DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

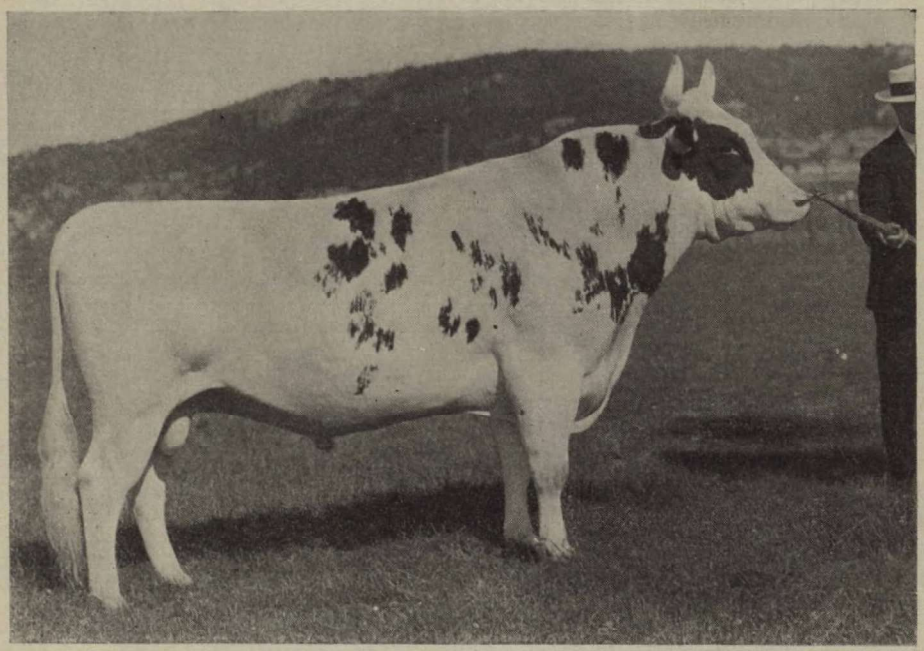
DOMINION EXPERIMENTAL FARMS

ANIMAL HUSBANDRY DIVISION

REPORT OF THE DOMINION ANIMAL HUSBANDMAN

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

FOR THE YEAR ENDING MARCH 31, 1930



Ayrshire bull "Ottawa Supreme 10th—91809." Bred and developed at the C.E.F., Ottawa. No. 21 Class AA in Advanced Registry, No. 389 in the Record of Performance. A well bred and proven sire.

Published by the direction of the Hon. ROBERT WEIR, Minister of Agriculture, Ottawa, 1931

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BEEF CATTLE

STEER FEEDING, 1929-30

Work with beef cattle during the past year has been entirely with feeding cattle. The market being thought to be as low a level for feeders as it was likely to reach, two carloads comprising 69 head of cattle were purchased in the latter part of March, 1929, on the Winnipeg market. These were dehorned yearling steers in extremely thin condition, weighing only 737 pounds each on the average, but showing good breeding and with good frames. They were tuberculin tested, and two reacted and were disposed of in the yards. On arrival at Ottawa they showed evidence of having suffered considerably both in the yards at Winnipeg while undergoing test, and en route to Ottawa. One animal died shortly after arrival from pneumonia contracted en route. These steers were housed in the yard at the building in the new portion of the Farm from March 22 to April 23, and were fed all the good grass hay they would eat. They soon recovered their condition and when run to range on April 23, they had improved very much.

By turning them out on the range early, they were made to procure their living for the first week or two from the old grass of the previous year, of which there was a plentiful covering. Then as the new grass came up through the old, the change was made very gradually with the result that the cattle had no setback whatever, but went right ahead both growing and laying on flesh. The pasture season was a pretty dry one, but as the area was ample the steers had ample feed at all times, and made exceedingly good gains. One steer was lost in midsummer as the result of being hit with a stray bullet.

It was intended that these steers should have been marketed off the grass in the fall. When the time came, however, to sell the cattle the market was so low, owing to the unloading of cattle in all sections as a result of the continued dry weather, that they could not be sold to any advantage. It was decided, therefore, to feed two lots of these cattle for the Christmas market, and to consign the remainder to the Experimental Station at Harrow, Ont., to be fed there throughout the winter. Accordingly, twenty-five of the thinnest steers, i.e., those best suited to a long feeding period, were selected and shipped to Harrow on October 15 and the remainder were brought in on October 16, weighed, divided into two lots, heavies and lights, and put onto grain feeding immediately. They received four pounds per head per day at the start and this amount was increased at the rate of two pounds per week until ten pounds

*In the preparation of this Report, Mr. Geo. W. Muir has been responsible for the sections on beef and dairy cattle, Mr. E. B. Fraser for the section on swine, and Mr. Paul E. Sylvestre for the section on sheep.

per head per day was being fed. In addition they received approximately thirty pounds of silage per head per day and all the grass hay that they would clean up readily.

The following figures serve to show the increased profits realized from holding these cattle and finishing them for the Christmas market rather than selling them off grass when prices were down. At the time these cattle were taken off grass and put in for feeding $8.50 per hundred would have been considered a top price and it is on this basis that the data are worked up. These figures also serve to show that the younger, lighter cattle make the most gains and the most profit under circumstances of this kind.

DETAILS OF FEEDING EXPERIMENT

Items	Lot 1 Heavy	Lot 2 Light
No. cattle	20	20
Total weight October 16.....lb.	21,745	19,340
Average weight October 16.....lb.	1,087	967
Total weight December 10 (3 per cent shrink).....lb.	22,858	20,642
Average weight December 10 (3 per cent shrink).....lb.	1,142	1,032
Total gain for group.....lb.	1,113	1,302
Average gain per head.....lb.	55·6	65·1
Average gain per head per day.....lb.	1·0	1·18
Total cost of feed per group..... $	261 67	261 67
Average cost of steers to October 16..... $	76 60	76 60
Total cost of group to October 16..... $	1,532 00	1,532 00
Value steers October 16 at $8.50..... $	1,348 32	1,643 90
Possible profit per group at October 16..... $	316 32	111 90
Value steers October 16, plus cost of feed to December 10..... $	1,793 67	1,793 67
Sale value December 10, at $9.50..... $	2,171 50	.....
Sale value December 10, at $9.60..... $	.....	1,981 63
Profit December 10..... $	377 83	187 96
Increased profit due to holding, feeding and resulting higher prices..... $	61 51	76 06

The following table is a financial statement of the whole group of steers purchased:—

FINANCIAL STATEMENT COVERING PURCHASE, FEEDING AND SALE OF WESTERN STEERS PURCHASED IN WINNIPEG IN MARCH, 1929

Date	Item	Dr.	Cr.
		$	$
1929			
March 16....	To 31 steers, 25,220 pounds at $8.20	2,068 04	
	To 2 steers, 1,400 pounds at $8	112 00	
	To 36 steers, 24,260 pounds at $8.40	2,037 84	
	To insurance ½ of 1 per cent	21 08	
	To commission, feed, loading, etc. (2 cars)	106 40	
	To freight and feed en route to Ottawa	461 20	
	By sale, 2 reactors	.....	105 07
March 22 to April 23....	To cost of feed at C.E.F., 23,760 pounds hay at $7.50 per ton	89 10	
April 24 to October 15.	To cost of pasture 65½ head, 5¾ months at 50c. each per month*	188 31	
October 15..	By sale 25 steers to Experimental Station, Harrow, Ont., 23,270 pound at $8.50 per cwt	.....	1,977 95
October 15...	To interest on investment $4,701.49, 7 months at 5 per cent	137 13	
October 16to December 10	To cost of stall feeding 21,100 pounds grain at $38 per ton	409 34	
	13 tons silage at $3 per ton	39 00	
	10 tons hay at $7.50 per ton	75 00	
December 10	By sale 20 steers 22,858 pounds at $9.50 per cwt	.....	2,171 50
	By sale 20 steers 20,642 pounds at $9.60 per cwt	.....	1,981 63
	To slaughter inspection charges	10 00	
December 10	To interest on balance of investment pro rated per steer, $2,893.24, 8 weeks at 5 per cent	22 26	
	Profit on 67 steers in spite of loss of two	459 45	
		6,236 15	6,236 15

*One animal died in spring at the Central Experimental Farm and one on range in midsummer.

STANDING OF THE FOREGOING CATTLE UNDER THE BEEF GRADING POLICY

The opportunity was taken to follow these steers through the slaughter house and to grade their carcasses on the rail in the cooling room. These steers would have been classed as an extra good to choice lot, when seen on the hoof, as they drew special comment when they appeared on the market previous to slaughtering. It was not possible to get a separate grading in the two groups, consequently the following figures are for the forty head of cattle.

Number of cattle	40
Number of "Red" grade carcasses	nil
Number of "Blue" grade carcasses	23
Number of carcasses below "Blue" grade	17
Average weight "Blue" grade carcasses	623 pounds
Number of animals above average	11
Number of animals below average	12
Average weight of carcasses below "Blue" grade	601 pounds
Number of animals above average	7
Number of animals below average	10

It will be seen that some 58 per cent of the carcasses graded "Blue Ribbon." Also that the average weights of both grades were quite close while the proportion of carcasses above and below the average weights in each case was practically identical showing that finish rather than weight was the deciding factor in the grading policy.

THE VALUE OF HEIFERS AS STOCKERS

Early in the grazing season of 1929, it was seen that more cattle, over and above the steers purchased in March of that year, would be required to keep down the grass on the range. Stockers not being available at reasonable prices locally, the Winnipeg market was again turned to for supplies. It was found that prices were high there also, good stocker steers being quoted at $9.30 per cwt. which was out of the question as there would be little hope of profitable feeding at the above price. Stocker heifers of good quality, however, were being quoted at prices approximately one dollar per cwt. below those for steers consequently it was decided to try a load of heifers as an experiment particularly as it would be possible to segregate them on the range.

Accordingly one carload of thirty-eight was bought. On subjection to the tuberculin test, two reacted. During shipment to South March, Ontario, one heifer calved. Both this heifer and her calf died shortly after arrival, in spite of treatment, as a result of the exposure in the car during the trip. The remaining thirty-five heifers were put on pasture and did well throughout the summer.

During the summer, seven of these heifers calved, one calf dying but the remaining calves did quite well suckling their dams. Later in the season when the heifers were taken into the sheds for feeding purposes, one aborted and three others that were heavy in calf had to be sold at once at a reduction. When slaughtered it was found that three more heifers were carrying calves conceived before the heifers were purchased while quite a number were carrying calves conceived since coming to the range, indicating that some bull had broken into the enclosure at some time.

Following is a financial statement covering the purchase, feeding and sale of the foregoing heifers.

FINANCIAL STATEMENT COVERING PURCHASE, FEEDING AND SALE OF 38 WESTERN HEIFERS PURCHASED ON WINNIPEG MARKET

Date	Items	Dr.	Cr.
		$	$
1929			
May 11	To 38 heifers, 25,570 pounds at $8.25	2,109 52	
May 11	To insurance, ½ of 1 per cent	10 54	
May 11	To commission, feeding, yardage, etc	53 40	
May 11	By sale, two reactors		98 90
May 11	To freight and feed en route to Ottawa	228 35	
May 11	By rebate on freight, account of overcharge		17 34
*Nov. 16	To pasture, 35 head 6 months, at 50c. per head per month	105 00	
Nov. 27	By sale, 3 heifers at $70 each		210 00
Dec. 10	To stall feeding at C.E.F.—		
	1,500 pounds grain at $1.75 per cwt	26 25	
	7,680 pounds hay at $7.50 per ton	28 80	
	9½ tons silage at $3 per ton	28 50	
Dec. 10	By sale, 26 heifers, 24,061 pounds at $8.50 per cwt		2,045 18
Dec. 10	By sale, 6 heifers, 4,535 pounds at $7.50 per cwt		340 12
Dec. 10	To slaughter inspection charges on above, 32 heifers	8 00	
Dec. 10	By sale, 6 calves, 1,552 pounds at $10.50 per cwt		162 96
Dec. 10	To interest on investment at 2,285·57, 7 months at 5 per cent	66 66	
	Profit	209 48	
		2,874 50	2,874 50

*One heifer died on arrival at range.

In the case of purchase of stocker heifers therefore, it is evident that a few factors must be watched closely, i.e.:—

1st. That heifers over eight months gone in calf should not be shipped at all as they are liable to be a total loss.

2nd. That heifers from five to eight months gone in calf are not likely to be profitable animals as the nursing of their calves pulls the heifers down in value considerably more than is made up for in the value of the calf. It is evident therefore that in the purchase of stocker heifers, the buyer should be protected by obtaining a guarantee that the animals selected for him by his agents on the market are not more than four months gone in calf at the time of purchase in the spring.

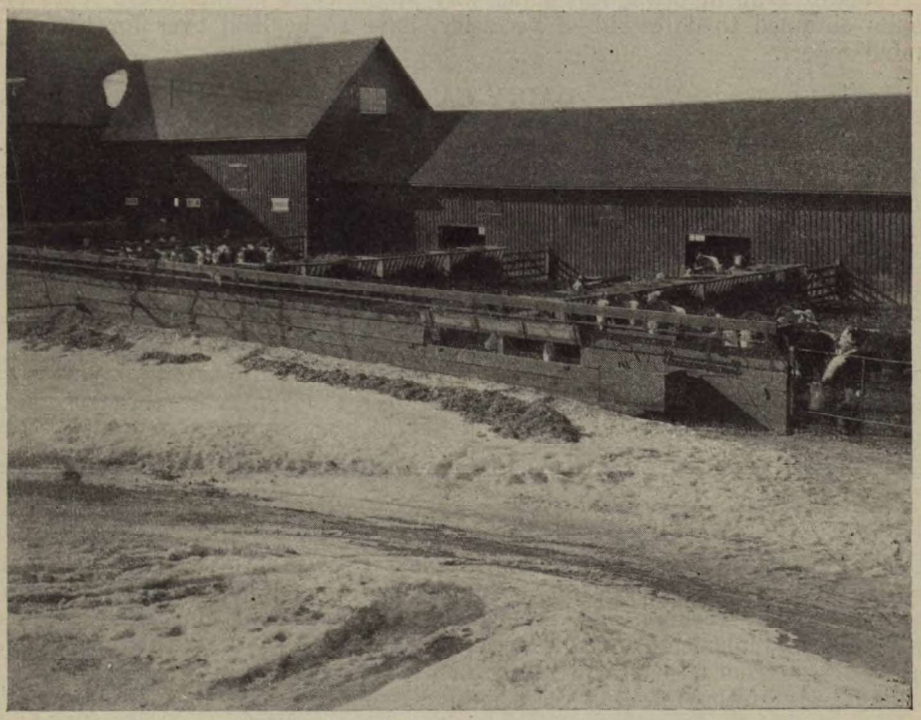
3rd. On the other hand recently bred heifers quiet down and put on flesh considerably better than other heifers so that any arrangement that can be made to secure heifers of this class at reasonable prices should be profitable.

4th. Under the conditions obtaining with this shipment of heifers they cannot be said to have been a profitable investment.

BUILDINGS AND EQUIPMENT

With the acquisition of more land and buildings, through the purchase of an adjoining property, it has been possible to transfer all beef cattle feeding work to a location on the new property. An old horse stable, and a machinery shed 132 by 24 feet, were converted into five roomy sheds, with open fronts facing south, for winter steer feeding quarters. This gives accommodation for over a hundred head of feeding stock, and there is the possibility of enlarging it to accommodate some thirty head of breeding stock as well. Substantial hay racks form the partitions between the five yards, while a feeding trough for silage and grain runs the full length of the south fence. An overhead track for a feed truck facilitates the feeding of the silage from a silo at the west end. Hay is stored in the adjoining barn, and is fed out by means of a horse and cart. Straw is blown into the lofts over the steer sheds at threshing time in the fall, and is then simply forked down into the pens as needed, the steers

picking out any edible material before it is tramped in. Water is supplied from a nearby well by means of an automatic electric pump, pneumatic tank, and frost proof standpipes to watering tanks in the yards. Freezing of the water in these tanks is prevented by use of small-sized electric water heaters. These have proven very satisfactory, keeping the water from freezing to any



General view of the steer feeding quarters, C.E.F., Ottawa, showing different groups on feed during fall and winter 1929-30.

extent on even the coldest night. The only thing lacking to make this one of, if not the best, practical and experimental steer feeding plants in Eastern Canada is a scale for weighing the steers, and this will be installed in a handy location before another feeding season. With these facilities one man is able to handle a large number of animals, and has time to spare for other work as well.

Experimental Work

With the completion of these excellent winter feeding quarters, one hundred and two head of cattle, a part of the cattle utilized in range investigation at the Dominion Range Experiment Station, Manyberries, Alberta, were brought to Ottawa in November, 1929. These are Herefords and the group is made up of calves, yearlings and two-year-olds. The objectives in view in the experiment now under way are as follows:—

1. To determine the economy of high-class range cattle when fed in Eastern Canada.
2. To determine the most profitable age as relating to purchase and sale.

3. To determine the most profitable methods of finishing calves and yearlings, i.e., calves finished at approximately one year or eighteen months, etc.; finishing during the winter with maximum grain versus utilizing minimum grain, maximum roughage and finishing on grass.

4. To establish contact with and expand the work of the Range Station at Manyberries.

This experiment being still under way at the close of this fiscal year, any results obtained to date will of necessity, have to be held over for the next annual report.

DAIRY CATTLE

The breeding of Ayrshire and Holstein cattle on the Central Experimental Farm, in the Animal Husbandry Division, constitutes one of the important projects of the Division. A very successful year can be reported in the year ending March 31, 1930. At that time the herds were made up as follows:—

DAIRY CATTLE AT THE CENTRAL EXPERIMENTAL FARM, MARCH 31, 1930

Breed	Milk cows	Heifers	Bulls	Total
Ayrshires	43	39	17	99
Holsteins	30	28	12	70

AYRSHIRES

The Ayrshire herd has been making excellent progress during the year, both in quality and number. The improvement in quality has been brought about by better breeding, and thorough culling, the latter being made possible by the rapid replenishing of the herd through the fact that there were no serious losses from either tuberculosis, or contagious abortion.

Analysis of the breeding records, calf crop, and subsequent condition of the cows in relation to the bulls used in service to get these calves will be of interest, in view of later remarks on the relation of the removal of contagious abortion blood-test reactors to the general health of the herd. The following figures are based on the number of cows which dropped calves during the year ending March 31, 1930.

BREEDING RECORDS OF AYRSHIRE SIRES 1929-30

Sires	White Beauty's Good Gift	Ottawa Supreme 10th	Ottawa Supreme 37th	Ottawa Supreme 40th	Ottawa Supreme 24th	Dunlop Reflection
Number of cows bred	9	16	8	1	2	13
Number of services	16	22	8	1	2	15
Number of conceptions	6	16	7	1	0	11
Services per conception	2·66	1·37	1·14	1	.....	1·18
Number of calves dropped	7	16	7	1	.....	12
Number of males	3	8	5	1	.....	5
Number of females	4	7	2	.....	.....	7
Number of normal calves	4	11	7	1	.....	10
Number of abortions	.....	2	.....	.....	.....	.....
Number of deformed calves	.....	2	.....	.....	.....	.....
Number died at or shortly after birth	3	1	.....	.....	.....	2
Number of cows retaining afterbirth	.....	.....	.....	.....	.....	2

The two abortions noted in the foregoing table occurred, in both cases, with cows in the isolated herd of reactors to the blood test for contagious abortion. A feature to be noted is the small number of cows suffering from retained afterbirth. It has been shown fairly clearly that if a herd can be cleaned up entirely of contagious abortion infection, many other troubles such as retained afterbirth, sterility, calf scours, etc., will tend to be reduced, also, and this has been the case to quite a large extent in the Ayrshire herd. Breeding results for the year have shown fairly clearly, however, that in addition to having cows free of genital disease, the herd bulls must be free of genital disease. Provided the cows are clean and normal, the number of services per conception is a fairly

Ayrshire cow "Relief Lucy (Imp.) 83933." An exceedingly typey Ayrshire cow, with six records in R.O.P. averaging 10,546 pounds milk, 405 pounds fat in 309 days, and seven single calves within five years and three months—a profitable producer and reproducer.

good guide as to the condition of the bull as regards genital disease. Note that the White Beauty Good Gift bull in the foregoing table required twice as many services per conception as any of the other bulls listed. Clinical examination of the bulls and microscopical examination of their semen at different times during the year revealed the fact that the White Beauty Good Gift bull was badly diseased, and a source of danger in the herd, while the other bulls were all normal. Apparently this diseased condition had something to do with the larger number of services per conception, and number of weak calves that died at birth or very shortly afterwards. The normal calves were of good quality throughout. Bulls used in the herd during the year were as follows:—

AYRSHIRE BULLS USED IN C.E.F. HERD DURING 1929-30

Name	Age	Reg. No.	A.R. No.	Class
	Years			
Ottawa Supreme 10th	5	91809	16	AA
Ottawa Supreme 12th	5	92925	105	A
Ottawa Supreme 26th	3	105008	.....	.....
Ottawa Supreme 37th	2	112627	.....	.....
Dunlop Reflection (imp)	4	110286	551	A

The only animals brought into the herd during the year were the bull Ottawa Supreme 26th —105008—, which was purchased from the breeder to whom he had been sold, and the bull Dunlop Reflection (imp) which was rented for short periods at two different times during the year.

The average yearly milk production of the five best producing Ayrshire cows in the herd for the year, including one two-year-old, was 9,048 pounds milk testing 4·11 per cent butterfat. The average for the whole herd of twenty-four cows and heifers for the year was 7,381 pounds milk testing 4·06 per cent butterfat. This constitutes a drop in average production compared to the previous year which may be accounted for by the fact that there was a large percentage of young cows in the herd.

HOLSTEINS

The Holstein herd has been making gradual improvement, this being particularly noticeable in the young stock coming on in the herd. Unfortunately, it was found necessary to dispose of the herd sire Abegweit Silver Chieftain —58694—, purchased in 1928, owing to his having developed genital disease in aggravated form. In his place the bull K.A.S. Count —53941— was secured. This is a very well bred bull from a cow with a three-year-old record of 18,320 pounds of milk testing 3·42 per cent fat.

In addition there were purchased, as prospective herd sires, two bull calves sired by the famous breeding and show bull Brookholm Inka —60995—, and out of two well bred, high producing, and high testing cows.

The following table of figures in the breeding records, calf crop, and subsequent condition of the cows in relation to the bulls used in service to get these calves, is based on the cows which dropped calves during the year ending March 31, 1930.

BREEDING RECORDS OF HOLSTEIN SIRES 1929-30

Sire	Ottawa Pietje Faforit	Abegweit Silver Chieftain	K.A.S. Count	Brookholm Inka 25th
Number of cows bred	3	14	4	1
Number of services	7	42	4	1
Number of conceptions	3	14	4	1
Services per conception	2·33	3	1	1
Number of calves dropped	3	14	4	1
Number of males	2	7	3	1
Number of females	1	7	1	0
Number of normal calves	3	14	4	1
Number of abortions	0	0	0	0
Number of deformed calves	0	0	0	0
Number died at, or shortly after birth	0	0	0	0
Number of cows retaining afterbirth	1	4	0	0

In the case of the Holsteins no abortions occurred in either the negative or the positive herds. The number of services per conception is of interest. It will be noted that the bull Abegweit Silver Chieftain already mentioned as being disposed of on account of genital disease, required three services per conception. The bull Ottawa Pietje Faforit also required an unusual number of services per conception; not because he was diseased himself, but because he was used after the Abegweit Silver Chieftain bull on cows that had been infected by the latter bull. It will be noted that a large percentage of retained afterbirths followed the use of the diseased bull. One cow was so badly infested that she died. The one cow that had retained afterbirth after the service of Ottawa Pietje Faforit had previously been served twice by the diseased bull, which in all probability accounted for her condition.

Holstein bulls used in the herd during the year were as follows:—

Name	Age	Reg. No.	A.R. No.	Class
	years			
Abegweit Silver Chieftain	6	58694	161	XX
K.A.S. Count	8	53941	.....	.....
Brookholm Inka 25th	1	80068	.....	.....
Brookholm Inka 31st	1	80074	.....	.....

Apart from the herd sires previously mentioned, no animals were purchased during the year.

The average yearly milk production of the five heaviest milk producing Holstein cows in the herd for the year including one two-year-old, and one three-year-old was 14,055 pounds milk testing 3·78 per cent fat. The average for the whole herd of twenty cows and heifers averaging four years of age, for the year was 10,106 pounds of milk testing 3·31 per cent. These figures show a profitable level of production for this herd.

ADVANCED REGISTRATION OF DAIRY CATTLE

This work has been followed up as closely as possible. Owing to lack of space for holding calves, however, the most of the bull calves sold during the year were sold before attaining eight months of age, and consequently, were not eligible for Advanced Registration. This accounts for there being only four bulls, Ayrshires, entered in the Advanced Registry during the year. In the case of females, there were no inspections for Advanced Registration during the year.

SALES OF BREEDING STOCK

Sales of breeding stock consist largely of sales of young bulls to farmers, and breeders in outlying districts. Demand was exceptionally good during the year with the result that thirteen Ayrshire bull calves, and nine Holstein bull calves were placed in various parts of the country, where they will have a chance to do much for the dairy industry. In addition to the above-mentioned animals sold to private breeders, four young bulls suitable to take their places as herd sires were shipped to the following Experimental Stations:—

Experimental Station, Ste. Anne de la Pocatière, Que.
Experimental Station, Farnham, Que.
Experimental Station, Kapuskasing, Ont.
Experimental Station, Morden, Man.

TUBERCULOSIS ERADICATION

The regular semi-annual tuberculin test of the herd conducted in May, 1929, showed that the herd was free of tuberculosis infection at that time. In the regular November test, however, one animal reacted, this being a three-year-old cow which fortunately had been under isolation in the barn housing the reactors to the blood test for contagious abortion. The persistancy of the infection in this herd is unusual, but in view of the remarkably small percentage of reactors, less than one per cent, it is hoped that the disease will be completely eradicated within a very short time.

CONTAGIOUS ABORTION ERADICATION

The project on the control of contagious abortion being carried on in co-operation with the Health of Animals Branch, has been one of the major projects during the year.

The method of control being followed is outlined in the Report of this Division for the year ending March 31, 1929. Briefly, it is as follows. All animals are subjected to the agglutination and complement fixation blood tests for contagious abortion. All reactors are either disposed of immediately, or isolated in a separate barn with separate attendants. If reacting cows are isolated as above, the calves from these reacting cows are in turn isolated in still another barn. Here they are fed milk from the non-reacting herd. These calves are not admitted to the main herd until they have been tested, and found to be negative to the above-mentioned tests.

As reported in the 1929 Report of this Division, there were no abortions in the negative herd during the year 1928-29, nor have there been any during the year covered by this report. When it is stated that previously there was an average of around six to eight abortions a year, it can readily be seen how efficient the blood tests have been in picking out infected animals.

With regard to the development of further reactors in the main (negative) herd subsequent to the initial segregation of reactors in the spring of 1928, one cow reacted in March, 1929, three in May, 1929, and one in October, 1929. In each case these animals, all cows in milk, were transferred to the isolation barn. It is interesting to note the subsequent results. The cow reacting in March, 1929, was picked out of a herd of around 150 head, and aborted in the isolation barn in July. Of the three cows reacting in May, 1929, and one reacting in October, 1929, none aborted on being transferred to the isolation barn.

The foregoing results are about what might be expected in that all reactors are not necessarily aborters, but being harbourers of the germ of the disease if left in the herd, they may be the means of infecting other animals with less resistance and thus cause a storm of abortion in the herd. Similarly in the case of the original reactors, a comparatively small percentage of them aborted while in isolation. One point noted was that the calves from the reacting cows were somewhat harder to raise than those from the non-reacting cows, as they seemed to be more subject to calf scours and pneumonia.

The foregoing results go to show that in the blood test, properly applied and followed up, the farmer and dairyman has at his disposal a means whereby he can eradicate contagious abortion from his herd very effectively. All inter-

ested parties should write the Health of Animals Branch, Department of Agriculture, Ottawa, Ont., for information as to the assistance offered individuals in the eradication of this insidious disease.

DAIRY HERD RECORDS OF PRODUCTION

Following will be found a table giving the milk and fat production and feed consumption records for all cows and heifers which have completed a normal lactation period during the year ending March 31, 1930; also a table giving the average production of the five best cows of each breed and of the whole herd of each breed for the same period.

Name and Breed of Cow	Age at commencement of lactation period	Date of dropping calf	Length of lactation period	Total pounds of milk for period	Daily average yield of milk	Average percentage fat in milk	Pounds of butter produced in period	Value of butter at 43c. per pound	Value of skim milk at 30c. per cwt.
			days	lb.	lb.	%	lb.	$	$
Colony Daisy McKinley Abbekerk..... H.	4	Jan. 28, 1929	404	12,742·0	31·54	3·72	556·71	239 39	36 81
Perfect Bessie Bos..... H.	3	Oct. 14, 1928	425	12,390·0	29·15	3·89	566·55	243 62	35 73
Cheer Echo..... H.	7	June 2, 1928	421	18,497·7	43·94	2·38	517·06	222 34	54 17
Ottawa Grace Echo..... H.	4	March 2, 1929	371	13,820·5	37·28	3·03	493·45	212 18	40 23
Ottawa Midnight Perfection..... H.	2	Nov. 14, 1928	429	12,815·5	29·87	3·45	519·81	223 52	37 13
Evelyn Westport Walula Rooker..... H.	9	Nov. 24, 1928	399	13,414·5	33·62	3·30	521·12	224 08	38 91
Ottawa Kyle Blossom.. A.	4	Dec. 13, 1928	352	9,369·5	26·62	4·12	453·93	195 19	26 95
Ottawa Pietje Leila..... H.	2	Dec. 14, 1928	319	11,282·5	35·37	3·32	440·64	189 48	32 72
Ottawa Supreme Lavender..... A.	2	Nov. 8, 1928	388	10,019·5	25·82	3·84	452·81	194 71	28 90
Lennoxville Roxie..... A.	12	May 9, 1929	289	9,255·0	32·02	4·12	448·33	192 78	26 62
Ottawa Auchenbay Mina 2nd..... A.	5	Oct. 19, 1928	381	8,725·5	22·90	4·41	452·58	194 61	25 02
Lennoxville Roxie 3rd... A.	7	March 15, 1929	260	7,873·0	30·28	4·08	378·36	162 69	22 65
Springbrook Lady Anggie H.	5	August 3, 1928	316	9,402·9	29·76	3·97	379·30	163 10	27 24
Lennoxville Roxie 2nd... A.	10	March 7, 1929	330	9,730·0	29·51	3·43	393·18	169 07	28 21
Bessie Ann Echo..... H.	5	Jan. 16, 1929	349	10,191·0	29·30	3·9	468·05	201 26	29 38
Relief Lucy..... A.	6	Dec. 7, 1928	333	11,241·5	33·76	3·44	455·19	195 73	32 56
Ottawa Pietje Oliva.... H.	2	Oct. 27, 1928	359	10,408·5	28·99	3·23	394·96	169 83	30 22
Ottawa Supreme Dewdrop..... A.	2	August 29, 1928	320	7,249·0	22·65	4·26	363·47	156 29	20 82
Ottawa Supreme Flavia A.	4	Nov. 23, 1928	326	8,343·5	25·59	3·93	386·22	166 07	24 05
Ottawa Supreme Wilhelmina..... A.	2	Nov. 11, 1928	338	8,424·0	24·92	3·76	372·25	160 07	24 32
Lennoxville Marjorie 3rd A.	7	March 13, 1929	243	7,994·0	32·90	3·75	352·62	151 63	23 08
Dalfibble Orange Blossom..... A.	6	Nov. 24, 1928	329	10,116·0	30·75	3·47	413·31	177 72	29 29
Lennoxville Susie..... A.	9	June 12, 1928	302	6,917·8	22·91	3·73	303·89	130 67	19 98
Ottawa Pietje Bos de Kol H.	3	Oct. 21, 1929	454	10,033·0	22·10	3·30	399·72	171 88	29 08
Agassiz Korndyke Rajah H.	3	Feb. 15, 1929	334	6,983·5	20·91	3·7	305·04	131 17	20 17
Lennoxville Roxie 4th... A.	4	Jan. 1, 1929	320	7,671·0	23·97	3·93	354·65	152 50	22 11
Ottawa Lady Hartog Burke..... H.	3	July 16, 1928	472	9,154·1	19·39	3·95	424·96	182 73	26 38
Lennoxville Bluebell 5th A.	2	Oct. 13, 1928	352	7,262·0	20·63	3·60	307·36	132 16	21 00
Ottawa Kyle Lady..... A.	2	Oct. 18, 1928	363	6,634·0	18·28	4·53	353·85	152 16	18 20
Lennoxville Pansy 2nd.. A.	6	April 11, 1929	283	7,823·0	27·64	3·92	361·01	155 23	22 55
Ottawa Kyle Pet..... A.	3	July 21, 1928	345	6,740·2	19·54	4·04	320·13	137 66	19 40
Ottawa Victorine..... A.	7	Nov. 15, 1928	295	6,710·5	22·75	4·07	321·68	138 32	19 31
Ottawa Pietje Zorra.... H.	2	Oct. 23, 1928	431	8,480·5	19·70	3·27	326·48	140 39	24 64
Ottawa Kyle Marjorie.. A.	4	Jan. 6, 1929	270	5,874·5	21·76	4·58	316·19	135 96	16 82
Agassiz Faforit Canary Pietje..... H.	3	June 20, 1928	307	6,304·8	20·54	3·4	250·26	107 61	18 28
Belmont May Canary... H.	7	May 10, 1928	302	8,406·9	27·84	3·00	297·27	127 83	24 46
Lennoxville Bettina 2nd. A.	7	May 1, 1929	276	6,408·5	23·22	3·54	267·20	114 90	18 55
Agassiz Lulu Faforit.... H.	6	Aug. 15, 1928	291	5,673·5	19·50	3·4	228·42	98 22	16 44
Agassiz Walula Canary Inka..... H.	6	Nov. 8, 1928	342	7,825·5	22·88	2·9	265·38	114 11	22 80
Agassiz Lulu Canary.... H.	4	Aug. 9, 1928	346	6,627·5	19·15	2·9	227·71	97 92	19 30
Lennoxville Bettina 3rd. A.	4	July 14, 1928	320	5,116·1	15·99	3·78	227·52	97 83	14 77
Ottawa Dignity Dot.... A.	9	May 31, 1929	237	5,350·0	22·57	3·94	248·49	106 85	15 42
Perfect March Korndyke H.	3	Dec. 16, 1928	320	7,648·0	23·25	3·33	299·42	128 75	22 18
Lennoxville Bluebell 4th A.	4	Aug. 5, 1928	262	4,109·3	15·68	3·40	104·56	70 76	11 91
Total for Herd (44 cows)....		.....	14,914	379,263·8	.....	.....	16,351·09	7,030 97	1,118 76
Average for herd (44 cows)..	4·8	.....	339	8,619·6	25·43	3·66	371·62	159 79	25 43

COMPLETED DURING THE YEAR

Total value of product	Amount of meal eaten at $35 per ton	Amount of ensilage eaten at $4.25 per ton	Amount of roots eaten at $4.07 per ton	Amount of hay eaten at $6.60 per ton	Months on pasture at $2 per month	Total cost of feed for period	Cost to produce 100 pounds of milk	Cost to produce one pound of butter skim-milk neglected	Profit on one pound of butter skim-milk neglected	Profit on cow calf and labour neglected
$	lb.	lb.	lb.	lb.	mos. days.	$	$	cts.	cts.	$
276 20	3,567	10,725	1,740	2,512	4 19	106 29	0 83	19	24	169 91
279 35	3,778	10,625	4,220	2,528	4 19	114 88	0 93	20	23	164 47
276 51	4,671	9,249	1,800	5,634	.....	123 68	0 67	24	19	152 83
252 41	3,768	9,920	.....	2,264	4 19	103 74	0 75	21	22	148 67
260 65	3,456	10,510	5,420	2,776	4 19	112 27	0 88	22	21	148 38
262 99	3,907	10,625	4,220	2,528	4 19	117 13	0 87	22	21	145 86
222 14	2,929	6,375	3,700	1,816	4 19	87 32	0 93	19	24	134 82
222 20	3,129	6,515	4,060	1,792	4 19	92 02	0 82	21	22	130 18
223 61	3,104	7,185	4,340	2,032	4 19	94 38	0 94	21	22	129 23
219 40	2,830	12,620	.....	4,256	.....	90 39	0 98	20	23	129 01
219 63	2,800	8.115	4,340	2,280	4 19	93 35	1 07	21	22	126 21
185 34	2,266	4,875	.....	2,016	4 19	65 89	0 84	17	26	119 45
190 34	2,407	8,400	.....	1,912	3 4	72 60	0 77	19	24	117 74
197 28	2,421	9,497	.....	2,528	4 19	80 14	0 82	20·4	22·6	117 14
230 64	3,824	14,774	.....	4,658	.....	113 76	1 12	24	19	116 88
228 29	4,036	12,964	.....	4,445	.....	112 91	1 00	25	18	115 38
200 05	3,098	6,905	4,220	1,856	4 19	92 85	0 89	24	19	107 20
177 11	2,120	6,750	4,220	1,920	2 4	70 66	0 97	19	24	106 45
190 12	2,514	7,215	4,340	2,040	4 19	84 17	1 01	22	21	105 95
184 39	2,617	6,285	4,340	1,640	4 19	82 71	0 98	22	21	101 68
174 71	2,644	6,580	.....	1,792	4 19	75 45	0 94	21	22	99 26
207 01	3,948	12,844	420	4,321	1 10	114 24	1 13	28	15	92 77
160 65	1,908	5,354	.....	1,773	4	58 71	0 85	19	24	91 94
200 96	3,370	11,390	4,220	2,776	4 19	110 27	1 10	28	15	90 69
151 34	1,672	7,285	1,040	1,816	4	60 89	0 87	20	23	90 45
174 61	2,736	7,340	2,980	2,032	4 19	85 56	1 12	24	19	89 05
209 11	3,984	13,304	.....	4,341	4	120 38	1 31	28	15	88 73
153 16	1,847	6,445	2,360	1,818	4	64 86	0 89	21	22	88 30
170 36	2,352	7,215	4,220	2,424	4 19	82 39	1 24	23	20	87 97
177 78	2,978	13,410	.....	4,392	.....	95 17	1 22	26	17	82 61
157 06	2,434	8,539	.....	2,865	4	78 24	1 16	24	19	78 82
157 63	2,862	10,709	.....	3,609	.....	84 81	1 26	26	17	72 82
165 03	2,708	9,070	5,420	2,352	4 19	96 36	11·3	29	14	68 67
152 78	2,812	10,859	240	3,853	.....	85 54	1 46	27	16	67 24
125 89	1,789	7,240	.....	1,696	3 10	58 99	0 94	24	19	66 90
152 29	2,954	8,400	4,220	1,920	3	90 54	1 08	30	13	61 75
133 45	2,440	10,710	.....	3,672	.....	77 63	1 21	29	14	55 82
114 66	1,948	7,355	.....	1,920	3	62 10	1 09	27	16	52 56
136 91	2,749	7,390	4,220	1,792	4	86 37	1 10	33	10	50 54
117 22	2,343	7,645	.....	1,456	4	70 08	1 06	31	12	47 14
112 60	2,234	7,564	.....	2,530	1	65 56	1 28	29	14	47 04
122 27	2,289	11,690	1,840	4,008	.....	81 94	1 53	33	10	40 33
150 93	3,716	14,910	320	4,446	.....	112 11	1 46	37	16	38 83
82 67	1,341	6,060	3,720	1,816	1 20	52 28	1 27	32	11	30 39
8,149 73	125,480	399,437	90,436	114,597	4,039 days	3,881 61	.....	.....	.....	4,268 05
185 22	2,852	9,078	2,055	2,604	91·8 days	88 21	1 04	24	19	97 00

AVERAGE PRODUCTION OF FIVE

HOL

Name of Cow	Age at commencement of lactation period	Date of dropping calf	Length of lactation period	Total pounds of milk produced in period	Daily average yield of milk	Average percentage fat in milk	Pounds of butter produced in period	Value of butter at 43c. per pound	Value of skim milk at 30c. per cwt.
			days	lb.	lb.	%	lb.	$	$
Colony Daisy McKinley Abbekerk	4	Jan. 28, 1929	404	12,742·0	31·54	3·72	556·71	239 39	36 81
Perfect Bessie Bos	3	Oct. 14, 1928	425	12,300·0	29·15	3·89	566·55	243 62	35 73
Cheer Echo	7	June 2, 1928	421	18,497·7	43·94	2·38	517·06	222 34	54 17
Ottawa Grace Echo	4	March 2, 1929	371	13,829·5	37·28	3·03	493·45	212 18	40 23
Ottawa Midnight Perfection	2	Nov. 14, 1928	420	12,815·5	20·87	3·45	519·81	223 52	37 13
Average of 5 best cows	4	.....	410	14,055·0	34·28	3·78	530·72	228 21	40 81
Average of herd of 20 cows	4·2	.....	370	10,106·0	27·31	3·31	394·12	169 47	29 31

AYR

Ottawa Kyle Blossom	4	Dec. 13, 1928	352	9,360·5	26·62	4·12	453·03	195 10	26 95
Ottawa Supreme Lavender	2	Nov. 8, 1928	388	10,010·5	25·82	3·84	452·81	194 71	28 90
Lennoxville Roxie	12	May 9, 1929	280	9,255·0	32·02	4·12	448,33	192 78	26 62
Ottawa Auchenbay Mina 2nd	5	Oct. 19, 1928	381	8,725·0	22·90	4·41	452·58	194 61	25 02
Lennoxville Roxie 3rd	7	Mar. 15, 1929	260	7,873·0	30·28	4·08	378·36	162 69	22 65
Average of 5 best cows	6	.....	334	9,048·4	27·53	4·11	437·20	188·00	26 03
Average of herd of 24 cows	5·3	.....	313	7,381·0	23·58	4·06	352·86	151·73	22 10

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

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

Pasture	$12 00 per month
Meal and other concentrates	35 00 per ton
Hay (mostly clover and alfalfa)	6 60 "
Roots (mangels)	4 07 "
Silage (corn)	4 25 "

The foregoing values represent the cost of production in the case of home-grown feeds and the actual cost price in the case of the mill feeds, factory by-products, etc., which were purchased.

In calculating the value of the product, the actual average cash price per pound received for butter was used while in the case of the by-product skim-milk, this was valued at 30 cents per hundredweight.

The labour of caring for the cattle, the cost of manufacture of the butter, etc. have not been taken into consideration. On the other hand the value of the manure and the value of the calves at birth will offset these items though probably not sufficiently to cover other overhead charges such as interest, depreciation, etc. except in the case of extremely valuable breeding cows.

OFFICIAL RECORDS

In order that the many surplus bull calves may have the necessary credentials in the way of official records, all normal cows and heifers that had not

BEST COWS AND OF TOTAL HERD IN EACH BREED

STEIN

Total value of product	Amount of meal eaten at $35 per ton	Amount of ensilage eaten at $4.25 per ton	Amount of roots eaten at $4.07 per ton	Amount of hay eaten at $6.60 per ton	Months of pasture at $2 per month	Total cost of feed for period	Cost to produce 100 pounds of milk	Cost to produce one pound of butter skim-milk neglected	Profit on one pound butter skim-milk neglected	Profit on cow labour and calf neglected
$	lb.	lb.	lb.	lb.	mos. days	$	$	cts.	cts.	$
276 20	3,567	10 725	1,740	2,512	4 19	106 29	0 83	19	24	169 91
279 35	3,778	10,625	4,220	2,528	4 19	114 88	0 93	20	23	164 47
276 51	4,671	9,240	1,800	5,634	.....	123 68	0 67	24	19	152 83
252 41	3,768	9,920	.....	2,264	4 19	103 74	0 75	21	22	148 67
260 65	3,456	10,510	5,420	2,776	4 19	112 27	0 88	22	21	148 38
260 02	3,848	10,206	2,636	3,143	87·2 days	112 17	0 81	21	22	156 85
198 78	3,146	9,612	2,256	2,649	105·3 "	94 28	0 97	25	18	103 14

SHIRE

222 14	2,929	6,375	3,700	1,816	4 19	87 32	0 93	19	24	134 82
223 61	3,104	7,185	4,340	2,032	4 19	94 38	0 94	21	22	129 23
219 40	2,830	12,620	4,256	.....	.....	90 39	0 98	20	23	129 01
219 63	2,890	8,115	4,340	2,280	4 19	93 35	1 07	21	22	126 21
185 34	2,266	4,875	.....	2,016	4 19	65 89	0 84	17	26	119 45
214 02	2,804	7,834	3,327	1,629	87·2 days	86 27	0 95	20	23	127 74
173 91	2,606	8,633	1,813	2,568	80·6 "	81 85	1 09	24	19	91 23

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.

The following table gives the lists of cows qualifying during the year:—

CANADIAN RECORD OF PERFORMANCE TESTS ON CENTRAL EXPERIMENTAL FARM, APRIL 1929, TO MARCH 1930

Name and number of cow	Breed	Age at commencement of test	Number of days milking	Pounds milk	Pounds fat	Average per cent fat
		years		lb.	lb.	%
Ottawa Supreme Lavender—102939	Ayrshire	2	365	9,969	384	3·85
Relief Lucy—83933	"	6	333	11,242	422	3·75
Ottawa Kyle Mina—98623	"	3	365	8,180	353	4·32
Ottawa Supreme Wilhelmina—10376i	"	2	337	8,424	338	4·01
Ottawa Supreme Dewdrop—101335	"	2	305	7,072	299	4·23
Lennoxville Bluebell 5th—99410	"	2	305	6,550	250	3·82
Ottawa Kyle Pet—98439	"	2	305	6,499	256	3·94
Cheer Echo—98596	Holstein	6	365	17,780	504	2·83
Ottawa Grace Echo—132935	"	4	365	13,813	492	3·56
Evelyn Westport Walula Rooker—72985	"	9	365	13,190	440	3·34
Colony Daisy McKinley Abbekerk—137919	"	3	365	12,509	463	3·70
Ottawa Midnight Perfection—144781	"	2	365	12,193	441	3·62
Johanna Segis Jewel—134727	"	3	365	12,004	454	3·78
Perfect Bessie Bos—131915	"	3	365	11,974	411	3·43
Ottawa Pietje Leila—154153	"	2	320	11,284	359	3·18
Ottawa Pietje Oliva—151618	"	2	357	10,409	339	3·26
Ottawa Pietje Sweet Echo—148518	"	2	365	10,211	367	3·59

THE DAIRY

REVIEW OF THE YEAR'S WORK

The dairy work consists chiefly in the handling, processing, and marketing of the milk from the dairy herd.

During the year 483,924 pounds of milk were handled in the dairy. The first step is pasteurization, then a portion is sold as whole milk to Experimental Farm officers and employees. The balance of the whole milk is used in calf feeding, and in cheese making, or it is separated and the cream manufactured into butter, while the skim-milk is used for calf, pig, and poultry feeding. Butter was the main product sold, the total being 13,689 pounds, which is over one-third more than was produced the previous year. This is due mainly to the building up of the herd to a sound production basis due to the elimination of two devastating diseases, namely tuberculosis and contagious abortion.

Another year should see a still further increase in revenue from this source.

Through the co-operation of the Division of Bacteriology, it has been possible during the past year to obtain a detailed report every few days as to the condition of the raw milk previous to pasteurization. This has made it possible to check up on any undue rise in bacteria content of the milk, locate the cause and eliminate it before any great harm has been done.

The following table shows the monthly averages of the tests conducted:—

DIVISION OF BACTERIOLOGY LABORATORY REPORT

Summary of Milk Analyses, April 1929 to March, 1930

Month	Raw milk		Pasteurization		Pasteurized milk		Per cent efficiency	Bottled milk	
	Total count	B. coli in 0·1 cc.	Temp.	Time	Total count	B. coli in 1·0 cc.		Total count	B. coli in 1·0 cc.
1929		%	°F.	min.		%			%
April	12,338	31·3	147	32	79	25·0	99·36	435	18·8
May	26,782	40·9	147	32	53	9·1	99·80	6,160	0·0
June	182,800	90·0	146	32	90	10·0	99·95	100	10·0
July	40,460	75·0	145	34	161	0·0	99·60	131	0·0
Aug	10,920	90·0	148	31	65	0·5	99·40	95	0·0
Sept	14,367	58·3	146	31	77	0·0	99·46	8,078	0·0
Oct	57,688	100·0	146	33	181	0·0	99·69	191	0·0
Nov	10,500	43·8	146	31	218	0·0	97·92	209	0·0
Dec	7,800	31·3	147	31	109	0·0	98·60	168	0·0
1930									
Jan	68,489	16·7	147	31	171	0·0	99·75	209	0·0
Feb	19,900	0·0	148	31	81	0·0	99·59	54	0·0
March	10,930	45·0	146	31	195	0·0	98·22	125	0·0

It will be noted there were three occasions on which the bacteria counts of the raw milk were abnormally high. The cause of the first of these was undetermined owing to the absence of the Dairy Bacteriologist immediately following the check-test. In the second case the increase was found to be due to faulty cooling of the evening's milk. In the third case the trouble was found to be due to a previously undetected case of mastitis (garget) for when the milk from one cow was withheld the count immediately dropped to the normal level. It will be noted that the efficiency of pasteurization was at a high level at all times.

Additional work in the Dairy took the form of testing an increasingly large number of milk samples for surrounding farmers, the competition in the local milk market making it imperative that the producer weed out all poor-doing, lower-testing cows.

HORSES

On March 31, 1930, there were 46 horses at the Central Experimental Farm, Ottawa. These were composed of 20 registered Clydesdales and 26 grade geldings and mares. The registered Clydesdales consisted of 11 mares, 8 fillies and one stallion.

During the year there were 8,547 days of work performed by the work horses for the various Divisions of the Central Experimental Farm.

FEED AND MAINTENANCE COST OF DRAFT HORSES

The following tables show the yearly feed cost, average yearly feed consumption and the yearly feed and maintenance cost of eleven draft horses.

YEARLY FEED COST OF ELEVEN DRAFT HORSES

64,558 pounds oats at $42.20 per ton	$	1,362 17
3,432 pounds bran at $27.71 per ton		47 55
77,178 pounds hay at $7.25 per ton		279 77
550 pounds rock salt at $20 per ton		5 50
Total feed cost	$	1,694 99
Average feed cost		154 09

AVERAGE YEARLY FEED CONSUMPTION

Oats	5,869 pounds
Bran	312 pounds
Hay	7,016 pounds
Salt	50 pounds

FEED AND MAINTENANCE COST AND COST OF HORSE LABOUR

Total feed	$	1,694 99
Labour (stable attendance)		475 00
Interest, $2,475 at 6 per cent		148 50
Depreciation, $2,475 at 6 per cent		148 50
Shelter estimated at $25 each		275 00
Harness and repairs		154 00
Shoeing, $20 per head		220 00
Total yearly feed and maintenance cost (11 horses)	$	3,115 99
Average yearly feed and maintenance cost		283 27
Number of hours worked		29,876
Cost of horse labour per hour	$	0·104

In a survey of the above tables, the feed consumption and cost of feed per horse would at first glance seem rather high. However, when it is realized that the horses are, for the most part, well bred Clydesdales and are kept in a fairly high condition throughout the year, then the costs would not be considered unreasonable. As compared with the previous year, grain prices were somewhat lower. However, no carrots were fed to the work horses during the past winter, the farm crop of these for the past year being insufficient. Thus, the ration of grain was increased somewhat, the lowered grain prices being offset by the larger amounts of grain fed.

COST OF REARING FOALS

The following table gives the cost of feed for eight foals during the first year. The record is from birth during April, May or June, 1929, to March 31, 1930.

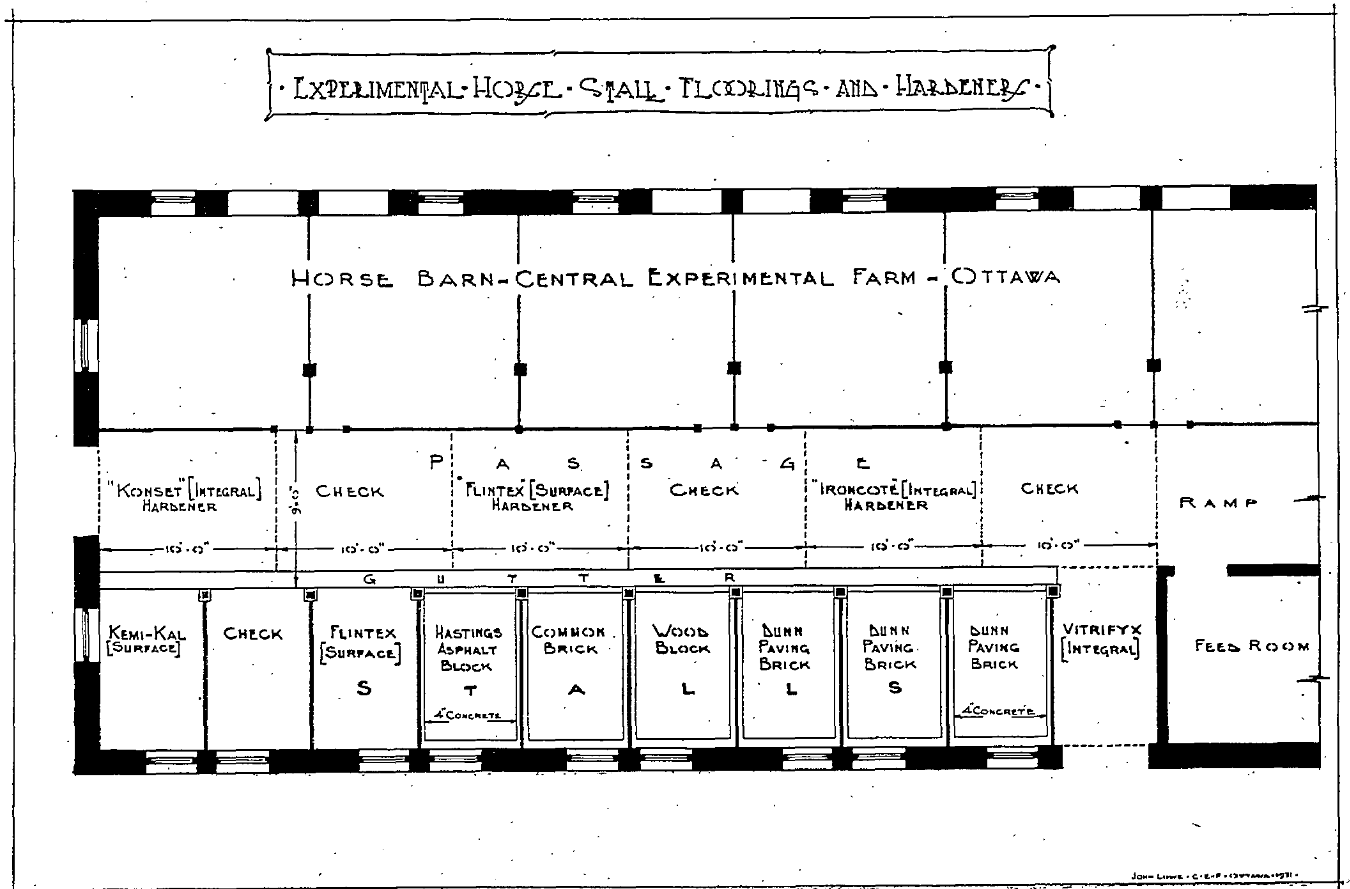
COST OF FEEDING FOALS

Feed record of eight foals

10,264 pounds oats at $42.20 per ton	$	216 57
2,715 pounds bran at $27.71 per ton		37 62
11,768 pounds hay at $7.25 per ton		42 66
120 pounds rock salt at $20 per ton		1 20
Total feed cost	$	298 05
Average feed cost per foal		37 26

A south view of the enlarged horse barn, C.E.F., Ottawa.

An interior view of the horse barn taken from the old wing, C.E.F., Ottawa.



Floor plan of addition to horse barn, showing different types of stall flooring, and cement hardeners used.

FOAL REARING AT THE CENTRAL EXPERIMENTAL FARM

Eight foals were dropped during the summer of 1929. These consisted of three horse and five filly foals and were all sired by the imported stallion Sandy Mac—24318. During the summer of 1930, there are seven mares due to foal. Two of these were bred to the horse Imperial Victor—21091—owned by Mr. Wm. Meharey, Russell, Ont., and five were bred to the colt Master Mac—25300—a son of Sandy Mac—24318.

BUILDINGS

During the summer an extension was made to the Main Horse Barn, by which nine tie stalls, six box-stalls with earthen floors, and a feed room were added. The opportunity was taken to conduct an experiment on various types of stall floor materials, i.e. wire-cut paving bricks, asphalt paving bricks, common building brick all set in cement, and wood paving blocks set in tar. At the same time, some integral and surface hardeners for use with cement were given trials. It is much too early to give a report on the results, but the accompanying diagram will give interested parties an idea of the scope of the work should they require information along this line at a later date.

SHEEP

On March 31, 1930, the flock at the Central Experimental Farm numbered 519 head. It was an increase of seventy-three head over the preceding year. This is in keeping with our policy of having a large flock as a profitable possibility in Eastern Ontario.

BREEDS AND BREEDING

The flock consisted of pure-bred Shropshire, pure-bred Leicester, crosses of these two breeds, and grade Shropshires. The latter group includes the grade ewes bought in the fall of 1928 plus sixty-one yearlings, a selection from the first crop.

The composition of the entire flock is as follows:—

	Number
Shropshire—	
Breeding ewes	101
Yearling ewes	15
Lambs (up to April 1, 1930)	67
Rams	6
Total	189
Leicester—	
Breeding ewes	62
Yearling ewes	12
Lambs (up to April 1, 1930)	36
Rams	6
Total	116
Cross-breds—	
Cross-bred ewes	40
Cross-bred yearlings	28
Total	68
Grade Shropshire—	
Grade ewes	85
Grade yearlings	61
Total	146
Grand total	519

Shropshire

The Shropshire flock has increased in number by forty head. However, a rigid selection was made at breeding time, and only the best ewes having a clean breeding record were used to raise the pure-bred stock, the remainder being bred to a Leicester ram.

Three imported rams head the flock: Bibby 100, bred by F. B. F. Bibby, Hardwiche Grange, Shrewsbury, England, imported in 1928; Tanner 27 and Tanner 63, bred by E. Craig Tanner, Eyton-on-Severn, Salop, England. The former was imported in 1928, and the latter in the fall of 1929 for the breeding season.

The sales of pure-bred ram lambs numbered sixteen.

Leicester

The flock of Leicester sheep has not increased materially, but it is remarkably uniform throughout and shows good quality. The two rams used were: Ottawa Emigrant, bred by the Director, Experimental Farms, and Deserter 24, bred by A. M. Whitelaw, Guelph, Ont. During the year, seven ram lambs were sold for breeding purposes.

CONDITION OF THE FLOCK

The health of the flock was generally good throughout the year, except for a few deaths, which were probably due to poisoning, caused by the development of Bacillus Botulinus in silage. Five ewes died from this trouble. They first showed weakness, then later on swelling of the throat and tongue developed. They were unable to eat, and drippings from the mouth were a general characteristic. There also seemed to be partial blindness. An examination by officials of the Health of Animals Branch revealed a case of toxin poisoning.

As stated above, this toxin is produced by the Bacillus Botulinus germ widely distributed in nature. This germ cannot grow in the presence of air or oxygen. In this case, it was thought the silage was responsible, so its feeding was stopped, and the trouble disappeared. For the most part, farmers think mouldy silage is responsible. The fact is that the germ may grow in both good and mouldy silage, and the poisonous fodder is not distinguishable from the good. When there is moisture, warmth and absence of air—the latter being the most important—the germ is likely to develop. Mouldy silage, however, favours its growth. Mould growing on the top makes a blanket, which keeps the air from the part below. After completion of fermentation, there is no more air and the germ underneath is in an ideal medium to grow. Under these conditions, Botulinus poisoning is likely to appear. The remedy for the disease if it develops is to stop feeding silage, good or bad.

LAMBING RESULTS

The 1929 lamb crop was considered very good; 232 ewes produced 333 lambs, or an average of 1·5 lambs per ewe. This result should be considered better than the preceding year's since the same average per ewe was obtained by a larger number of ewes.

In the following table, the ewes are divided into six groups for the purpose of comparing the results of different breeds and crosses. The lambs are either pure-bred Shropshire or Leicester, cross-breds (Shropshire ewes), cross-breds (Leicester ewes), and grade Shropshire.

LAMBING DATA, 1929

Class of Lambs	Pure-bred	1st cross	Pure-bred	1st cross	2nd cross	Grade
Breeding of Lambs	Shropshire x Shropshire	Leicester x Shropshire	Leicester x Leicester	Shropshire x Leicester	Shropshire x (Leicester x Shropshire Shropshire x Leicester)	Shropshire x Grade Shropshire
Total number of ewes.....No.	51	30	31	26	19	65
Total lambs born.....No.	85	55	54	47	21	71
Average lambs per ewe.....No.	1·66	1·83	1·74	1·8	1·1	1·09
Total weight of lambs at birth... lb.	457	388	364	241	118	.....
Total lambs weighed.....No.	72	55	54	35	21	.....
Average weight of lambs at birth. lb.	6·47	7	6·74	6·88	5·62	.....

The grade Shropshire and the cross-bred ewes made a very poor showing in lambs born, their average being 1·09 and 1·1 respectively. The reciprocal crosses of the two breeds were highest, followed by the pure-breds. As regards the weight, one may notice that the cross-bred lambs are the heaviest; the pure-bred Leicester and the pure-bred Shropshire, in the order named, come next.

WINTER QUARTERS

The increase in size of the flock necessitated larger winter quarters. Consequently, a small barn, formerly of general use, was moved and placed south-west of the two already existing sheep barns. Two new pens of a fair size were thus provided. In the meantime, a wooden fence 5 feet 6 inches high was built

A general view of the sheep barns and paddocks after the rearrangement of the buildings, C.E.F., Ottawa.

surrounding the sheep yard, the yard being divided into four smaller ones. The yards are well drained, receive plenty of sunshine, and the sheep during the winter seemed at their best. They can have plenty of exercise and take full advantage of the sunny days.

LAMB SALES

Each year at the Central Experimental Farm, a certain number of lambs are sold as market lambs. They are mostly cross-bred and raised especially for this purpose. This year they totalled 103, and were sold in three shipments at different times of the year. The first group was sold on August 16, 1929; the second September 23, 1929; and the third November 20, 1929.

The following table shows the sales in detail:—

LAMB SALES, 1929

April 16	32 lambs, 2,800 pounds at 13 cents	$ 364 00
Sept. 23	33 lambs, 2,770 pounds at 10 cents	277 00
Nov. 20	38 lambs, 3,350 pounds at 10·5 cents	351 75
Total	103 lambs, 8,920 pounds	$ 992 75
Average per lamb		9 63

A total of 103 lambs brought in $992.75, or an average of $9.63. The relatively high price paid for the first shipment shows the possibility of taking advantage of an early market, since the lambs sold for three cents more per pound.

SHEEP GRAZING EXPERIMENT

OBJECT OF THE EXPERIMENT.—To determine the possibility of improving permanent pasture for sheep by close grazing and proper dressing with fertilizers.

The close grazing would permit having a more nutritious pasture producing more digestible nutrients, particularly protein, and the fertilizers would stimulate the growth.

PLAN OF THE EXPERIMENT.—The experiment was conducted in co-operation with the Field Husbandry and the Chemistry Divisions. Twelve acres of land at the Connaught Rifle Range were divided into three sections of four acres each.

Each section was stocked with twelve ewes and twelve lambs. Section No. 1 was given an application of commercial fertilizer, consisting of 75 pounds of sulphate of ammonia, 225 pounds superphosphate, and 563 pounds muriate of potash, per acre. Section No. 2 was given no treatment. Section No. 3 received no treatment, but was divided into three equal parts. The animals from that section were changed from one field to another, every week. It was in fact a rotated pasture.

The experiment started on June 7, 1929, and lasted until September 20, at which date the lambs were sold. Weights were taken at the beginning of the experimental period, at three-week intervals thereafter, and at the end.

The following table gives an account of the gains made by the different lots. In computing the Animal Unit Pasture Days, the following scale was adopted:—

1 mature cow equal to 1 animal unit.
1 heifer equal to 0·75 animal unit.
7 sheep (adult) equal to 1 animal unit.
12 lambs equal to 1 animal unit.
1 horse equal to 1 animal unit.

LOT I—EWES

——	June 7	June 29	July 20	Aug. 10	Aug. 31	Sept. 20	Oct. 12
Total weight..... lb.	1,413	1,591	1,587	1,606	1,594	1,573	1,559
Average weight..... lb.	117·7	132·5	132·2	133·8	132·8	131	129·9
Gain per lot..... lb.	.....	178	−4	19	−12	−21	−14
Gain per animal..... lb.	.....	14·8	−0·33	1·58	− 1	− 1·75	− 1·16
Average daily gain per head..... lb.	.....	0·672	−·0157	0·0752	−·0476	−·0875	−·0527
Total gain to date..... lb.	.....	178	174	193	181	160	146
Number of days on pasture days	127	.....	.....	.....	.....	.....	.....
Number of sheep pasture days.....days	1,524	.....	.....	.....	.....	.....	.....
Animal unit.....	1·71	.....	.....	.....	.....	.....	.....
Animal unit pasture days....	217·7	.....	.....	.....	.....	.....	.....

LOT I—LAMBS

——	June 7	June 29	July 20	Aug. 10	Aug. 31	Sept. 20	Oct. 12
Total weight..... lb.	328·0	498·0	665·0	767·0	857·0	905·0	.....
Average weight..... lb.	27·3	41·5	55·4	63·9	71·4	75·4	.....
Gain per lot..... lb.	.....	170·0	167·0	102·0	90·0	48·0	.....
Gain per animal..... lb.	.....	14·1	14·0	8·5	7·5	4·0	.....
Average daily gain per head..... lb.	.....	0·64	0·66	0·40	0·357	0·20	.....
Total gain to date..... lb.	.....	170·0	337·0	439·0	529·0	577·0	.....
No. days on pasture....days.	105	.....	.....	.....	.....	.....	.....
No. of lamb pasture days days	1,260	.....	.....	.....	.....	.....	.....
Animal unit.....	1	.....	.....	.....	.....	.....	.....
Animal unit pasture days....	105	.....	.....	.....	.....	.....	.....

LOT II—EWES

——	June 7	June 29	July 20	Aug. 10	Aug. 31	Sept. 20	Oct. 12
Total weight..... lb.	1,397	1,582	1,531	1,555	1,504	1,524	1,480
Average weight..... lb.	116·4	131·8	127·5	129·5	125·3	127	123·3
Gain per lot..... lb.	.....	185	51	24	51	20	44
Gain per animal..... lb.	.....	15·4	4·2	2	4·2	1·66	3·6
Average daily gain per head..... lb.	.....	0·7	0·2	0·095	0·2	0·083	0·63
Total gain to date..... lb.	.....	185	134	158	107	127	83
No. days on pasture.....days	127	.....	.....	.....	.....	.....	.....
No. sheep pasture days. days	1,524	.....	.....	.....	.....	.....	.....
Animal unit.....	1·71	.....	.....	.....	.....	.....	.....
Animal unit pasture days....	217·7	.....	.....	.....	.....	.....	.....

LOT II—LAMBS

——	June 7	June 29	July 20	Aug. 10	Aug. 31	Sept. 20	Oct. 12
Total weight..... lb.	324	511	677	799	855	901	.....
Average weight..... lb.	27	42·5	56·4	66·5	71·2	75	.....
Gain per lot..... lb.	.....	187	166	122	56	46	.....
Gain per animal..... lb.	.....	15·5	13·5	10·1	4·6	3·8	.....
Average daily gain per head..... lb.	.....	0·7	0·64	0·48	0·219	0·19	.....
Total gain to date..... lb.	.....	187	353	475	531	577	.....
No. days on pasture.....days	105	.....	.....	.....	.....	.....	.....
No. of lamb pasture days days	1,260	.....	.....	.....	.....	.....	.....
Animal unit.....	1	.....	.....	.....	.....	.....	.....
Animal unit pasture days....	105	.....	.....	.....	.....	.....	.....

LOT III—EWES

——	June 7	June 29	July 20	Aug. 10	Aug. 31	Sept. 20	Oct. 12
Total weight..... lb.	1,408	1,477	1,461	1,506	1,454	1,472	1,473
Average weight..... lb.	117·3	123	122·5	125·5	121·1	122·6	122·7
Gain per lot..... lb.	.....	69	−6	35	−52	18	1
Gain per animal..... lb.	.....	5·75	−5	2·9	− 4·33	1·5	0·08
Average daily gain per head..... lb.	.....	0·479	−0·416	0·241	− 0·36	0·125	0·006
Total gain to date..... lb.	.....	69	63	98	46	64	65
No. days on pasture.....days	127	.....	.....	.....	.....	.....	.....
No. sheep pasture days..days	1,524	.....	.....	.....	.....	.....	.....
Animal unit.....	1·71	.....	.....	.....	.....	.....	.....
Animal unit pasture days....	217·1	.....	.....	.....	.....	.....	.....

LOT III—LAMBS

——	June 7	June 29	July 20	Aug. 10	Aug. 31	Sept. 20	Oct. 12
Total weight..... lb.	325	499	664	764	825	885	.....
Average weight..... lb.	27	41·5	55·3	63·6	68·7	73·7	.....
Gain per lot..... lb.	.....	174	165	100	61	60	.....
Gain per animal..... lb.	.....	14·5	13·7	8·3	5	5	.....
Average daily gain per head..... lb.	.....	0·658	0·652	0·395	0·238	0·238	.....
Total gain to date..... lb.	.....	174	339	439	500	560	.....
No. days on pasture.....days	105	.....	.....	.....	.....	.....	.....
No. lamb pasture days..days	1,260	.....	.....	.....	.....	.....	.....
Animal unit.....	1	.....	.....	.....	.....	.....	.....
Animal unit pasture days....	105	.....	.....	.....	.....	.....	.....

SUMMARIZED RESULTS FOR LOT I

Total Animal Unit pasture days	322·7
A.U. pasture days per acre	80·07
Carrying capacity in A.U.	0·68
Grazing season days	127
Total gain	723
Gain per acre	180·7

SUMMARIZED RESULTS FOR LOT II

Total Animal Unit pasture days	322·7
A.U. pasture days per acre	80·07
Carrying capacity in A.U.	0·68
Grazing season days	127
Total gain	660
Gain per acre	165

SUMMARIZED RESULTS FOR LOT III

Total Animal Unit pasture days	322·1
A.U. pasture days per acre	80·07
Carrying capacity in A.U.	0·68
Grazing season days	127
Total gain	625
Gain per acre	155·8

DISCUSSION.—It is premature to draw any conclusion from a one-year trial. However, the data show a decided advantage for the fertilized pasture over the two others. The difference in total gain of the lots is sixty-three pounds in favour of the fertilized pasture over the unfertilized one, and a difference of thirty-five in favour of the non-fertilized over the rotated field. The first gain is easily explained. The application of fertilizers is the responsible factor. As regards the two other fields, the cause is not so clear. Other factors must have had their influence. With an experiment of this kind, the first year can hardly be looked upon as more than a start. Too many factors were at work to be controlled perfectly. The carrying capacity of the field, the rapidity with which the grass reacted to fertilizer, the precipitation and temperature as affecting the

growth, the time at which the animals were put on pasture, and adding to this the kind of livestock, it was enough to mask the true results. The information gathered will, however, enable us to control or neutralize the effect of the above factors, especially as regards the luxurious pasture growth in June, which will no doubt necessitate the putting on of more animals.

The discrimination of the sheep as regards grazing is also a factor, which must be reckoned with. They will eat the short and tender grass and refuse the tall.

The experiment will be continued in order to see the possible improvement due to fertilizers and rotation.

INDIVIDUAL FLEECE GRADING POLICY

The Animal Husbandry Division at the Central Experimental Farm is co-operating with the Live Stock Branch in the policy of individual grading of pure-bred fleeces.

The intent of this movement is firstly to improve the quality of the wool in general, secondly, to discover the type of wool of each pure-bred flock in particular, and last but not the least, to furnish the owner of pure-bred stock with accurate records of performance so as to enable him to organize his breeding operations accordingly. The average farmer is looking to the breeder of pure-bred stock for the improving of his flock through good rams. Therefore, it is important that the breeder of registered sheep be able to improve not only the conformation but also the quality of the wool. The grading of the fleece of each individual in the flock should help him to do so.

We have followed this policy, and we now have a complete record of our flock. This places us in a position to breed accordingly.

MARKETING OF THE WOOL

As in the previous years, the wool produced on this Farm was sold to the Canadian Co-operative Wool Growers, Limited. It was sold on a graded basis, and amounted to 2,290 pounds. Of this, 34·33 per cent was of the medium staple ($\frac{3}{8}$ blood staple), 31·59 per cent low medium staple ($\frac{1}{4}$ blood staple), 18·59 per cent of low staple (low $\frac{1}{4}$ blood staple), 9·1 per cent hard cotts, and the balance, 9·1 per cent, was composed of common braid, soft cotts, and dead fleeces.

The following table gives a summary of the weight and grading of fleeces by breeds and crosses.

SUMMARY—WEIGHTS AND GRADES OF FLEECES

Description		Shropshire	Grade Shropshire	Cross-bred Shrop. x Leicester	Leicester
Number of fleeces	No.	117	82	38	72
Total weight	lb.	809·8	515·1	295·3	512·5
Average weight per fleece	lb.	6·9	6·28	7·77	7·11
Grading					
Medium staple ($\frac{3}{8}$ blood staple)	No.	84	37	.....	.....
percentage	%	71·78	45·12	.....	.....
Med. clo. ($\frac{3}{8}$ blood staple)	No.	1	.....	.....	.....
percentage	%	0·85	.....	.....	.....
Low medium staple ($\frac{1}{4}$ blood staple)	No.	28	45	27	.....
percentage	%	23·93	54·87	71·05	.....
Low staple (Low $\frac{1}{4}$ blood staple)	No.	.....	.....	11	40
percentage	%	.....	.....	28·95	55·55
Hard cotts	No.	.....	.....	.....	26
percentage	%	.....	.....	.....	36·11
Soft cotts	No.	.....	1	.....	.....
percentage	%	.....	1·22	.....	.....
Coarse	No.	.....	.....	.....	5
percentage	%	.....	.....	.....	6·94

A comparison with the previous year shows a marked improvement in the quality of the wool. In 1928, the percentage of medium staple in Shropshire fleeces was 50 per cent, in 1929 it was 71·78 per cent. The Leicester last year had a percentage of 34·85 per cent of low staple; this year it is 55·55, an increase of 20·70 per cent. Last year, the percentage of hard cott fleeces was 62·12 per cent; it is now 36·11 per cent, a decrease of 26·01 per cent.

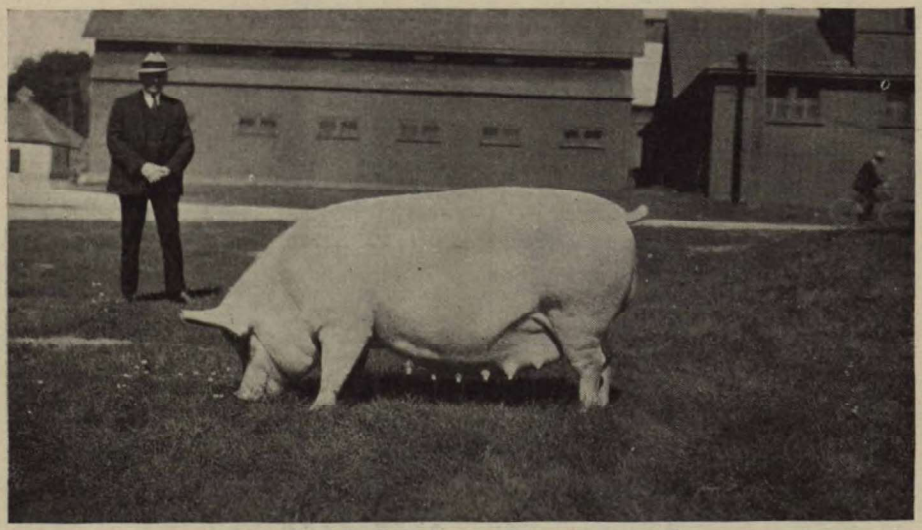
The results are quite encouraging, and with the means of individual grading of fleeces we expect to be able to breed only the ewes which show in their fleeces the desirable qualities of the breed. In so doing, the improvement of the flock in general will be more rapid.

SWINE

The swine herd at the Central Experimental Farm, Ottawa, is composed of Yorkshires and Berkshires. These are representative of the hogs in the district surrounding the Farm as well as being two of the outstanding breeds reared in Canada. The Yorkshire herd consists of one boar, thirty-five mature sows, nine gilts, and one hundred and twelve young pigs. The Berkshire herd is made up of one boar, ten mature sows, four gilts, and six feeder pigs.

The demand for breeding stock during the past year has been somewhat greater than could be supplied. A rather large number of pigs are needed each year for experimental work, and thus it is not always possible to fill all the requests that are received for pigs of various ages. There was a total of ninety-six head of breeding stock sold, which consisted of forty-five Yorkshire boars, twenty-nine Yorkshire sows, fifteen Berkshire boars, and seven Berkshire sows. Most of these were sold shortly after weaning, which takes place when the pigs are eight weeks old.

In addition to the sales of breeding stock, there is a considerable amount of pork marketed, being mainly the product of experimental work. In all 25,140 pounds of market hogs were sold in addition to 2,950 pounds of fresh pork.



In the production of quality hogs it is essential to use brood sows of correct type and breeding.

EXPERIMENTAL WORK

Experimental work has been continued in which researches in feeding have predominated. The chief limitations to carrying on this work, or in extending its scope, have been the insufficiency of equipment and housing facilities. However, even with these drawbacks considerable work has been accomplished, which will serve as the answers to practical problems in the swine industry.

ANALYSES OF FEEDS

All feeds used in experimental work throughout the year were sampled so that complete analyses might be made. The Division of Animal Husbandry is indebted to Dr. F. T. Shutt, the Dominion Chemist, for his generous aid and co-operation, and for the following analytical data on feeds used in experimentation throughout the year.

ANALYSES OF FEEDS

Lab'y No.	Feed	Source	Moisture	Protein	Fat	Carbo-hydrates	Fibre	Ash
			%	%	%	%	%	%
100001	Shorts	Ogilvy Flour Mills, Montreal	9·27	16·25	5·99	56·46	7·55	4·48
100002	Oats	Home grown	8·63	10·93	6·27	60·84	10·58	2·75
100003	Bran	Ogilvy Flour Mills, Montreal	7·92	14·81	7·23	53·17	10·92	5·95
100004	Barley	Home grown	8·77	11·81	2·28	68·51	5·58	3·05
100005	Middlings	Maple Leaf Milling Co., Toronto	10·66	15·84	3·65	62·93	3·88	3·04
100006	Linseed oil meal	Sherwin-Williams Co., Ltd., Montreal	7·79	34·03	8·39	36·66	7·62	5·51
100007	Bone char*	Canada Sugar Refinery Co., Montreal	1·05	N=·47	.....	.....	.....	89·91
100008	Tankage**	Swift Canadian Co., Toronto	7·51	65·62	8·51	.....	.....	14·17
100009	Corn	Lake of Woods Mfg. Co., Toronto	9·95	9·28	3·87	71·70	3·16	2·04

*P_2O_5=35·26% $Ca_3(PO_4)_2$=77·02%
**P_2O_5=5·10% $Ca_3(PO_4)_2$=11·14%

COST OF FEEDS

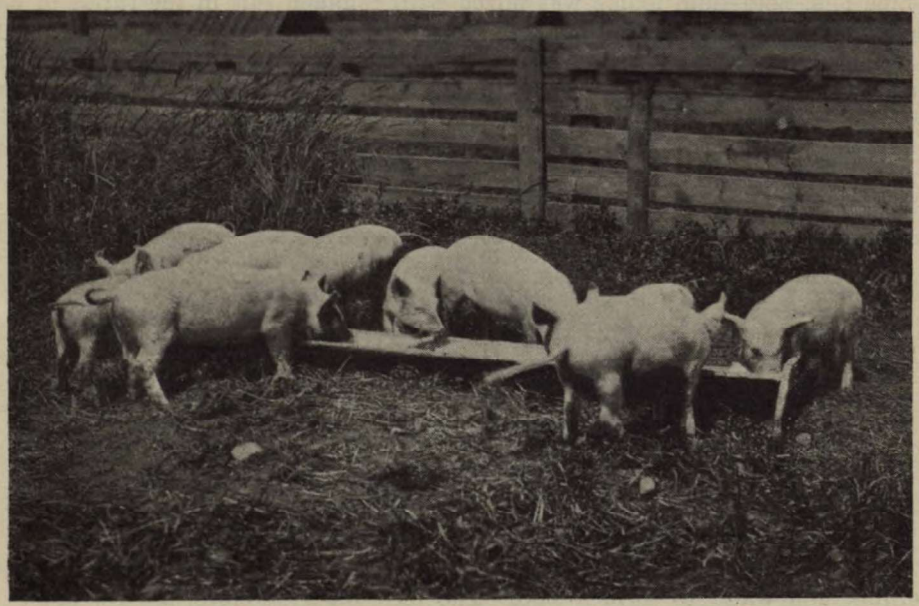
The prices of feeds for the year 1929-30 have been considerably lower than in the previous year, both mill feeds and coarse grains being reduced in cost as is shown in the following prices of feeds, which were purchased during the year.

Feed Costs

Middlings, per ton	$ 32 00
Ground oats, per ton	42 20
Ground barley, per ton	32 00
Shorts, per ton	29 04
Bran, per ton	27 71
Linseed oil meal, per ton	53 30
Tankage, 50 per cent protein, per ton	57 10
Tankage, 60 per cent protein, per ton	66 75
Bone char, per ton	20 00
Salt, per ton	20 25
Buttermilk, per ton	6 00
Skim-milk, per ton	8 00
Mangels, per ton	3 50
Green feed, per ton	4 75
Ground corn, per ton	47 50

ERADICATION OF SWINE PARASITES

The system for eradication of parasites adopted last year has been continued with very gratifying results. As stated in our last annual report, a procedure was started to attempt to eradicate the troublesome parasites and especially the common round worm from the herd. Further, a system of prevention as well as cure was instituted for the young pigs. Under the plan followed the mature sows are treated for worms a few weeks before farrowing and a few days later are moved to a clean pen. As farrowing time draws near, the sow is washed with tepid water, making sure that the udder and teats are carefully washed and later disinfected with a creolin solution. The sow is then put



A pasture supplying an abundance of green feed supplemented by the feeding of some concentrates, is an ideal arrangement for the growing of breeding stock.

in the farrowing pen, which has previously been scrubbed with boiling water and lye, using one pound of lye with forty gallons of water. If possible the sow and pigs are again moved to another clean pen a few weeks after farrowing as a further preventative of worm infection. As soon as the pigs are weaned, which is generally done at eight weeks of age, they are given a vermifuge so that any possibility of the pigs harbouring worms will be eliminated.

Treated in this way, it is believed that for all practical purposes the herd is almost worm free and the excellent results with the young pigs during the past season would seem to justify this contention. To further corroborate our observations, pigs slaughtered were followed through the abattoir without finding any evidence of round worm infestation.

THE FEEDING VALUE OF SALT AND IODIZED SALT

The following experiment with salt and iodized salt was undertaken to further confirm results, which were secured during the previous year. In this experiment, however, the proportion of potassium iodide was increased somewhat, thus determining its nutritional value when fed in larger quantities. This was prompted by our experience in the former experiment where the larger amount of potassium iodide produced cheaper gains, whereas the smaller amount produced a negligible difference in gain.

In this experiment, three groups of six pigs each were started on test at an average weight of 61 pounds. The experiment was continued until the pigs reached market weights averaging over 200 pounds each. The iodine was fed in the form of potassium iodide and in order that the correct quantity would be fed, it was mixed in a larger quantity of common salt. Thorough mixing was accomplished by drying the salt and then spreading it out evenly on a clean floor. The potassium iodide was dissolved in a small amount of water, and the solution was sprinkled evenly over the salt. The whole was well mixed upon completion of drying, and was then sacked preparatory to using. For the iodine lots, potassium iodide was mixed with common salt in the ratios of one to 500 and one to 250 by weight for the low and high iodized lots respectively.

Three lots of pigs were fed, namely, common salt lot, low iodized salt lot, and high iodized salt lot. The salt mixture was fed in each lot at the rate of one-half pound per pig for each 30 day period.

The basal meal ration for all lots was as follows:

1st 60 days	Pounds	*60 to 90 days*	Pounds
Middlings	100	Middlings	100
Ground oats	200	Ground oats	100
Ground barley	50	Ground barley	100
Shorts	50	Shorts	100
Bran	50	Bran	50
	Per cent		Per cent
Linseed oil meal	3½	Linseed oil meal	3½
Tankage	3½	Tankage	3½

90 days to finish

	Pounds
Barley	200
Oats	200
Shorts	100
	Per cent
Tankage	3½

Just previous to each feeding, the meal and salt were mixed up with buttermilk and water to form a slop. The feed was, therefore, always fed in a fresh condition, thus obviating any danger from feeding sour or tainted feed.

The following table shows the relative gains, feed consumption, and cost of gains for the three lots:—

RESULTS OF SALT AND IODIZED SALT EXPERIMENT

Items		Lot 1 Check common salt	Lot 2 Common salt and small amount of iodine	Lot 3 Common salt and large amount of iodine
Number of pigs	No.	6	6	6
Initial weight, gross	lb.	364	368	367
Initial weight, average	lb.	60·7	61·3	61·2
Final weight, gross	lb.	1,212	1,274	1,246
Final weight, average	lb.	202	212·3	207·7
Total gain	lb.	848	906	879
Average gain per pig	lb.	141·3	151·0	146·5
Number of days on test	No.	110	110	110
Average daily gain	lb.	1·28	1·37	1·33
Total meal consumed	lb.	2,285	2,407	2,398
Meal eaten per 100 lb. gain	lb.	269·5	265·7	272·8
Total buttermilk consumed at 30 cents per cwt	lb.	4,250	4,450	4,450
Buttermilk consumed per 100 pounds gain	lb.	501·1	491·2	506·3
Additional supplement	lb.	11	11	11
Value of supplement	$	0 11	0 11	0 11
Meal cost per cwt	$	1 80	1 80	1 80
Total feed cost	$	53 99	56 79	56 62
Feed cost per head	$	9 00	9 47	9 44
Feed cost per 100 pounds gain	$	6 37	6 27	6·44

In a survey of the above table, it is easily noticeable that Lot 2, which was fed the salt containing the small amount of iodine, made gains which were produced at a very slightly lower cost. However, there was not very much variation between the lots and so the difference would be considered negligible. Both the meal consumption and buttermilk consumption per 100 pounds gain of the three lots were practically the same. These results are in accord with previous findings in which the reaction to the feeding of potassium iodide was indifferently positive. The potassium iodide was fed in amounts of one-30,000 pound and one-15,000 pound per pig daily. The conclusions as a result of this experiment, and which bear out to a large extent the previous findings, would be that there was not any definite beneficial effect from potassium iodide feeding in the above-mentioned quantities, and that certainly no toxic or ulterior effects resulted from such treatment. Therefore, until further results are procured, which are definitely positive or negative, the feeding of potassium iodide to growing and fattening swine, even in a district such as this, which is semi-iodine deficient, would not seem advisable.

However, these results are not expected to apply in all districts. It is realized that certain districts are much more deficient in iodine than others. Wherever there is evidence of marked deficiency of iodine, which is revealed by goitre in calves and lambs and hairlessness in pigs, then the feeding of iodine to pigs is certainly advised. This can be easily accomplished by mixing four ounces of potassium iodide with 100 pounds of salt as carried out in the above experiment, and then the mixture should be fed daily as one would feed common salt, namely at the rate of one-half pound to one pound per pig per month, depending on the size of the pigs.

OLD HICKORY SMOKED SALT

Old Hickory Smoked Salt has been advertised rather widely as a ready-to-use product for the curing, preserving, and flavouring of meat products. Its main value would seem to lie in the fact that its use would obviate the necessity

of smoking in the regular way. The smoked salt is a brown coloured substance, and consists of common salt to which a smoke has been added by means of a patent process. According to the manufacturers, the smoked salt should be used in a curing formula in the same proportion as ordinary salt and that with such treatment a smoked flavour will be imparted to the meat.

It was decided to test out the value of smoked salt in curing pork, and to this end four sides of pork were cured experimentally. Two of these sides were brine cured, one with smoked salt, and the other with common salt, the latter being afterward smoked. The other two sides of pork were dry sugar cured, one with smoked salt, and the other with common salt, and of these the side cured with common salt was afterward smoked.

All four sides were cured by the formulas recommended by the Smoked Salt Company in their booklet. The mild curing directions for Canadian conditions were followed, the meat being cured one and one-half to two days per pound, depending on the weight and thickness of the pieces.

The following receipes were used in the brine cured lots:—

Common Salt lot—
9 pounds common salt.
2½ pounds sugar.
4 ounces saltpetre.
4½ gallons water.

Smoked Salt lot—
9 pounds smoked salt.
2½ pounds sugar.
4 ounces saltpetre.
4½ gallons water.

In the dry cure lots, the following curing recipes were used:—

Common Salt lot—
7½ pounds common salt.
2½ pounds sugar.
4 ounces saltpetre.

Smoked Salt lot—
7½ pounds smoked salt.
2½ pounds sugar.
4 ounces saltpetre.

The brine lots were cured in the above-mentioned brines for the requisite number of days, and the dry cure lots were rubbed and also rerubbed with the dry cure mixtures. All cures were overhauled after being five days in cure. The brine lots were taken out and turned, the brine was boiled, then cooled, and again poured over the meat. In overhauling the dry cure lots, the pieces of meat were taken out of the curing barrels and rubbed with the curing mixture. The pieces were then replaced in the curing barrels, and the pickle which had previously formed was sprinkled over the meat. Curing took place between the temperatures of 40 and 43 degrees Fahrenheit. By the eighteenth day, all pieces were removed from the cures. After removal from the cures, the meat was soaked in warm water at about 70 degrees Fahrenheit for from forty to eighty minutes, depending on the size of the pieces. Any excess fat was removed by scraping with a dull knife. The smoked salt lots were then hung up to condition in a warm, dark room, and the common salt lots were smoked with a mixture of maple and hickory hardwood.

The shoulders, bacons, and hams in all the lots were weighed individually both before and after curing. This was carried out to determine if there was any great variation in shrinkage due to method of curing. Smoking of meats always seems to cause considerable shrinkage, and it was with this in mind as compared to the smoked salt method of curing that the shrinkages were determined. It was found that the smoked salt lots had an average shrinkage of 4·5 per cent, while the common salt lots, which were afterward smoked, averaged 8 per cent shrink. This is a considerable saving for the smoked salt method of curing, since ordinary smoking produces rather heavy shrinkage in the meat.

After the curing processes were completed, samples of the common salt and smoked salt cures were given to a number of responsible parties, who tested these and filled out a questionnaire on their findings. It was practically a universal opinion that the smoked salt lots had a genuine smoked flavour, while only about fifty per cent regarded it either as the more pronounced smoked

flavour or the more desirable flavour. It is, therefore, quite evident that a smoked flavour was imparted to the meat. However, its smoked flavour was preferred to ordinary hardwood smoking in only about fifty per cent of the cases. There was very little, if any, difference in texture of meat between the two methods of curing.

The frying pieces of both the common salt and smoked salt lots required parboiling before frying in order to be most palatable. With such treatment, the quality of the cured meat of both lots ranked high, and would be considered high-class farm cured products.

Thus the findings of the experiment may be summarized as follows:—

Smoked salt produced somewhat less shrinkage in curing than ordinary hardwood smoking.

Although the smoked salt produced a genuine smoked flavour, nevertheless, it was not considered superior to curing with common salt and then smoking with hardwood.

No difference could be detected between the methods of curing in the texture of the cured products.

Undoubtedly, smoked salt curing, exclusive of the cost of the smoked salt, was quite economical due to the saving in labour and equipment.

BLOOD TESTING OF BROOD SOWS

It was conceived some time ago that some of the weaknesses in young pigs and apparent inability of brood sows to raise profitable litters might be due, or at least be partially caused by an anemic condition in the sows. Thus, the testing of the blood of sows to determine its hemoglobin content was undertaken, and since first started during the past year, the blood of each sow in the herd has been tested, and in many cases also retested at various times.

The testing of the sow's blood to determine its hemoglobin content was done with a Dare Haemoglobinometer. By means of this instrument the undiluted blood of the animal is matched in camera with a graduated coloured disc. After the matching of colours the hemoglobin percentage of the blood can be read from a scale on the instrument. It can then be ascertained which sows have a normal hemoglobin percentage, and whether any are below normal, thus disclosing an anemic condition.

So far, this project is only in the data gathering stage, and although a considerable number of tests have already been made, nevertheless, further work is necessary in order that a suitable standard can be set and all tests made, then compared to such a standard. Just in passing, it may be remarked that considerable variation in the hemoglobin content of the blood of the sows has been found as well as a certain variation in the test of individual sows, the latter being evidently the result of the breeding duties of the sow, such as pregnancy and suckling a litter.

ANEMIA CONTROL IN GROWING PIGS

Anemia in young growing pigs is evidently one of the latest scourges to which the pig like other classes of animals and the human race is addicted. It was decided to try out various supplements such as iron oxide and copper sulphate to determine their value as preventives of anemia; the resultant difference, if any, to be measured by the variation in feed consumption, average daily gains, feed consumption per pound of gain, cost of gains, and also by observations and blood testing from time to time. Tests were made of the blood of each pig to determine the percentage of hemoglobin at the beginning, end, and through the course of the experiment.

The following basal feeding mixtures were used for all lots during the experiment.

BASAL FEEDING MIXTURES

1st 60 days	Pounds	*60 to 90 days*	Pounds
Middlings	200	Middlings	100
Ground oats	100	Ground oats	150
Ground barley	50	Ground barley	100
Shorts	50	Shorts	50
Bran	25	Bran	25
Linseed oil meal	14	Linseed oil meal	14
Tankage	14	Tankage	14
Bone char	4½	Bone char	4½
Salt	2¼	Salt	2¼
Buttermilk	hand fed	Buttermilk	hand fed

The experiment consisted of 12 pigs, which were divided into three lots of four pigs each, the allotment to the various groups being made so that they would be as nearly equal as possible in thrift, weight, condition, and breeding.

The following shows the allotment, rations, and supplements of the various groups:—

LOT 1.—Check. Basal feeding mixture.

LOT 2.—Same as Lot 1 plus iron oxide which was fed at the rate of one teaspoonful per group daily. This supplied $\frac{1}{256}$ pound of iron oxide per pig daily.

LOT 3.—Same as Lot 1 plus a mixture of iron oxide and copper sulphate. The mixture was made up of 19 parts iron oxide and one part copper sulphate, and was supplied at the rate of one teaspoonful per group daily. This supplied $\frac{1}{270}$ pound of iron oxide and $\frac{1}{5120}$ pound of copper sulphate per pig daily.

The following table shows the gains, feed consumption, cost of gains and the average hemoglobin tests of the various lots.

ANEMIA CONTROL IN GROWING PIGS

Items		Lot 1 Check		Lot 2 Iron oxide		Lot 3 Iron oxide and copper sulphate	
		60-day trial	Full experiment 90 days	60-day trial	Full experiment 90 days	60-day trial	Full experiment 90 days
No. of pigs per lot	No.	.....	4	.....	4	.....	4
Initial weight group	lb.	.....	247	.....	231	.....	249
Initial weight average	"	.....	61·8	.....	57·8	.....	62·3
Final weight group	"	567	799	525	743	543	754
Final weight average	"	141·7	199·7	131·3	185·8	135·8	188·5
Total gain	"	320	552	294	512	294	505
Average gain per pig	"	80	138	73·5	128	73·5	126·3
Number of days on test	No.	60	90	60	90	60	90
Average daily gain	lb.	1·3	1·5	1·2	1·4	1·2	1·4
Total meal consumed at $1.78 per cwt	"	701	1,396	580	1,202	584	1,166
Meal eaten per lb. gain	"	2·2	2·5	2·0	2·3	2·0	2·3
Total buttermilk consumed at 30 cents per cwt	"	2,100	3,300	1,800	2,874	1,800	2,874
Buttermilk consumed per lb. gain	"	6·6	5·9	6·1	5·6	6·1	5·7
Total feed cost	$	18·78	34·85	15·72	30·19	15·80	29·44
Feed cost per cwt. gain	$	5·86	6·31	5·34	5·89	5·38	5·82
Hemoglobin tests—							
Average at beginning		99·3	.....	96·8	.....	98·8	.....
Average at end of test		90·3	91·8	100·5	92·3	97·3	91·3

The foregoing table gives the results for the full period of the experiment and also for the first 60 days during which it was conducted. It was considered important to include separately the first 60 days of the trial, since it

is during the early stages of the pig's life that symptoms of anemia are most apparent and when the effect of agencies for the control and elimination of anemia might be most clearly shown.

The pigs were normal fall pigs, and were fed during the fall and winter of the past year—the time of year that would bring out an anemic condition if the pigs were so addicted or the ration sufficiently deficient in some particular to cause it.

The pigs in all lots were hand fed throughout the experiment and thus the differences in feed consumption and average daily gain may be taken as due to the method of feeding. However, the figures showing feed cost per cwt. gain reveal that both the supplemented lots made cheaper gains than Lot 1, the check lot. This was the case both for the 60-day and the 90-day experiments, the greater difference, however, being in the 60-day test where a variation in cost of 100 pounds gain of 52 cents is shown, the difference in the 90-day test being 39 cents.

There was very little difference between Lots 2 and 3, the supplemented lots, in cost of gain. In the 60-day test the iron oxide group showed the cheaper gains while in the 90-day test the iron oxide and copper sulphate produced cheaper gains. Nevertheless, the differences were so small that they may be considered negligible, and were certainly within the limits of experimental error. In the light of other investigations, one would expect a considerable difference between these two lots if the mineral substances employed were pure. Some research workers have found that the presence of copper in the ration even in small amounts along with an iron supplement will make the iron much more readily available for the use of the animal. Thus it is presumed that the iron oxide contained copper in minute amounts and that even this trace of the latter was all that was required for optimum nutrition. The important result of the experiment would seem to be the cheaper gains made by the iron oxide and iron oxide and copper sulphate lots in comparison to the check lot which did not receive these supplements. Naturally these cheaper gains in terms of dollars and cents were the result of a lower feed consumption, but owing to the feeds consisting of both meal and milk, the gains can be interpreted more clearly and easily in terms of their monetary value.

The hemoglobin tests reveal some interesting results. The 60 day experiment, which because of the time of the year when it was in progress and being the early life of the pigs, would likely be a clearer index of the results of feeding the iron oxide and copper sulphate supplements than the 90 day period where the pigs were grown practically to market weights. In this test the average hemoglobin test shows a rather sharp decline for the check lot while the supplemented lots practically held or increased the hemoglobin percentage in their blood. These data, coupled with the hemoglobin tests for the 90 day test, would seem to show that there was a natural decline in percentage hemoglobin in the blood as the pigs grew older, but that this decline did not appear quite as quickly when the ration was supplemented by the iron and iron and copper supplements. The pigs in the suplemented lots likely enjoyed somewhat better health than the check lot, this being further corroborated by the foregoing data in which the supplemented lots made more economical gains consistently throughout the test.

The iron oxide and copper sulphate supplements proved of considerable value in the ration of growing pigs in this one test. However, the work will be repeated as soon as possible in order to corroborate these results and establish more definitely the relative values of these two compounds when fed in purer form.

ADVANCED REGISTRY POLICY FOR SWINE

The co-operative project with the Dominion Livestock Branch for the advanced registration of swine has been continued during the past year on the Central Farm as well as on several Branch Experimental Farms. During the previous year, litters had only been tested at the Central Farm, but during the year 1929 this work was extended to include a good number of Branch Experimental Farms and other institutional farms as well as any private breeders who cared to enter their stock. Thus, considerable data were gathered in a single year, and since it came from such a variety of districts and conditions might be considered representative data for the formulation of a tentative standard. A tentative standard was established by the Advanced Registry Board, which seems to pass very fair judgment on the pigs tested during the past year.

The Advanced Registry Policy for swine is in effect a yardstick for measuring the breeding ability of sows and boars. Under the tentative standard, a sow, in order to pass successfully must wean eight pigs, five of which are nominated by the breeder at weaning time and are fed up to market weights. The pigs must gain at the rate of 200 pounds in 200 days, or its equivalent. When the pigs reach market weights four of the five pigs nominated at weaning, must be shipped to an abattoir for a slaughter test in which there is a strict examination and grading of the carcasses. Thus, in order to qualify, the sow must raise pigs which conform to the three requirements—namely, eight pigs must be weaned, the nominated pigs must gain on the average 200 pounds in 200 days, and four of the nominated pigs when submitted to the slaughter test must pro-

The following table shows the gains, feed consumption, cost of gains, Registry

WEIGHTS AND FEED RECORDS OF

Name of sow	Tattoo	Registration number	Sire of litter	Breed	Litter data						
					Number born	Number weaned	Weight of litter		Farrowing to weaning		Cost to raise one pig from birth to weaning
							Birth	Weaning	Amount of feed	Total cost of feed	
							lb.	lb.	lb.	$	$
Ottawa Luck 194 E.T. 634.	P	71496	Compton Hall 69327	Berkshire.....	11	6	24	225	995	10 32	1 72
Ott. Augustine 229 E.T.409B	H	104997	Brandon A.F. 331	Yorkshire....	11	9	29	317	1,400	13 39	1 49
Ott. Lass 405 E.T. 547A	I	122306	Lakeside Bourne Boy 4	Yorkshire....	12	8	22	274	1,400	13 39	1 67
Ott. Alexandra 201 E.T.499A	G	115556	Lakeside Bourne Boy 4	Yorkshire....	10	8	27	294	1,400	13 39	1 67
Ottawa Luck 187 E.T. 513	O	69854	Compton Hall 69327	Berkshire.....	9	6	21	204	1,110	11 18	1 86
Ott. Beauty 32 E.T. 715B	M	135686	Brandon A. F. 331	Yorkshire....	13	7	24	237	1,350	13 29	1 90
Ott. Alexandra 287 E.T.742B	K	135685	Lakeside Bourne Boy 4	Yorkshire....	16	9	30	263	1,350	13 29	1 48
Ott. Augustine 273 E.T. 717	L	128920	Lakeside Bourne Boy 4	Yorkshire....	15	10	36	324	1,375	13 75	1 38
Ott. Augustine 304 E.T.721B	Q	135682	Brandon A. F. 331	Yorkshire....	8	8	25	249	1,350	13 29	1 66

duce carcasses of the required bacon type, fleshing and general conformation and finish.

The pigs from nine sows were tested during the year under the Advanced Registry Policy, feed and weight records being recorded on the five nominated pigs of each litter from weaning up to market weights. The pigs were weighed individually at weaning which constituted the beginning of the feeding period and then weighed every 30 days thereafter until they were marketed. The amount of feed consumed in each 30 day period was also recorded, the following being the feed mixtures used throughout the feeding period.

1st 60 days	Pounds
Middlings	200
Ground oats	100
Ground barley	50
Shorts	50
Bran	25
Linseed oil meal	14
Tankage	14
Bone char	4½
Salt	2¼
Buttermilk	hand fed

60 to 90 days	Pounds
Middlings	100
Ground oats	150
Ground barley	100
Shorts	50
Bran	25
Linseed oil meal	14
Tankage	14
Bone char	4½
Salt	2¼
Buttermilk	hand fed

90 days to finish	Pounds
Ground oats	150
Ground barley	100
Ground corn	100
Shorts	100
Linseed oil meal	14
Tankage	14
Bone char	4½
Salt	2¼
Buttermilk	hand fed

etc., for each of the nine groups of pigs entered under the Advanced scheme.

PIGS IN ADVANCED REGISTRY POLICY FOR SWINE

Weights of 5 feeder pigs							Feed consumption and cost, 5 feeder pigs weaning to finish						Returns from 5 pigs	
at weaning	90th day	at finish	Total gain	Days of feeding trial	Average daily gain	Average Number of days birth to finish	Meal at $1.84 per 100 pounds	Meal eaten per pound gain	Milk at $6.00 per ton	Green feed at $4.75 per ton	Total cost	Feed cost per 100 pounds gain	Cash returns	Net returns birth to finish
lb.	lb.	lb.	lb.		lb.		lb.	lb.	lb.	lb.	$	$	$	$
194	675	1,006	812	162·2	1·00	222·2	1,968	2·42	5,390	275	53 03	6 53	116 70	55 07
183	811	1,061	878	146	1·20	206	2,275	2·59	5,355	305	58 65	6 68	123 08	56 98
172	868	997	825	139	1·19	199	2,100	2·55	5·373	340	56 17	6 81	115 65	51 13
180	910	1,016	836	137	1·22	197	1,953	2·34	5,057	291	51 80	6 20	117 86	57 71
180	957	998	818	128·6	1·27	188·6	1,660	2·03	4,405	305	44 48	5 44	115 77	61 99
167	990	1,040	873	128·2	1·36	188·2	2,030	2·33	4,400	310	51 29	5 88	120 64	59 85
167	1,030	1,030	863	120	1·44	180	1,860	2·16	4,100	340	47 33	5 48	119 48	64 75
186	1,009	1,009	823	119·8	1·37	179·8	1,895	2·30	4,525	305	49 17	5 97	117 04	60 97
160	1,001	1,001	841	120·6	1·39	180·6	2,092	2·49	4,920	344	54 07	6 43	116 12	53 75

Although the differences between the various groups were not great, nevertheless they were sufficient to note certain particulars in which the pigs of some of the sows clearly excelled others. Thus, due mainly to the number of pigs weaned, the cost of raising from birth to weaning varied from $1.38 to $1.90 per pig. This means that some of the pigs and especially those from large litters were produced at a much lower cost, and consequently would return in this period a larger profit to the producer. Again it was found that there was a large variation in the number of days required to bring the pigs to market weights, the birth to market period varying from 180 days to 222 days. This item is of utmost importance to the producer of market hogs, since it is by a quick turnover that the greatest profits are generally made.

Accurate data were compiled of all feeds consumed and when these are charged at standard prices, reveal a considerable variation in cost per 100 pounds gain. Under this heading the cost ranged from $5.44 to $6.81 for each 100 pounds of gain.

In all sections of the policy, variations have been found in the various litters similar to those pointed out in the weights and feed records. Some sows farrow and wean larger litters than others; some produce pigs which will grow faster and more economically than others, and finally some of the pigs will yield carcasses better suited for the production of Wiltshire sides of the correct weight and finish. Thus, certain sows are more valuable than others in the herd as breeders of good type, easy feeding pigs, and the Advanced Registry Policy as indicated above will assist materially in selecting out these good matrons. Likewise, with the accumulation of further records it will be possible to determine the boars which are producing the most desirable type of pigs, and here too, select only the very best breeding boars for future use.

REPORT ON ANIMAL HYBRIDIZATION AT BUFFALO PARK, WAINWRIGHT, ALTA.

FOR THE YEAR ENDING MARCH 31, 1930

(Supervised by Mr. A. G. Smith, Superintendent, Buffalo Park)

The various groups as arranged for the 1928 breeding season, together with the resultant natural increase in 1929, were as follows:—

Group No. 1—

Domestic bull	6 bison cows
	1 yak-bison
	2·75 per cent domestic, 25 per cent bison
	1 50 per cent bison, 25 per cent yak, 25 per cent domestic
	1 50 per cent domestic, 25 per cent yak, 25 per cent bison
	1 50 per cent yak, 25 per cent bison, 25 per cent domestic
	3 bison-domestic

Group No. 2—

Bison bull	4 domestic
	1 domestic-yak
	3 yak-domestic

Group No. 3—

50 per cent yak, 25 per cent bison, and 25 per cent domestic bull.....3 domestic

Group No. 4—

75 per cent domestic, 25 per cent yak bull.....2 domestic

Group No. 5—

Yak-domestic bull (5 years old)	3 yak
Domestic-yak bull (4 years old)	3 yak-domestic
	1 domestic

NATURAL INCREASE RESULTING FROM 1928 MATINGS

Group 1 (Domestic Sire).—The increase from this group was as follows:—

From the six bison cows three calves were secured, one of which came prematurely and dead at birth. The remaining two hybrids, a male and a female, were healthy and normal.

From the yak-bison cow, a female calf (50 per cent domestic, 25 per cent bison, 25 per cent yak).

From the two second generation cows (75 per cent domestic, 25 per cent bison), one female calf (87½ per cent domestic, 12½ per cent bison). One cow was not with calf.

From the second generation cow (50 per cent bison, 25 per cent domestic, 25 per cent yak)—not with calf.

From the second generation cow (50 per cent domestic, 25 per cent yak, 25 per cent bison), a male calf (75 per cent domestic, 12½ per cent yak, 12½ per cent bison).

From the second generation cow (50 per cent yak, 25 per cent bison, 25 per cent domestic)—not with calf.

From the three first generation hybrids (bison-domestic), only one calf, a male (75 per cent domestic, 25 per cent bison), was secured.

NOTE.—While comparatively few calves of the domestic-bison cross have been produced so far, it is interesting to observe that no loss of females has

occurred, a fact distinctly in contrast with the results of the reserve cross. Of the three calves secured, one was premature and the remaining two are strong and rugged.

Group 2 (Bison Bull).—Four domestic cows; two conceived; both aborting—one in November, 1928, the other in March, 1929.

One domestic-yak cow; produced a female calf dead at birth.

Three yak-domestic cows; two conceived, one of which aborted, the other delivering a female calf.

Groups 3, 4 and 5.—From these groups no increase was secured.

As a net result, seven calves were secured, this number being reduced to three owing to the loss of one and the decision to eliminate the yak, and all succeeding generations showing yak blood, from the experiment, as a result of which three 1929 calves were slaughtered.

In connection with the natural increase as described, there should be noted the addition of three bison heifer calves from the Buffalo Park herd. This was done by way of increasing the female bison breeding cows in the enclosure. As indicated in previous reports, introductions of this nature must be made while the animals are quite young in order that they may accustom themselves to, and later consort with domestic cattle.

Photographs of the three 1929 calves are shown in this report.

DECREASE IN HERD

Reference to the report for the previous year will disclose reasons for the elimination of the yak from the breeding program. As a result, a number of animals showing various percentages of yak blood were slaughtered, a substantial sum being realized from the sale of dressed carcasses as sold to Messrs. Burns & Company of Calgary, the slaughter being conducted at the Buffalo Park Abattoir. The hides were removed and remain the property of the department, some being dressed and tanned as exhibits and the balance salted and stored.

The following is a list of the animals slaughtered:—

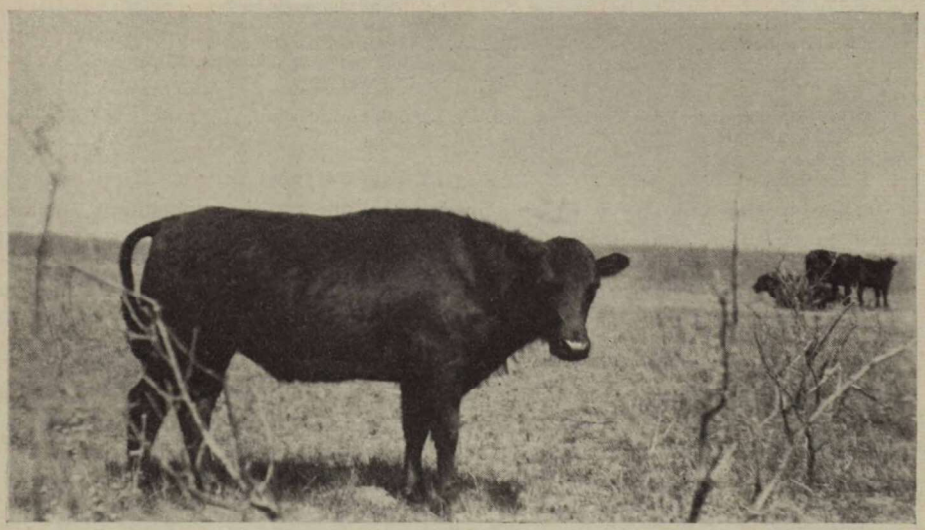
Breeding	*Sex*	*Year born*
Domestic-yak hybrid	Male	1924
Yak-domestic hybrids	Male	1924
	Male	1925
	Male	1926
50 per cent yak, 25 per cent domestic, 25 per cent bison	Male	1925
	Male	1925
	Female	1927
75 per cent yak, 25 per cent domestic	Male	1925
75 per cent domestic, 25 per cent yak	3 Males	1926
	2 Males	1927
	2 Males	1928
50 per cent domestic, 25 per cent bison, 25 per cent yak	Female	1926
	Male	1928
	Female	1929
50 per cent bison, 25 per cent yak, 25 per cent domestic	Female	1927
	Female	1929
75 per cent domestic, 12½ per cent bison, 12½ per cent yak	Male	1929
Domestic	Male	Age: 12 years

Further reductions were as follows:—

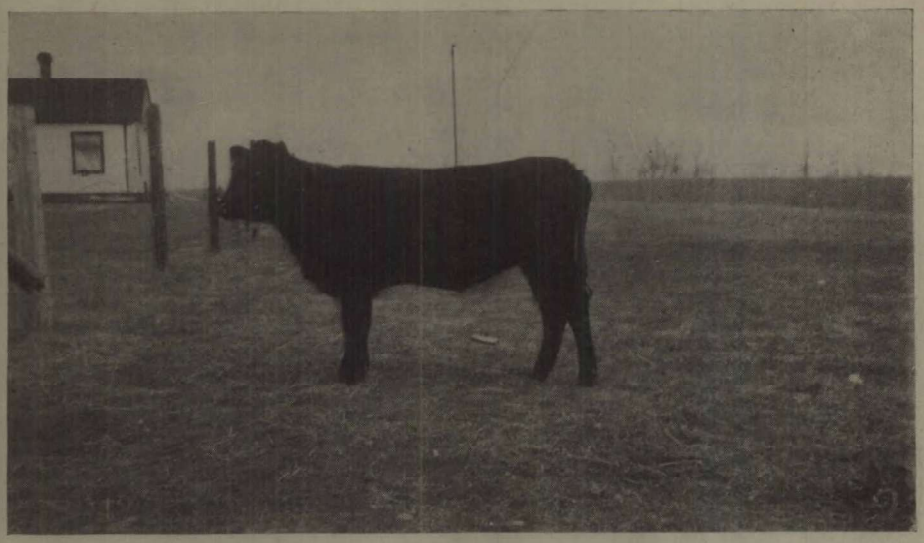
One male and three female yak transferred to the Buffalo Park yak herd.

One male calf of 1929 (75 per cent domestic, 25 per cent bison) died in December, 1929.

Hybrid male 1929, the get of a Domestic bull crossed on a Bison cow. This cross would seem to offer material advantages over the reverse (Bison sire, Domestic female).



Hybrid female (1929). Sired by a Domestic bull, and from a Bison cow.



Third generation female (1929), theoretically 87½ per cent Domestic, 12½ per cent Bison, the result of crossing a Domestic bull with a second generation hybrid, (75 per cent Domestic, 25 per cent Bison).

GROUPS FOR THE 1929 BREEDING SEASON

Group arrangements involved in this experiment have been greatly simplified by the elimination of the yak. In the future only bison and domestic cattle will be utilized. The groups for 1929 were as follows:—

Group No. 1—	
Domestic bull	8 bison cows 1 yak-bison cow
Group No. 2—	
Domestic bull	6 yak-domestic cows 1 domestic-yak cow 3 bison-domestic cows 2 75 per cent domestic, 25 per cent bison cows
Group No. 3—	
75 per cent domestic, 25 per cent bison bull (2 years old)	5 domestic cows
Group No. 4—	
Bison bull	5 domesti cows

Although the yak have disappeared from the main experiment, it was decided to retain a few of the yak-domestic hybrids, the offspring of which will be bred successively to domestic bulls to note the rate of disappearance of yak characteristics. Arrangements to this end have been made as indicated in the foregoing grouping.

INVENTORY AS ON MARCH 31, 1930

The following list shows the live stock on hand as on March 31, 1930, and discloses the presence of several particularly interesting and promising males as relating to possibilities for future progress:—

Breeding	*Males*	*Females*
Bison	3	10
Domestic	2	11
Bison-domestic hybrids	—	3
Domestic-bison hybrids	1	2
Domestic-yak hybrids	—	1
Yak-domestic hybrids	—	6
Yak-bison hybrids	—	1
75 per cent domestic, 25 per cent bison	2	2
87½ per cent domestic, 12½ per cent bison	1	1

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