318	389	288	356	306
Initial weight, average	"	44·5	53	64·8	36	44·5	38·2
Final weight, gross	"	1,068	1,036	1,170	1,010	920	961
Final weight, average	"	178	172·6	195	126·2	115	120·2
Total gain per lot	"	801	718	781	722	564	655
Number of days on test	dys.	95	95	95	79	79	79
Average gain per hog	lbs.	133·5	119·66	130·1	90·3	70·5	81·87
Average daily gain per hog	"	1·40	1·26	1·37	1·14	·89	1·03
Amount of meal consumed	"	2,165	1,630	1,945	2,110	1,400	1,505
Amount of skim-milk consumed	"	4,265	3,260	4,265	3,630	3,455	3,595
Pounds meal eaten per pound gain	"	2·70	2·27	2·49	2·92	2·48	2·29
Pounds milk eaten per pound gain	"	5·32	4·54	5·46	5·03	6·13	5·49
Total cost of meal	$	37·80	28·43	33·88	36·44	24·24	26·04
Total cost of feed (pasture negltd.)	$	46·33	34·95	42·41	43·70	31·15	33·23
Cost of feed per head	$	7·72	5·82	7·07	5·46	3·89	4·15
Cost of feed per head per day	cts.	8·13	6·12	7·44	6·91	4·94	5·26
Feed cost to produce 1 pound gain	"	5·78	4·87	5·43	6·05	5·52	5·07

This test presented some interesting and instructive features relative to influence of feeds and feeding methods on bacon type.

Of the three lots which were fed inside the self-fed lot made the greatest gains with the largest meal consumption and at the highest cost, followed in turn by the heavily hand-fed lot and the lightly hand-fed lot. The outstanding feature of this part of the test was the low meal and milk consumption and the low feed cost shown by the lightly hand-fed lot, the feed cost of this lot being .91 of a cent less than the self-fed lot and .56 of a cent less than the heavily hand-fed lot per pound of gain produced.

In this particular test 1 pound of meal and 1 pound of skim-milk fed under the light hand-feeding method were equivalent to 1.19 pounds of meal and 1.17 pounds of skim-milk under the self-feeding system, while under the heavy hand-feeding system 1.08 pounds of meal and 1 pound of milk were equal to 1 pound of meal and 1.03 pounds of milk under the self-feeding method.

These three lots of hogs were graded at the end of the test with the following results:—

—	Lot I	Lot II	Lot III
	Self-fed	Light hand-feeding	Heavy hand-feeding
	Per cent	Per cent	Per cent
Select	0	50	0
Shop hogs	16·6	50	16·6
Thick-smooth	83·3	0	83·3

	Lot. I	Lot II	Lot III
REMARKS:—	Most uniform.	Least uniform.	Longer than Lot 1.

It will be observed that the light hand-feeding method is more conducive to the development of bacon type than is either the heavy hand-feeding method or the self-feeding method. While the hogs in this lot lacked uniformity, this

may have been due in part, at least, to the fact that the hogs in this lot were slightly underfed in order to accentuate the difference between heavy and light feeding on the type of hog produced.

Self-fed hogs fail to make the best use of pasture crops.

The self-fed hogs were more uniform than the other two lots, but tended to run too thick for select bacons, being too heavily fleshed and shorter in length of side than is desirable. The heavily hand-fed hogs had less bloom and uniformity but resembled the self-fed hogs in type and finish. One hog in this lot might have graded select with lenient grading, but lacked somewhat in length. The lightly hand-fed hogs were a little underfinished and lacked in

Comparatively liberal feeding by the trough method encourages greater consumption of pasture than in the case of the self-fed pigs.

uniformity but this lot possessed decidedly more bacon type than the other two lots. The fact that only fifty per cent of the hogs in this lot graded select was due in part, at least, to the fact that too skimpy a ration was fed, this practice being deliberately followed in order to accentuate the influence of such feeding on the type of hog produced.

In the case of the pasture-fed hogs, the pasture used consisted of oats, peas, and vetches. As this crop dried up, this part of the test was conducted for 79 days only, and as a result these pigs were not up to weight at the end of the test. The heavily hand-fed pigs also suffered a check, partly the result of sun-burn and partly overfeeding, and as a result these pigs were fed twice a day on diminished rations until they came back to their feed.

This latter part of the test did not prove as successful as inside feeding, although some interesting features were demonstrated.

Decreasing the meal fed means that the pigs make greater use of available pasture..

The self-fed hogs again made the largest gains with the highest meal consumption and the greatest feed cost. While the heavily hand-fed lot made the next highest gains, this lot made their gains at a feed cost of almost a cent less per pound of gain than the self-fed lot and also somewhat more economically than the lightly hand-fed lot. This is the only feature of the pasture-fed lots which is not in agreement with the results obtained from the lots fed inside.

The self-fed hogs made the poorest use of their pasture and consumed less than either of the hand-fed lots, while the lightly hand-fed lot consumed the most pasture. These results are to be expected since lighter meal feeding would encourage the pigs to take more exercise and consume more pasture in order to obtain sufficient feed to satisfy their appetites.

While these pasture-fed pigs were not up to market weights, the ultimate type was becoming more or less pronounced.

The self-fed hogs were very uniform, of fair length, relatively better than the pen-fed hogs, and tending towards the thick-smooth type of hog. These hogs were inclined to lie around near the self-feeder and took little exercise.

The heavily hand-fed lot on pasture was considerably less uniform than the self-fed lot. Four of the pigs were thick and short, due in part to the check

which they received at the commencement of the test. The other four pigs were more like the self-fed pigs in type, but smaller and possessing somewhat more length.

The lightly hand-fed lot was very uneven in size but possessing more length than the two other lots. Here again this method of feeding tended to produce hogs more nearly approaching the select bacon type but gave the impression that they were slightly underfed.

It would also appear from this test that it is more difficult to produce select bacon hogs, particularly white-skinned hogs on pasture than when fed inside.

Deductions.—1. It is very difficult to produce select bacon hogs when carried for the full feeding period on a self-feeder whether used in conjunction with a pasture crop or otherwise.

2. Heavy hand-feeding throughout the full-feeding period is conducive to the production of short thick hogs similar in type to self-fed hogs, but with slightly more length and less uniformity.

3. The light hand-feeding method is capable of giving a larger percentage of selects, but as this method will in all probability result in underfinished hogs, heavier feeding should be practised during the last few weeks of the feeding period.

4. White-skinned hogs are subject to sun-burn and as a result may suffer from this while on pasture with deleterious results.

VALUE OF ALFALFA MEAL FOR MARKET HOGS

Objects of Experiment.—1. To determine the economy of feeding alfalfa meal in the ration of market hogs.

2. To determine the quantity of alfalfa meal that is most profitable to feed in the ration of market hogs.

PLAN OF EXPERIMENT

Lot	Breed	Number of hogs in test	Number of days on test	Meal ration fed	Rate of feeding alfalfa meal	Other Feeds
I	Yorkshire..	6	60	Ground oats, 1 part; ground barley, 1 part; shorts, 1 part; middlings, 1 part; linseed oil meal, 3 per cent; tankage, 5 per cent.		Skim-milk.
II	Yorkshire..	6	60	Same as Lot I.....	11·1	Skim-milk.
III	Yorkshire..	6	60	Same as Lot I.....	14·3	Skim-milk.
IV	Berkshire...	6	60	Same as Lot I.....	14·3	Skim-milk.

This test was conducted in the main piggery. The hogs were weighed individually at the commencement of the test, at the end of thirty days, and at the end of the test. The feed consumed by each lot was carefully weighed when mixed and any of this feed not given to the hogs was credited to the respective lots at the end of the test.

Valuation of Feeds.—The meal mixture cost $39.90 per ton, the alfalfa meal $2.25 per cwt., and the skim-milk 20 cents per cwt.

Composition of meal ration		Lot I (Yorks) Mixed Meal	Lot II (Yorks) Mixed meal, 8 parts Alfalfa meal, 1 part	Lot III (Yorks) Mixed meal, 6 parts Alfalfa meal, 1 part	Lot IV (Berks) Mixed meal, 6 parts Alfalfa meal, 1 part
Number of hogs	No.	6	6	6	6
Initial weight, gross	lbs.	386	346	472	568
Initial weight, average	"	64·3	57·7	77	94·6
Final weight, gross	"	961	883	947	1,033
Final weight, average	"	160·1	147·1	157·8	172·1
Number of days on test	days	60	60	60	60
Total gain per lot	lbs.	575	537	475	465
Average gain per hog	"	95·8	89·5	79·1	77·5
Average daily gain per hog	"	1·59	1·49	1·32	1·29
Total meal eaten per lot	"	1,210	1,130	1,250	1,205
Total skim-milk eaten per lot	"	2,405	2,405	2,540	2,505
Amount of meal per lb. gain	"	2·10	2·10	2·63	2·59
Amount of milk per lb. gain	"	4·18	4·47	5·34	5·38
Total cost of feed	$	28·95	27·67	30·46	29·49
Cost of feed per head	$	4·83	4·61	5·07	4·91
Cost of feed per head per day	cts.	8·04	7·68	8·46	8·19
Cost of feed per pound gain	"	5·03	5·11	6·41	6·35

Summary.—The unsupplemented meal and milk ration gave the most rapid gains followed in turn by the 11.1 per cent ration (one part alfalfa meal to eight parts mixed meal) and the two 14.3 per cent rations (one part alfalfa meal to six parts mixed meal). It is noteworthy that the Yorkshire lot on the 14.3 per cent ration made more rapid gains than the Berkshire lot on a similar ration even though the latter contained older and larger pigs.

On the basis of pounds of feed required to produce a pound of gain, the meal and milk consumption for all lots was very low for pigs of this weight, Lot I showing a consumption of 2.1 pounds of meal and 4.18 pounds of skim-milk per pound of gain in weight, Lot II following closely with a similar meal consumption and .29 of a pound more skim-milk, Lot IV with 2.59 pounds of meal and 5.38 pounds of milk, and Lot III with 2.63 pounds of meal and 5.34 pounds of milk. When compared on the basis of cost of feed per pound of gain, the same relative order was followed with Lot I showing a cost of 5.03 cents, Lot II a cost of 5.11 cents, Lot IV a cost of 6.35 cents and Lot III a cost of 6.41 cents.

These results indicate that the substitution of alfalfa meal for part of the mixed meal ration gave slower gains at an increased feed cost. This difference, however, was slight when the alfalfa was fed at the rate of one of alfalfa to eight of mixed meal, but when the alfalfa was increased to the ratio of 1 to 6 the gains were considerably slower and the feed consumption and costs considerably greater for a given gain in weight.

With the mixed meal valued at $39.90 and skim-milk at 20 cents per hundred pounds, the alfalfa meal in the 11.1 per cent ration had a theoretical value of $34.75 per ton, while in both the 14.3 per cent rations it showed a minus value.

This test is one of a series which has been conducted during the past two years with market hogs, and while some of these former tests have given alfalfa meal a higher cash value than the test just completed, its greatest value as an ingredient in the ration cannot be measured in terms of pounds of gain or cost of gains.

Its greatest usefulness would appear to lie in its value as a conditioner. The rations in which it was fed encouraged the development of frame and muscle

and it was characteristic of the alfalfa-meal-fed pigs that they were longer and leaner than the hogs not supplied alfalfa meal and also that they possessed greater bloom, smoothness of hair and an appearance of thrift not exhibited by the other hogs.

Deductions.—The following deductions may be drawn from these tests:

1. The feeding of alfalfa meal in limited quantities to market hogs is conducive to the development of longer and leaner hogs of more pronounced bacon type.

2. That 10 per cent of alfalfa meal in the meal ration is sufficient to obtain satisfactory results and that when fed in excess of this amount less desirable results are realized, both in gains produced and economy of gains.

3. That alfalfa meal is fundamentally a roughage in character although finely ground, and the relatively small capacity of the stomach of the hog limits the amount of feed of this nature which can be fed profitably to this class of stock.

STRAIN TESTING OF PURE-BRED YORKSHIRE HOGS

Object of Experiment.—To determine the relative feeding characteristics of pigs sired by the imported boar Dalmeny A. R.—88840—and pigs sired by Calcairn Monarch 8—88845—.

Plan of Experiment

Lot	Number of hogs	Number of days fed	Meal ration fed	Other feeds
1	5	90	*First 30 days*—	
			Ground oats, 2 parts	
			Ground barley, 1 part	
			Shorts, 1 part	Skim-milk
			Middlings, 1 part	
			Tankage, 5%	
			Oil Meal, 3%	
			31 to 60 days—	
			Ground oats, 2 parts	
			Ground barley, 2 parts	
			Shorts, 1 part	Skim-milk.
			Middlings, 1 part	
			Tankage, 5%	
			Oil Meal, 3%	
			61 to 90 days—	
			Ground barley, 3 parts	
			Ground oats, 3 parts	
			Shorts, 1 part	Skim-milk
			Tankage, 5%	
			Oil meal, 3%	
11	5	90	Same as Lot I	Same as Lot I

The two lots were fed in the main piggery under identical conditions. The meal ration for the first thirty days cost $33.50 per ton, for the second thirty days, $34.83 per ton and for the last 30 days it cost $35.38 per ton. The skim-milk was valued at 20 cents per hundred pounds. The test was commenced on August 19, 1924, and continued for the subsequent 90 days.

STRAIN TEST

—		Lot I Dalmeny Pigs	Lot II Culcairn Monarch Pigs
Number of pigs	No.	5	5
Initial weight, gross	lbs.	246	264
Initial weight, average	lbs.	49·2	52·8
Final weight, gross	lbs.	757	794
Final weight, average	lbs.	151·4	158·8
Total gain for lot	lbs.	511	530
Number of days on test	days	90	90
Average gain per hog	lbs.	102·2	106
Average daily gain per hog	lbs.	1·14	1·17
Amount of meal eaten per lot	lbs.	1,340	1,360
Amount of milk eaten per lot	lbs.	2,985	2,985
Lbs. meal eaten per lb. gain	lbs.	2·62	2·57
Lbs. milk eaten per lb. gain	lbs.	5·84	5·63
Total cost of meal	$	23·27	23·59
Total cost of feed	$	29·21	29·85
Cost of feed per head	$	5·84	5·97
Cost of feed per head per day	cts.	6·49	6·63
Cost of feed per pound of gain	cts.	5·71	5·63

Summary.--The pigs which were sired by the Culcairn Monarch boar had a slight advantage in size at the commencement and held this slight lead throughout the test. This lot was the most economically fed, but here again the difference was slight. It is worthy of note that these pigs from the Culcairn Monarch boar developed into hogs which were more typical of the type of hogs that are required in the Wiltshire trade, although both lots were good in this respect.

The fact that the lot which produced the most typical bacon hogs also made the most rapid gains and the most economical gains, even although the difference was slight, would indicate that the blood lines or the breeding back of the hogs exercises a pronounced influence throughout the feeding period and which cannot be overlooked. It is indicative of the fact that while feeding certainly exercises a marked influence on the ultimate type, the breeding of the hog is no less capable of influencing the rapidity and economy of gains.

The unsuccessful feeder of hogs for bacon purposes would do well to look into the breeding of his parent stock, and there rectify defects which it is impossible to overcome by feeding, no matter how expertly it may be conducted.

COMPARISON OF YORKSHIRE VS BERKSHIRE FEEDERS

—		Yorkshire	Berkshire
Number of pigs in lot	No.	6	6
Initial weight, gross	lbs.	540	291
Initial weight, average	lbs.	90	48·5
Final weight, gross	lbs.	1,080	790
Final weight, average	lbs.	180	131·6
Total gain for lot	lbs.	540	499
Average gain per pig	lbs.	90	83·2
Number of days on test	days	60	90
Average daily gain per pig	lbs.	1·5	·924
Total meal consumed	lbs.	1,432	1,230
Total milk consumed	lbs.	2,540	2,940
Lbs. meal eaten per lb. gain	lbs.	2·64	2·46
Lbs. milk eaten per lb. gain	lbs.	4·69	5·87
Total cost of feed	$	30 05	27 35
Cost of feed per head	$	5 01	4 56
Cost of feed per head per day	cts.	8·35	5·06
Cost of feed per pound of gain	cts.	5·56	5·48

Summary.—While there was considerable difference in the weights of the two lots when placed on test, a comparison of the two breeds when fed under similar conditions is, nevertheless, of interest. These are two of the lots which were fed oat scalpings and in the rations of these two lots of hogs under discussion, the oat scalpings comprised 25 per cent of the meal ration.

It will also be observed from the table that the Yorkshire lot was fed for 60 days, while the Berkshire lot was fed for 90 days. This would tend to finish the two lots at more nearly the same weight if the Berkshires had made relatively as large gains. The fact that the Yorkshire lot made an average daily gain of 9 pounds, while the Berkshire lot made a gain of 5.54 pounds, which is approximately 3.5 pounds less for the six pigs per day, would indicate that the Yorkshires were capable of utilizing the oat scalpings to better advantage than the Berkshires, at least when comprising 25 per cent of the meal ration.

The Berkshires, however, made more economical gains, requiring 5.87 pounds of skim-milk and 2.46 pounds of meal to produce a pound of gain, while the Yorkshire lot consumed 4.69 pounds of skim-milk and 2.64 pounds of meal per pound of gain. On the basis of cost of feed per pound of gain the Yorkshire lot cost 5.56 cents and the Berkshire lot 5.48 or 0.08 of a cent less than the Yorkshire lot.

The relatively slow gains of the Berkshire lot, even although slightly more economical, would be an objectional feature in a commercial proposition where rapidity of gain is a desirable feature, provided this is not realized at the expense of type in the finished hog.

A further comparison of Yorkshire and Berkshire feeders is available in the test in which alfalfa meal was fed, Lots 111 and IV being fed similar rations. The reader is referred to that table for any further details that may be required other than those discussed here.

In this test the Berkshire hogs averaged 94.8 pounds at the commencement of the test, while the Yorkshires averaged 79.2 pounds or approximately 15.5 pounds less. The Berkshire lot failed to benefit by this, however, as the six hogs in this lot gained 465 pounds in the sixty days as compared with 475 pounds for the Yorkshire lot in the same period.

When compared on the basis of feed consumed per pound of gain, the Berkshires show a meal consumption of 2.59 pounds and a skim-milk consumption of 5.38 pounds at a feed cost of 6.34 cents, while the Yorkshire lot required 2.63 pounds of meal, 5.35 pounds of skim-milk and this cost 6.41 cents per pound of gain produced.

Deductions.—From these two comparisons it may be deduced,

1. That Yorkshire feeders are capable of making more rapid gains than Berkshire feeders.

2. That Berkshire feeders are capable of making slightly more economical gains.

3. That Berkshire feeders are more difficult to feed successfully, particularly if confined in limited quarters as they are more liable to cripple and also go off their feed.

COMPARISON OF YORKSHIRE AND BERKSHIRE FARROWING AND WEANING RECORDS, 1924-25

—	Total number of sows	Total number of pigs in litters	Average number of pigs per litter	Total number of good pigs at birth	Per cent of good pigs	Total number of small and weak pigs at birth	Per cent of small and weak pigs.	Total number of dead pigs at birth	Per cent of dead pigs	Total number of living pigs at eight weeks	Total losses during first eight weeks	Per cent of losses to eight weeks.	Average number of pigs per litter at eight weeks	Per cent of pigs raised to eight weeks.	Number fit for breeding purposes	Per cent fit for breeding purposes	Number fit only for feeding purposes.	Per cent fit only for feeding purposes.
Yorkshire	31	366	11·8	302	82·5	44	12·02	20	5·43	228	138	37·7	7·3	62·3	175	76·7	53	23·2
Berkshire	19	156	8·21	136	87·18	15	9·61	5	3·20	90	66	42·3	4·74	57·7	65	72·2	25	27·7
Records for 1923-24																		
Yorkshire	33	365	11·06	299	81·9	59	16·16	7	1·92	205	160	43·8	6·21	56·16	143	70	62	30
Berkshire	18	138	7·66	116	84·05	12	8·7	10	7·25	104	34	24·6	5·7	75·4	65	62·5	39	37·5

FARROWING AND WEANING RECORDS

DATA FROM THE FARROWING AND WEANING RECORDS OF THE BERKSHIRE HERD

In the Berkshire herd a total of nineteen litters were farrowed, an increase of one litter over the previous year. The average number of pigs per litter was 8·21 as compared to 7·66 pigs per litter in 1923-24. There was an increase of 3·13 per cent in the number of good pigs, an increase of ·91 of a per cent in the small and weak pigs, and a decrease of 4·05 per cent in dead pigs at birth.

There was a very marked falling off in the number of pigs raised to eight weeks, there being only 57·7 per cent raised as compared to 75·4 per cent in 1923-24, a decrease of 17·7 per cent for the last year.

Most of these losses were suffered among the earlier litters which did exceedingly poorly with one or two exceptions in spite of every care and precaution which was observed both at farrowing and weaning time, in the feeding and general management of the brood sows and young pigs.

DATA FROM THE FARROWING AND WEANING RECORDS OF THE YORKSHIRE HERD

During the fiscal year, ending March 31, 1924, the records for the Yorkshire herd show that there were two litters less farrowed than for the previous year, while the total number of pigs farrowed shows an increase of one pig, this giving an average number per litter of 11·8 pigs as compared to an average of 11·06 per litter during the previous twelve months.

There was also a very slight increase in the percentage of good pigs farrowed, a decrease of approximately 4 per cent in the number of small and weak pigs farrowed and an increase of 3·5 per cent in the number of dead pigs.

In the number of pigs raised to eight weeks of age a decided improvement is recorded, there being an increase of more than 6 per cent in the last fiscal year over the previous year.

The percentage of pigs fit for breeding purposes also showed an increase.

On the whole, the Yorkshires made a fairly creditable showing in this year's litters, but not as satisfactory as would be desirable and every effort will be made to continue this improvement in the farrowing and weaning records of this breed as well as improvement in the more mature stock.

THE DAIRY

All milk produced by the herds on the Central Experimental Farm is cared for, distributed, and manufactured by the Farm dairy. While milk is sold to employees and residents of the Farm and to a limited custom outside, the manufacture of butter is the main avenue of disposal. Cheddar cheese is made regularly in limited quantities. Various soft cheeses are manufactured, particular emphasis having been made during the past two years in the standardization of Meilleur cheese.

During the year, 747,830 pounds of milk passed through the dairy, from which the main return was through the manufacture of 22,635 pounds of butter, the balance being sold as milk, used in the manufacture of cheese and for experimental purposes. The gross revenue for the past year has amounted to $14,604.20, as compared with $13,487.16 for 1923-24.

BUTTER.—Butter is manufactured for high class city trade and is distributed in pound prints usually a few hours after wrapping and cooling. In 1924-25, 22,635 pounds were sold. The quality is kept at a high standard and there is an unlimited demand for a necessarily limited supply. Advice is being given continually regarding butter-making problems, through correspondence, to visitors, and occasionally through visits. Quite frequently, the butter-making processes employed are demonstrated to farm butter-makers at excursions or by special arrangement.

CHEDDAR CHEESE.—Although lack of sufficient milk supply and limited curing facilities prevent any considerable quantity production, Cheddar cheese is manufactured regularly in the ten pound size, which seems to meet with popular demand, both as regards quality and size.

MEILLEUR CHEESE.—This product originated at the Central Experimental Farm, has been manufactured regularly and has become increasingly popular. Efforts have been continued towards its favourable introduction to many connoisseurs and dairy experts. Instruction has been given to two intending manufacturers and it is hoped that this apparently valuable product may be available shortly to the public in a way not possible through the limited quantities made in the Experimental Farm dairy. Many opinions and reports concerning this product have been received, all favourable and some to the effect that it should be classed at the top of the list of cheeses of Canadian origin.

Further information concerning this product is being sought through the following channels:

1. The effect of varying percentages of butter-fat on quality.
2. Possibilities of curing under ordinary farm-cellar conditions.
3. Effect of keeping under cold-storage conditions for varying periods after curing. This is mainly directed toward ascertaining the possibility of storing the summer make for winter distribution.

Particulars of manufacture may be obtained through Pamphlet No. 27, New Series.

CREAM CHEESE.—The regular manufacture of this product has been discontinued temporarily, in an effort to popularize another soft cheese with distinct possibilities for profitable home-manufacture. Full particulars concerning the method of manufacture as employed and perfected at the Experimental Farm dairy may be secured in Exhibition Circular No. 62.

BUTTERMILK CHEESE.—For particulars of the special methods adopted at this dairy, see Exhibition Circular No. 63. For this product there is apparently an unlimited demand, and it has a place in the diet of children and patients under special dietetic regulations, provided it originates from high-quality buttermilk and is subject to the relatively low heating during manufacture, and as

specified. It has proven to all intents and purposes as palatable as a good cream cheese, although nothing but a concentrated buttermilk capable of turning a cheap by-product, through a simple process, into a product selling at a price ensuring a relatively high profit. Best of all, it is distinctly a farm dairy product, an oldfashioned, homely cheese improved to a considerable degree.

MILK-TESTING.—Besides the regular routine tests required for the monthly herd-records, with relation to experimental work, and in connection with Record of Merit tests, considerable assistance has been given to local dairymen and farmers in Eastern Ontario and Quebec, particularly in the matter of herd testing with a view to eliminating low-testing cows.

DAIRY BACTERIOLOGY.—The Division of Bacteriology occupies a laboratory in the dairy building and by the co-operation of the two Divisions, considerable work has been carried on in studies of clean milk-production, milking-machine comparisons, etc., as reported by the Dominion Bacteriologist.

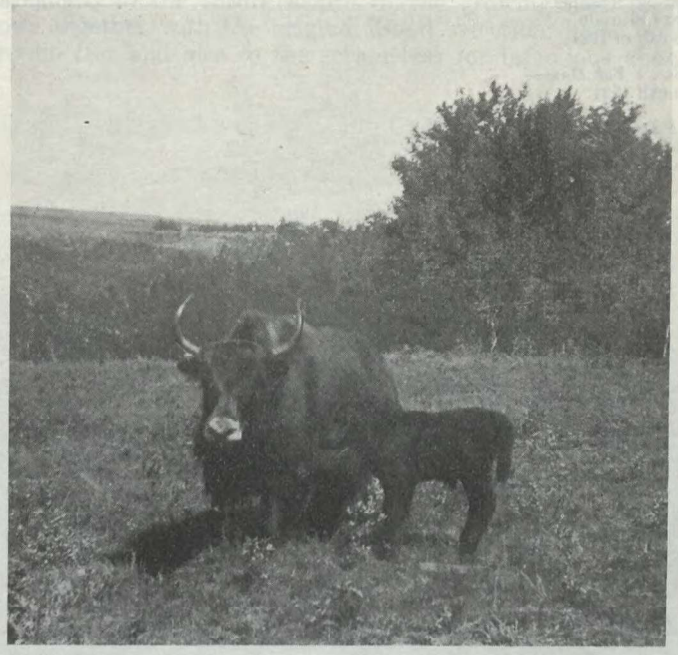
OUTSIDE ASSISTANCE.—Besides assistance rendered by the dairyman in the way of milk-testing and assisting in the first manufacture of cheese, he has acted as judge of dairy products at a number of local fairs and exhibitions.

A foster mother. Domestic cow rearing a pure-blood Bison calf.

A domestic cow with her female hybrid calf sired by a Bison.

ANIMAL HYBRIDIZATION AT BUFFALO PARK, WAINWRIGHT, ALTA.

In the report of the Division of Animal Husbandry for the year ending March 31, 1924, there will be found a brief resume of experimental work and its objects, as carried on in animal hybridization at the Buffalo Park, Wainwright, Alta.



A Yak cow with her hybrid male calf sired by a domestic (Aberdeen-Angus) bull.

It was pointed out in this report that no increase had resulted from the herd of half, three-quarter-bred and cattalo cows purchased from the estate of the late Mossom Boyd of Bobcaygeon, Ont., and that there was in process of building up a herd of hybrids bearing in various combinations the blood of the Bison, the Yak and the Domestic breed of cattle.

The following is a complete inventory of stock on hand as at the end of the 1924 breeding season, and shows the increases and their origin during the past year.

The Original Boyd Herd—
3–Hybrid cows aged (Bison sire x Domestic dam)
4–$\frac{3}{4}$ Bison cows, aged [Bison x (Bison x Domestic) dam]
4–Cattalo cows.
1–$\frac{5}{16}$ Buffalo bull.

Domestic Stock—
16–Cows (pure-bred Aberdeen-Angus, grade Herefords, Shorthorns and Angus).
2–Aberdeen-Angus Bulls.

Bison—
2–Cows.
2–Bulls.
4–Calves.

Yak—
3–Cows.
2–Bulls.

The foregoing represents the pure-blood foundation stock from which the first cross or hybrid stock have been and are being derived. These hybrids, as produced to date, are as follows:—

Yak Sire x Bison Dam—
1–2-year-old female.

Yak Sire x Domestic Dam—
5–2-year-old females.
1–2-year-old male.
1–male calf of 1924.

Domestic Sire x Yak Dam—
1–male calf 1924.

Bison Sire x Domestic Dam—
2–2-year old females.
1–female calf 1924.

A Bison cow with her hybrid yearling female sired by a Yak bull.

The hybrid increase for the year has been:—2 Yak x Domestic male calves (one died at eleven days), 1 Domestic x Yak male and 1 Bison x Domestic female. Particular interest attaches to the hybrid male calves. A further step in advance will be noted in the securing of the cross of the Domestic male and Yak female in reverse of the Yak x Domestic crosses already made.

MATING OF ANIMALS DURING 1924 BREEDING SEASON

The groups segregated for breeding purposes during 1924 were as follows,—
1. Bison male with Domestic Females.
2. Yak male with (1) Domestic, (2) Bison, (3) Bison x Domestic, (4) Yak x Domestic females.
3. Domestic males with Cattalo and Yak females.

The inclusion of hybrid females bred at Wainwright in the breeding programme is of interest, and at this writing, particular mention should be made of the fact that the two Bison x Domestic females in Group 2 are with calf to a Yak male.

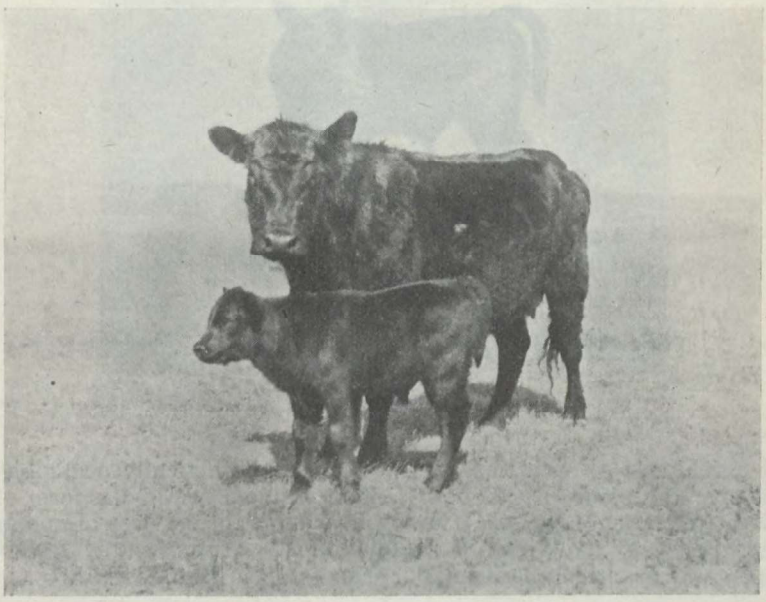
During the year additions have been made to the Domestic and Bison foundation stock. Six Aberdeen-Angus cows and a bull of the same breed were secured from the Experimental Station, Lacombe, Alberta, while four female Bison calves were taken from the main herd. Two of the latter were

secured when only a few days old and reared on Domestic cows, while the other two were brought in off the range when about four months of age.

Decreases may be accounted for by the loss of two Domestic cows, one in calf to a Bison and the other in calf to a Yak bull.

All hybrids have been both ear-tagged and tattoed as a positive means of future identification in conjunction with the system of breeding records maintained.

As a safeguard to the future health of the growing herd of hybrids, all Domestic cows together with the original Boyd selection, have been subjected to the tuberculin test and also to the serum test for infectious abortion.



An Aberdeen-Angus cow with her hybrid male calf sired by a Yak bull.

PLANS FOR THE BREEDING SEASON OF 1925

With the stock now available representing Bison, Yak, Domestic cattle and hybrids, the following outline of breeding operations will be followed during the breeding season of 1925.

Group 1—
Yak male with 7 Domestic females as formerly used in this cross.
Yak male with 2 Bison females.

Group 2—
Bison male with 5 Domestic females.

Group 3—
Domestic male with 3 Yak females.
Domestic male with 4 Yak x Domestic females.
Domestic male with 2 Bison x Domestic females.

Group 4—
Yak x Domestic male with 1 Yak x Domestic female.
Yak x Domestic male with 1 Yak x Bison female.
Yak x Domestic male with 3 Domestic females.

These matings offer interesting possibilities in the way of securing males containing varying percentages of Bison blood, the fertility and prepotency of

which males will later be tried out on Domestic females. It will be remembered that one of the main practical objectives of this work is to secure information dealing with a method or methods of cross-breeding calculated to produce a male of Bison, Domestic and Yak extraction,—the maximum of the first mentioned, the minimum of the last,—that may be bred to range cattle.

A male hybrid calf of 1924 (Yak sire x domestic dam).

The actual cost of operations in this project is practically negligible: range and feed are both plentiful; the few shelters required are in the form of cheap sheds; the direct care of the stock involved requires the services of one man and his horse; necessary additions to foundation stock are secured from surplus requirements at branch Experimental Farms and the Buffalo Park.

Yearling female hybrids. (Yak sire x domestic dam). Bred at Wainwright, Alberta.

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