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, 1928

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# REPORT OF THE ANIMAL HUSBANDRY DIVISION

G. B. ROTHWELL, DOMINION ANIMAL HUSBANDMAN

## BEEF CATTLE

Work with beef cattle during the fiscal year ending March 31, 1928, has been comparatively light. All cattle fed during the winter of 1926-27 were exported on March 26, 1927. A full report of the result of the feeding and shipment of these cattle is to be found in the annual report of the Division of Animal Husbandry for the year ending March 31, 1927. It will suffice to say here that the brighter prospects predicted for Canadian cattle on overseas markets did not materialize and, in fact, the above-mentioned shipment closed the trade in live cattle between Canada and Great Britain for the time being. The reasons for the discontinuation of overseas shipments of Canadian cattle were: (1) The poor market obtaining owing to adverse industrial conditions in Great Britain and meat trade war between British and American interests in the Argentine; (2) The high prices obtaining for cattle in the United States market, these culminating in the course of the year in record high prices for cattle on United States markets, all of which made it much more profitable for the Canadian breeders and feeders to dispose of their cattle across the line than overseas. This they did in large numbers at high prices, so that the industry has just experienced one of the best years in its history.

Early in the spring of 1927, one hundred and twenty steers were purchased on the Winnipeg market and placed on pasture at the Connaught rifle ranges, at an average cost of $7.50 per 100 pounds and total cost of $8,085.26. The pasture season was an extra good one and the steers made excellent gains as a consequence. Two carloads were sold on July 29, and three carloads on October 24 for a total of $10,194.15. This meant a gross profit of $2,108.89, in spite of the fact that two steers were lost, one being found dead in a swamp, and another having died of some unknown cause.

No steers were purchased for winter feeding during the winter of 1927-28, as the prices for feeders were so high during the fall of 1927 it was not felt that it would be a profitable proposition to feed steers during the winter of 1928. Later developments in the market situation would go to show, however, that even at the high prices ruling in the fall for feeding steers, feeding them could have been made a profitable venture.

## DAIRY CATTLE

Dairy cattle breeding, feeding and allied investigational and research work continues to be one of the most important divisions of the live stock work conducted by the Animal Husbandry Division of the Central Experimental Farm. This is entirely in keeping with the trend of agricultural development, both locally and in a Dominion-wide sense, as dairy farming is increasing by leaps and bounds from year to year. An unfailing market, due to increased export as well as increased home consumption, and a steady as well as increasing farm labour income are the factors that are bringing about the increased activity in dairy farming.

At the close of the fiscal year, March 31, 1928, there were on hand one hundred and seventeen head of dairy cattle, made up as follows:—

DAIRY CATTLE AT THE CENTRAL EXPERIMENTAL FARM IN 1928

| Breed | Milk cows | Heifers | Bulls | Totals |
|---|---|---|---|---|
| Ayrshires | 14 | 33 | 11 | 58 |
| Holsteins | 10 | 27 | 5 | 42 |
| Jerseys | 5 | 11 | 1 | 17 |
| Total | | | | 117 |

We have to report a reduction in numbers of fifty head as compared to the previous year. This is due primarily to an outbreak of tuberculosis in the herd, comment on which is made later on in this report. In addition, a small draft of females was sent to a branch Experimental Farm.

## AYRSHIRES

The Ayrshire herd received a rather serious setback owing to the loss of a number of the best mature females, as well as to the loss of some very promising young bulls, destined for future use in the herd. However, the ranks of the younger females were not depleted in any way, and among these are many individuals capable of keeping up the prestige of the herd.

Of the thirty-three calves dropped in the herd during the year, two were sired by the bull "Ottawa Lord Kyle 2nd, —77050—", three by "Ottawa Supreme 10th, —71809," four by "Ottawa Supreme 12th, —92925—," twenty-two by "Ottawa Supreme 15th, —94145," and two by "Ottawa Supreme 20th, —99327." The quality of the calves has been extremely good particularly those by the four sons of the old imported "Shewalton Mains Supreme" bull formerly used in the herd. Of the thirty-three calves born during the year three were abortions, two were rather badly deformed, while the remainder were normal, healthy calves. No animals were shown at exhibitions during the year. Only one addition to the herd by purchase took place, but it was a notable one inasmuch as the famous old breeding bull, "White Beauty's Good Gift, —76818—", A.R. No. 1, Class AA, R.O.P. No. 186, with twenty-one daughters having twenty-eight records, was received from MacDonald College for use in the herd. In addition to bull sales to be mentioned later, a draft of seven females was sent to establish an Ayrshire herd at the Experimental Farm at Farnham, P.Q.

The bulls used in service during the year were:—

AYRSHIRE BULLS USED AT THE CENTRAL EXPERIMENTAL FARM DURING 1928

| Name | Age | Reg. No. | A.R. No. | Class |
|---|---|---|---|---|
| | years | | | |
| White Beauty's Good Gift | 13 | 76818 | 1 | AA |
| Ottawa Supreme 15th | 3 | 94145 | 299 | A |
| Ottawa Supreme 20th | 2 | 99327 | 19 | AA |
| Ottawa Lord Kyle 35th | 2 | 98029 | 45 | AA |
| Ottawa Supreme 24th | 1 | 104759 | 339 | A |

The average production for the year, while not up to the previous year, due to the loss of many of the best mature producers, has been fairly well maintained. The average of the five best cows, including one two-year-old, is 9,466·1 pounds of milk, testing 4·02 per cent fat, at an average age of six years. The average for the whole herd of twenty cows amounts to 7,620·9 pounds of milk, testing 4·03 per cent fat. The reduction in the general average production is due to there being a larger number of young cows included. Comparing the three breeds, using the average production of the herd as a basis, Ayrshires take second place in economy of milk production, third place in economy of fat production, and second place in profit over feed consumed.

## HOLSTEINS

The Holstein herd is keeping pace with other herds of the breed in regard to improvement in type and butter fat percentage in the milk. Unfortunately, the tuberculosis outbreak in the herd worked its greatest havoc in the Holsteins, removing all the mature animals, both males and females. However, the two-year-old heifers and yearlings were a nice straight breedy lot, and bid fair to replace the older animals lost.

Ottawa Pietje Fayne—60931—Junior herd sire at the C.E.F., 1926-27. Record of dam: 21,473 pounds milk, 832 pounds fat in 305 days, average per cent fat, 3.87 per cent.

Twenty-four calves were dropped in the herd during the year, twenty-one being sired by the senior herd sire, "Agassiz Sir Pietje —51064—", and three by the junior herd sire, "Ottawa Pietje Fayne —60931—". Of the twenty-four calves four were abortions, one died shortly after birth from scours and pneumonia, while two died as the result of rear presentation at calving. No exhibition work with Holsteins was undertaken during the year. No additions were made to the herd by purchase, and there have been no transfers of females to branch Farms or Stations during the year.

The bulls used in service during the year were as follows:—

HOLSTEIN BULLS USED AT THE CENTRAL EXPERIMENTAL FARM DURING 1928

| Name | Age | Reg. No. | A.R. No. | Class |
|---|---|---|---|---|
| | years | | | |
| Ottawa Pietje Fayne | 2 | 66931 | 141 | X |
| Ottawa Pietje Faforit | 1 | 68848 | 200 | X |

The average milk production of the Holstein herd has been well maintained considering that the majority of the animals contributing to the average are young. The yearly average of the five best cows was 13,075·8 pounds of milk, testing 3·69 per cent fat, at an average age of four years. The average production of the whole herd of eighteen cows reported on was 10,118·6 pounds of milk, testing 3·67 per cent fat, at an average age of 4·8 years. The above figures represent a straight decrease in the average per cent fat for the five best cows, but quite an increase in the average per cent fat for the whole herd, showing that very satisfactory progress is being made towards raising the average per cent fat of the herd. In the comparison of breeds based on the average production of the respective herds, the Holsteins stand first in the economy of milk production, first in economy of fat production, and first in profit over feed consumed.

### JERSEYS

The Jersey herd has again suffered severely in reduction in numbers. Genital disease took out the senior herd sire, while tuberculosis claimed the junior herd sire. Johnnes disease took one mature female; another died as a result of a foreign body in the stomach, and five reacted to the tuberculin test. Of the seven calves born in the herd during the year, two were sired by the senior herd sire, "Castlehill Sybil's Gamboge No. —12271—", A.R. No. 1, Class A, and five by the new junior herd sire, " Bright Prince Seaside Lad —29617—", A.R. No. 25, Class AA. Of these seven calves only four were normal, two being abortions, and one died at birth. The quality of those that were normal was quite good, particularly in the case of those by the junior herd sire. The junior herd sire was the only one used in service during the latter part of the year.

Owing to the unfortunate circumstances surrounding this herd during the year, the production has again fallen off so that it is not fair to make a comparison with other breeds without taking the above facts into consideration. However, the average production of the five best cows in the herd was 7,132 pounds of milk, testing 5·09 per cent fat at an average age of four years, while the average of the whole herd of nine cows reported on was 6,173 pounds of milk, testing 5·19 per cent, at an average age of four years. In comparison with the other breeds Jerseys stand third in economy of milk production, fat production, and profit over feed consumed.

As the conditions under which these herds of dairy cattle are kept exert a definite influence on their relative economy of production, it will not be out of place to repeat in this report a section from the report of this division for the year ending March 31, 1926, covering this point.

### RELATIVE EFFECT OF TYPE OF FARMING ON BREEDS

In studying the foregoing comparisons of the three breeds maintained, the effect of the unusual conditions at the Central Experimental Farm must not

be lost sight of. The conditions are these: The Farm is comparatively small, some 475 acres in all, of which only some 185 acres may be considered as being used for the regular production of crops for live stock feeding. This area is under a three-year rotation of crops and produces large yields of grain, hay, silage, root and soiling crops, but comparatively little pasture. These crops are hauled in and either fed to the cows direct or stored for later feeding. That is, an intensive system of farming is followed, the feed being brought to the cows for consumption, rather than letting the cows go to the fields to gather their own feed, as is the case on most farms during a large part of the season at least. These are conditions that do not prevail on the average farm throughout the country, particularly in newly settled and rough areas, and yet they are conditions to which the Holstein as a breed is admirably adapted. They are big cows and will consume large quantities of roughages and turn them to good account, but if they are obliged to forage for their feed over large areas of scanty pasture, they are at a disadvantage. The Ayshire, on the other hand, is an exceptionally good forager, coming by this attribute honestly through having been originated in the hilly pastures in Scotland. On this account, Ayshires will make a good living where Holsteins might fail. Being comparatively easy keepers, the Ayrshires are possibly inclined to lay on a little too much body fat when subjected to the intensive farming conditions so suitable to the Holstein. The Jersey breed follows the Ayrshire fairly closely as regards the effect of type of farming on the relative amount and economy of production. These points should be kept in mind when comparing the relative economy of production and profit over feed as discussed in the foregoing sections.

### ADVANCED REGISTRATION OF DAIRY BULLS

This work has been followed up since its inception with the result that at the close of this fiscal year bulls bred or owned at the Central Experimental Farm had been entered in the Advanced Registry as follows:—

BULLS ENTERED IN THE ADVANCED REGISTRY

| Breed | Class A | Class AA |
|---|---|---|
| Ayrshire | 28 | 7 |
| Jersey | 3 | 1 |
| Holstein | 10 Class X | 1 Class XX |

The above constitutes an exceptional showing on the part of the Ayrshires and a very creditable showing on the part of the other breeds.

### ADVANCED REGISTRATION OF DAIRY FEMALES

During the present fiscal year the Holstein Freisian Association of Canada adopted a system of advanced registration for females based on type and production, the object being to weed out of the pure bred list any animals that did not measure up to a certain standard of individual excellence, and to give credit to those that had the required individual excellence, plus good milk record backing. This was considered to be a forward movement, consequently it was put into practice in the Central Experimental Farm Holstein herd, and all cows in milk, twenty-three in number, were entered in June, 1927, with the result that twenty-one received Advanced Registration certificates, and two had their regular registration certificates cancelled.

## SALES OF BREEDING STOCK

Owing to the rigid selection and weeding out of females in various herds in the process of improving type and production, there are few, if any, females available for sale as breeders, the bulk of the sales being made up of bulls, these being sold at very reasonable prices considering their breeding and individuality. These sales are for the most part made to parties purchasing pure bred bulls for the first time, which has the effect of opening up new markets for breeding stock. During the year, twenty-two breeding bulls were sold, this number being made up of ten Ayshires, nine Holsteins and three Jerseys. In the case of the Ayrshires two were Class A bulls, and two Class AA bulls; in the case of the Holsteins, three were Class X bulls; and in the case of the Jerseys, one was a Class A bull. Many of the others were sold while still too young for inspection.

## TUBERCULOSIS ERADICATION

As was intimated earlier in this report, the herd was given a serious set-back due to an outbreak of tuberculosis. The Bang herd of tuberculosis animals had been disposed of early in the fiscal year, and as nothing but tested animals remained on the farm and there was no longer connection with an infected herd it was felt that the main herd would now be comparatively safe. Late in the fall of 1927, however, one cow was noticed to be going down rapidly in condition. As she had had trouble at calving time a case of absorption from metritis, or possibly the presence of a foreign body, was suspected and she was slaughtered. Post-mortem revealed the fact that she was in an advanced stage of tuberculosis. Consequently, a test was conducted on the herd at the earliest opportunity, with the result that thirty-seven animals reacted. Fortunately the reactors were confined to the mature milch cows and the bulls, the heifers that were on the range not being affected. A retest in January took out another eleven head, while a further retest in March found only one reactor, showing the efficacy of the tuberculin test in stamping out a most virulent outbreak in a comparatively short space of time.

## CONTAGIOUS ABORTION

There was a total of eight abortions in the herd during the fiscal year. No attempt will be made at this time to analyse the situation with regard to this trouble other than to say that with one exception these abortions occurred in cows carrying either their first or second calves, consequently it would appear that if one were able to keep these heifers free of infection the disease could be eradicated from a herd. Annual blood tests to determine the presence of infection from the *Bacillus Abortus* Bang have been carried on and the frequency of these tests was increased during the summer of 1927 and the early part of 1928 with the object of using the information thus gained to inaugurate in 1928 a policy of segregation and isolation of all reacting animals, in an endeavour to develop an abortion free herd, along the same lines as the tuberculosis free herds of the country. This work is being carried on in co-operation with the Pathological Division of the Health of Animals Branch.

## PRACTICAL FEEDING METHODS

For a synopsis of the procedure followed with dairy cattle and dairy calves both in summer and in winter, the reader is referred to the report of this division for the year ending March 31, 1927.

## EXPERIMENTAL FEEDING

Owing to the losses incurred in the herd of milk cows from the tuberculosis outbreak there were not sufficient cows to carry on dairy cattle feeding experimental work, and as it was not thought advisable to put in more cows until it was known that the trouble had been entirely cleared up no experimental feeding work was conducted during the winter of 1927-28.

## 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 finished a normal lactation period during the year ending March 31, 1928. 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 | Number of days in lactation period | Total pounds of milk for period | Daily average yield of milk | Average p.c. fat in milk | Pounds of butter produced in period | Value of butter at 45c. per pound | Value of skim milk at 30c. per cwt. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | lb. | lb. | % | lb. | $ | $ |
| Ottawa March Johanna.....H. | 4 | Sept. 18, 1926 | 359 | 14,595·5 | 40·66 | 3·75 | 644·47 | 290 01 | 42 14 |
| Johanna Pietertje Ormsby.....H. | 5 | Oct. 26, 1926 | 269 | 13,015·5 | 48·38 | 3·80 | 582·52 | 262 13 | 37 56 |
| Ottawa Faforit Perfect.....H. | 3 | Sept. 20, 1926 | 387 | 15,223·0 | 39·34 | 3·28 | 586·79 | 264 06 | 44 17 |
| Hardcroft Dewdrop 3rd.....A. | 12 | April 7, 1927 | 287 | 10,434·5 | 36·36 | 3·95 | 484·74 | 218 13 | 30 07 |
| Perfect Butter Maid.....H. | 2 | Nov. 6, 1926 | 360 | 12,277·5 | 34·10 | 3·67 | 529·71 | 238 37 | 35 48 |
| Ottawa Burma Lady 4th.....J. | 3 | Dec. 27, 1926 | 430 | 8,570·5 | 19·93 | 5·11 | 515·16 | 231 82 | 24 40 |
| Korndyke Bessie Ann.....H. | 6 | Feb. 11, 1927 | 281 | 10,267·5 | 36·54 | 3·99 | 482·02 | 216 91 | 29 57 |
| Relief Lucy.....A. | 4 | Nov. 2, 1926 | 324 | 10,550·0 | 32·56 | 3·78 | 469·56 | 211 30 | 30 45 |
| Ottawa Supreme Lillian.....A. | 2 | Dec. 18, 1926 | 318 | 9,391·5 | 19·53 | 4·03 | 445·06 | 200 28 | 27 04 |
| Johanna Pietertje Perfect.....H. | 3 | Sept. 12, 1926 | 323 | 10,437·0 | 32·31 | 3·75 | 460·68 | 207 31 | 30 14 |
| Ottawa Auchenbay Mina.....A. | 5 | Aug. 8, 1926 | 324 | 8,725·5 | 26·93 | 4·36 | 447·27 | 201 27 | 25 04 |
| Ottawa Triumph.....J. | 5 | Feb. 7, 1927 | 358 | 7,591·5 | 21·21 | 4·85 | 433·39 | 195 03 | 21 67 |
| Korndyke Evergreen March....H. | 2 | Nov. 19, 1926 | 337 | 9,614·5 | 28·53 | 3·97 | 449·11 | 202 10 | 27 70 |
| Johanna Helena Perfect.....H. | 2 | Dec. 4, 1926 | 331 | 10,214·0 | 30·86 | 3·57 | 428·99 | 193 05 | 29 55 |
| Francy Oliva DeKol.....H. | 5 | May 20, 1926 | 316 | 10,764·0 | 34·06 | 3·30 | 418·09 | 188 14 | 31 23 |
| Helena Plus Perfect.....H. | 2 | Nov. 3, 1926 | 298 | 9,407·5 | 31·57 | 3·72 | 411·88 | 185 35 | 27 17 |
| Ottawa Burma Lady 2nd.....J. | 8 | Jan. 30, 1927 | 294 | 6,719·0 | 22·85 | 4·96 | 391·71 | 176 27 | 20 16 |
| Ottawa Burma Lady 3rd.....J. | 5 | Oct. 16, 1926 | 310 | 6,414·0 | 20·69 | 5·37 | 405·01 | 182 25 | 18 21 |
| Bessie Ann Perfect.....H. | 3 | Oct. 28, 1926 | 369 | 10,066·5 | 27·28 | 3·57 | 422·66 | 190 20 | 29 12 |
| Allancroft Betsy.....A. | 9 | Oct. 21, 1926 | 325 | 8,229·0 | 25·32 | 4·06 | 393·32 | 176 99 | 23 68 |
| Ottawa Auchenbay Mina 5th...A. | 10 | Jan. 9, 1927 | 283 | 7,927·5 | 28·01 | 3·93 | 366·29 | 164 83 | 22 85 |
| Ottawa Auchenbay Mina 2nd...A. | 3 | Oct. 30, 1926 | 325 | 6,978·0 | 21·50 | 4·51 | 370·48 | 166 72 | 20 02 |
| Ottawa Victorine.....A. | 5 | Oct. 27, 1926 | 338 | 7,283·0 | 21·55 | 4·30 | 368·80 | 162 36 | 20 91 |
| Ottawa Milly 2nd.....J. | 2 | Dec. 6, 1926 | 378 | 6,365·5 | 16·84 | 5·23 | 391·95 | 176 38 | 18 10 |
| Johanna Keyes Helena.....H | 4 | Sept. 6, 1926 | 372 | 9,405·5 | 25·28 | 3·86 | 427·26 | 192 27 | 27 13 |
| Ottawa Maud 3rd.....A. | 2 | Nov. 26, 1926 | 299 | 7,945·5 | 26·57 | 4·09 | 382·25 | 172 01 | 22 86 |
| Ottawa Kyle Blossom.....A. | 2 | Oct. 4, 1926 | 340 | 8,072·5 | 23·74 | 4·19 | 397·79 | 179 01 | 23 20 |
| Dalfibble Orange Blossom.....A. | 4 | Nov. 20, 1926 | 300 | 8,818·5 | 29·40 | 3·82 | 369·69 | 166 36 | 25 44 |
| Johanna Butter Maid.....H. | 7 | Jan. 1, 1927 | 234 | 8,299·0 | 35·47 | 3·49 | 340·34 | 153 15 | 24 03 |
| Ottawa Tilly.....A. | 7 | Sept. 28, 1926 | 240 | 6,842·0 | 28·51 | 3·73 | 300·38 | 135 17 | 19 76 |
| Ottawa Gamboge Eclipse.....J. | 1 | Nov. 22, 1926 | 361 | 5,576·0 | 15·45 | 5·68 | 372·82 | 167 77 | 15 78 |
| Castlehill Strawberry.....A. | 12 | Nov. 20, 1926 | 278 | 8,399·5 | 30·21 | 3·55 | 350·76 | 157 84 | 24 30 |
| St. Valentines Pet.....A. | 13 | Nov. 4, 1926 | 315 | 7,316·5 | 23·23 | 3·95 | 340·22 | 153 10 | 21 08 |
| Leila Posch Mechthilde.....H. | 11 | June 1, 1926 | 333 | 8,674·0 | 26·05 | 3·57 | 363·95 | 163 78 | 25 09 |
| Ottawa Woodcrest Johanna.....H. | 4 | Sept. 30, 1926 | 268 | 7,725·5 | 28·83 | 3·91 | 355·61 | 160 02 | 22 27 |
| Korndyke Butter Maid DeKol.H. | 3 | Oct. 10, 1926 | 336 | 8,565·0 | 25·49 | 3·42 | 345·04 | 155 27 | 24 82 |
| Ottawa Culcaigrie Dot.....A. | 6 | Jan. 15, 1927 | 227 | 6,134·0 | 27·02 | 4·24 | 305·99 | 137 70 | 17 62 |
| Ottawa Dignity Dot.....A. | 7 | April 20, 1927 | 288 | 7,123·5 | 24·73 | 3·86 | 323·11 | 145 40 | 20 55 |
| Hobsland Lavender 2nd.....A. | 6 | Dec. 26, 1926 | 373 | 6,408·5 | 17·18 | 4·38 | 330·01 | 148 50 | 18 38 |
| Ottawa Bess Hengervold.....H. | 6 | Dec. 26, 1926 | 262 | 7,175·0 | 27·39 | 3·40 | 286·73 | 129 03 | 20 79 |
| Marjorie of Ottawa 10th.....A. | 7 | Sept. 18, 1926 | 279 | 4,995·0 | 17·90 | 4·37 | 257·04 | 115 67 | 14 33 |
| Ottawa Lou.....J. | 5 | Dec. 20, 1926 | 329 | 5,177·0 | 15·74 | 4·78 | 289·68 | 130 36 | 14 79 |
| Brampton Triumph 2nd.....J. | 8 | Aug. 26, 1926 | 340 | 3,629·0 | 10·67 | 6·64 | 283 63 | 127 63 | 10 16 |
| Ottawa Gamboge Beauty.....J. | 1 | Nov. 23, 1926 | 390 | 5,518·5 | 14·15 | 4·73 | 307·36 | 138 31 | 15 77 |
| Lillian of Oban.....A | 8 | Sept. 15, 1926 | 245 | 4,665·0 | 19·04 | 4·13 | 226·56 | 101 95 | 13 42 |
| Total for herd (45 cows)..... | 234 | ..... | 14,333 | 377,527·0 | ..... | ..... | 17,855·88 | 8,031 56 | 1,038 00 |
| Average for herd (45 cows).... | 5 | ..... | 319 | 8,3 9·48 | 16·13 | 4·02 | 39?·80 | 178 ·8 | 24 18 |

COMPLETED DURING THE YEAR

| Total value of product | Amount of meal eaten at $34 per ton | Amount of roots at $3.00 per ton and ensilage at $3.35 per ton | Amount of hay eaten at $6.75 per ton | Amount of green feed eaten at $6.00 per ton | Months on pasture at $2 per month | Total cost of feed between calvings | Cost to produce 100 lbs. of milk | Cost to produce one pound of butter skim-milk neglected | Profit on one pound of butter skim-milk neglected | Profit on cow between calvings, labour and calf neglected |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | lb. | lb. | lb. | lb. | | $ | $ | cts. | cts. | $ |
| 332 15 | 3,336 | 17,870 | 2,612 | 1,000 | 3 | 96 72 | 0 66 | 15·0 | 20·0 | 235 43 |
| 299 69 | 2,904 | 21,800 | 2,884 | ..... | 2 | 98 06 | 0 75 | 16·8 | 28·2 | 201 63 |
| 308 23 | 3,726 | 18,280 | 2,884 | 1,000 | 4 | 113 63 | 0 75 | 19·4 | 25·6 | 194 60 |
| 248 20 | 2,834 | 9,445 | 1,624 | 1,000 | 2 | 76 47 | 0 74 | 15·8 | 29·2 | 171 73 |
| 273 85 | 3,445 | 16,945 | 2,248 | 1,000 | 4 | 104 50 | 0 86 | 19·7 | 25·3 | 169 85 |
| 256 22 | 2,858 | 17,495 | 3,504 | 1,000 | 2 | 96 11 | 1 12 | 18·6 | 26·4 | 160 11 |
| 246 48 | 2,901 | 13,575 | 2,340 | 1,000 | 2 | 86 43 | 0 85 | 17·9 | 27·1 | 160 05 |
| 241 75 | 2,986 | 15,675 | 2,428 | ..... | 2 | 88 16 | 0 84 | 18·8 | 26·2 | 153 59 |
| 227 32 | 2,406 | 10,065 | 2,536 | 1,000 | 4 | 77 30 | 0 82 | 17·4 | 27·6 | 150 02 |
| 237 45 | 2,792 | 15,455 | 2,308 | 1,000 | 3 | 89 07 | 0 85 | 19·3 | 25·7 | 148 38 |
| 226 31 | 2,606 | 13,490 | 2,528 | 500 | 2 | 80 93 | 0 93 | 18·1 | 26·9 | 145 39 |
| 216 70 | 2,508 | 12,725 | 2,676 | 1,000 | 2 | 79 75 | 1 05 | 18·4 | 26·6 | 136 95 |
| 229 80 | 2,916 | 16,255 | 2,724 | 1,000 | 3 | 94 05 | 0 98 | 20·9 | 24·1 | 135 75 |
| 222 60 | 2,674 | 15,025 | 2,536 | 1,000 | 3 | 87 61 | 0 86 | 20·4 | 24·6 | 134 99 |
| 219 37 | 3,204 | 12,325 | 2,800 | ..... | 2 | 88 55 | 0 82 | 21·2 | 23·8 | 130 82 |
| 212 52 | 2,503 | 14,775 | 2,188 | 1,000 | 4 | 84 63 | 0 90 | 20·5 | 24·5 | 127 89 |
| 196 43 | 2,238 | 11,470 | 2,344 | ..... | 2 | 68 73 | 1 02 | 17·5 | 27·5 | 127 70 |
| 200 46 | 2,086 | 15,520 | 2,366 | 1,000 | 3 | 77 37 | 1 20 | 19·2 | 26·9 | 123 09 |
| 219 32 | 2,890 | 17,825 | 2,796 | 1,000 | 4 | 99 13 | 0 98 | 23·5 | 21·5 | 120 19 |
| 200 67 | 2,660 | 11,905 | 3,012 | ..... | 3 | 81 32 | 0 99 | 20·7 | 24·3 | 119 35 |
| 187 68 | 2,075 | 12,625 | 2,339 | 1,000 | 2 | 70 72 | 0 89 | 19·3 | 25·7 | 116 96 |
| 186 74 | 2,314 | 9,695 | 2,456 | 1,000 | 3 | 72 84 | 1 04 | 19·7 | 25·3 | 113 90 |
| 183 27 | 1,642 | 8,445 | 2,228 | ..... | 5·5 | 69 58 | 0 83 | 16·8 | 28·2 | 113 69 |
| 194 48 | 2,320 | 16,335 | 2,920 | 1,000 | 2 | 82 80 | 1 30 | 21·1 | 23·9 | 111 68 |
| 219 40 | 3,662 | 18,605 | 2,772 | 1,000 | 3 | 110 71 | 1 24 | 25·9 | 26·1 | 108 69 |
| 194 87 | 2,589 | 14,755 | 2,428 | 1,000 | 4 | 87 03 | 1 09 | 22·8 | 22·2 | 107 84 |
| 202 21 | 2,888 | 16,055 | 2,508 | 1,000 | 4 | 94 38 | 1 04 | 23·7 | 21·3 | 107 83 |
| 191 80 | 2,791 | 16,365 | 2,804 | 1,000 | 2 | 87 40 | 1 02 | 24·5 | 20·5 | 104 40 |
| 177 18 | 2,354 | 13,315 | 2,116 | 1,000 | 2 | 75 82 | 0 91 | 22·3 | 22·8 | 101 36 |
| 154 93 | 1,974 | 7,380 | 1,968 | ..... | 2 | 56 55 | 0 83 | 18·8 | 26·2 | 98 38 |
| 188 55 | 2,934 | 16,335 | 2,828 | 1,000 | 3 | 85 66 | 1 53 | 22·9 | 22·1 | 97 89 |
| 182 14 | 2,741 | 15,735 | 2,604 | 1,000 | 2 | 87 78 | 1 05 | 25·0 | 20·0 | 94 36 |
| 174 18 | 2,794 | 11,065 | 3,032 | ..... | 2 | 80 25 | 1 09 | 23·6 | 21·4 | 93 93 |
| 188 87 | 3,650 | 13,375 | 2,920 | ..... | 2 | 98 33 | 1 13 | 27·0 | 18·0 | 90 54 |
| 182 29 | 3,244 | 16,645 | 2,424 | ..... | 1 | 92 14 | 1 19 | 25·9 | 20·1 | 90 15 |
| 180 09 | 2,782 | 16,735 | 2,636 | 1,000 | 3 | 92 15 | 1 08 | 26·7 | 18·3 | 87 94 |
| 155 32 | 1,982 | 11,855 | 2,188 | 1,000 | 2 | 67 39 | 1 09 | 22·0 | 23·0 | 87 93 |
| 165 95 | 2,554 | 13,531 | 2,947 | 1,000 | 2 | 82 68 | 1 16 | 25·5 | 19·4 | 83 27 |
| 166 88 | 2,312 | 16,260 | 4,208 | ..... | 3 | 86 73 | 1 35 | 26·3 | 18·7 | 80 15 |
| 149 82 | 2,111 | 13,910 | 2,252 | 1,000 | 2 | 73 14 | 1 00 | 25·5 | 19·5 | 76 68 |
| 130 00 | 1,872 | 7,740 | 2,064 | ..... | 4 | 59 74 | 1 19 | 23·2 | 21·8 | 70 26 |
| 145 15 | 2,189 | 14,975 | 2,540 | 1,000 | 2 | 77 01 | 1 48 | 26·6 | 18·4 | 68 14 |
| 137 79 | 2,188 | 11,870 | 2,924 | 1,000 | 3 | 75 93 | 2 09 | 26·8 | 18·2 | 61 86 |
| 154 08 | 2,728 | 17,205 | 3,060 | 1,000 | 3 | 93 78 | 1 69 | 30·5 | 14·5 | 60 30 |
| 115 37 | 1,990 | 7,660 | 2,036 | ..... | 3 | 59 53 | 1 27 | 26·3 | 18·7 | 55 84 |
| 9,119 56 | 118,625 | 636,491 | 116,533 | 31,500 | 122·5 | 3,788 58 | ..... | ..... | ..... | 5,330 98 |
| 202 66 | 2,636 | 14,144 | 2,590 | 700 | 2·7 | 84 58 | 1 00 | 21·0 | 21·0 | 118 47 |

AVERAGE PRODUCTION OF FIVE BEST

AYR

| Name and Breed of Cow | Age at commencement of lactation period. | Date of dropping calf | Number of days in lactation period | Total pounds of milk for period | Daily average yield of milk | Average p.c. fat in milk | Pounds of butter produced in period | Value of butter at 45c. per pound | Value of skim milk at 30c. per cwt. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | lb. | lb. | % | lb. | $ | $ |
| Hardcroft Dewdrop 3rd | 12 | April 7, 1927 | 287 | 10,434·5 | 36·36 | 3·95 | 484·74 | 218 13 | 30 07 |
| Relief Lucy | 4 | Nov. 2, 1926 | 324 | 10,550·0 | 32·56 | 3·78 | 469·56 | 211 30 | 20 45 |
| Ottawa Supreme Lillian | 2 | Dec. 18, 1926 | 318 | 9,391·5 | 19·53 | 4·03 | 445·06 | 200 28 | 27 04 |
| Ottawa Auchenbay Mina | 5 | Aug. 8, 1926 | 324 | 8,725·5 | 26·93 | 4·36 | 447·27 | 201 27 | 25 04 |
| Allancroft Betsy | 9 | Oct. 21, 1926 | 325 | 8,229·0 | 25·32 | 4·06 | 393·32 | 176 99 | 23 68 |
| Average of best 5 cows | 6·4 | ..... | 316 | 9,466·1 | 28·14 | 4·02 | 447·99 | 201 59 | 27 25 |
| Average of herd of 20 cows | 6·5 | ..... | 302 | 7,620·9 | 25·20 | 4·03 | 361·99 | 64 81 | 24 43 |

HOL

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ottawa March Johanna | 4 | Sept. 18, 1926 | 359 | 14,595·5 | 40·66 | 3·75 | 644·47 | 290 01 | 42 14 |
| Johanna Pieterje Ormsby | 5 | Oct. 26, 1926 | 269 | 13,015·5 | 48·38 | 3·80 | 582·52 | 262 13 | 37 56 |
| Ottawa Faforit Perfect | 3 | Sept. 20, 1926 | 387 | 15,223·0 | 39·34 | 3·28 | 586·79 | 264 06 | 44 17 |
| Perfect Butter Maid | 2 | Nov. 6, 1926 | 360 | 12,277·5 | 34·10 | 3·67 | 529·71 | 238 37 | 35 48 |
| Korndyke Bessie Ann | 6 | Feb. 11, 1926 | 281 | 10,267·5 | 36·54 | 3·99 | 482·02 | 216 91 | 29 57 |
| Average of best 5 cows | 4 | ..... | 331·2 | 13,075·8 | 39·80 | 3·69 | 565·10 | 254 29 | 37 78 |
| Average of herd of 18 cows | 4·8 | ..... | 313·6 | 10,118·6 | 31·63 | 3·67 | 437·00 | 196 65 | 29 24 |

JER

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ottawa Burma Lady 4th | 3 | Dec. 27, 1926 | 430 | 8,570·5 | 19·93 | 5·11 | 515·16 | 231 82 | 24 40 |
| Ottawa Triumph | 5 | Feb. 7, 1927 | 358 | 7,591·5 | 21·21 | 4·85 | 433·39 | 195 03 | 21 67 |
| Ottawa Burma Lady 2nd | 8 | Jan. 20, 1927 | 294 | 6,719·0 | 28·85 | 4·96 | 391·71 | 176 27 | 20 16 |
| Ottawa Burma Lady 3rd | 5 | Oct. 16, 1926 | 310 | 6,414·0 | 20·69 | 5·37 | 405·01 | 182 25 | 18 21 |
| Ottawa Milly 2nd | 2 | Dec. 6, 1926 | 378 | 6,365·5 | 16·84 | 5·23 | 391·95 | 176 38 | 18 10 |
| Average of best 5 cows | 4·6 | ..... | 354 | 7,132·1 | 20·15 | 5·09 | 427·44 | 192 35 | 20 50 |
| Average of herd of 9 cows | 4·2 | ..... | 354·4 | 6,173·4 | 17·41 | 5·19 | 377·41 | 169 53 | 17 67 |

COWS AND OF TOTAL HERD IN EACH BREED

SHIRE

| Total value of product | Amount of meal eaten at $34 per ton | Amount of roots at $3.00 per ton and ensilage at $3.35 per ton | Amount of hay eaten at $6.75 per ton | Amount of green feed eaten at $6.00 per ton | Months on pasture at $2 per month | Total cost of feed between calvings | Cost to produce 100 lbs. of milk | Cost to produce one pound of butter skim-milk neglected | Profit on one pound of butter skim-milk neglected | Profit on cow between calvings, labour and calf neglected |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | lb. | lb. | lb. | lb. | | $ | $ | cts. | cts. | $ |
| 248 20 | 2,834 | 9,445 | 1,624 | 1,000 | 2·0 | 76 47 | 0 74 | 15·8 | 29·2 | 171 73 |
| 241 75 | 2,986 | 15,675 | 2,428 | ..... | 2·0 | 88 16 | 0 85 | 18·8 | 26·2 | 153 59 |
| 227 32 | 2,406 | 10,065 | 2,536 | 1,000 | 4·0 | 77 30 | 0 82 | 17·4 | 27·6 | 150 02 |
| 226 31 | 2,606 | 13,490 | 2,528 | 500 | 2·0 | 80 92 | 0 93 | 18·1 | 26·9 | 145 39 |
| 200 67 | 2,660 | 11,905 | 3,012 | ..... | 3·0 | 81·32 | 0 99 | 20·7 | 24·3 | 119 35 |
| 228 85 | 2,698·4 | 12,116 | 2,425·6 | 500 | 2·6 | 80 83 | 0 85 | 18 0 | 27·0 | 148 01 |
| 184 05 | 2,439·6 | 6,129·7 | 2,553·5 | 575 | 3·18 | 78 44 | 1 03 | 21·6 | 15·7 | 105 61 |

STEINS

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 332 15 | 3,336 | 17,870 | 2,612 | 1,000 | 3·0 | 96 72 | 0 66 | 15·0 | 21·0 | 235 43 |
| 299 69 | 2,904 | 21,800 | 2,884 | ..... | 2·0 | 98 06 | 0 75 | 16·8 | 28·2 | 201 63 |
| 308 23 | 3,726 | 18,280 | 2,884 | 1,000 | 4·0 | 113 63 | 0 75 | 19·4 | 25·6 | 194 60 |
| 272 85 | 3,445 | 16,945 | 2,248 | 1,000 | 4·0 | 104 50 | 0 86 | 19·7 | 25·3 | 169 35 |
| 246 48 | 2,901 | 13,575 | 2,340 | 1,000 | 2·0 | 86 43 | 0 85 | 17·9 | 27·1 | 160 05 |
| 292 07 | 3,262·4 | 17,694 | 2,593·6 | 800 | 3·0 | 99 86 | 0 77 | 17·7 | 25·4 | 192 21 |
| 225 89 | 2,967·1 | 16,024 | 2,647·1 | 722 | 2·7 | 92 86 | 0·917 | 21·2 | 23·8 | 133 03 |

SEY

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 256 22 | 2,858 | 17,495 | 3,504 | 1,000 | 2·0 | 96 11 | 1 12 | 18·6 | 26·4 | 160 11 |
| 216 70 | 2,508 | 12,725 | 2,676 | 1,000 | 2·0 | 79 75 | 1 05 | 18·4 | 26·6 | 136 95 |
| 196 43 | 2,238 | 11,470 | 2,344 | ..... | 2·0 | 68 73 | 1 02 | 17·5 | 27·5 | 127 70 |
| 200 46 | 2,086 | 15,515 | 2,366 | 1,000 | 3·0 | 77 37 | 1 20 | 19·2 | 26·9 | 123 00 |
| 194 48 | 2,320 | 16,335 | 2,920 | 1,000 | 2·0 | 82 80 | 1 30 | 21·1 | 23·9 | 111 68 |
| 212 85 | 2,402 | 14,708 | 2,672 | 800 | 2·1 | 80 95 | 1 14 | 18·9 | 26·6 | 131 90 |
| 182 72 | 2,391 | 14,481 | 2,455·7 | 440 | 1·2 | 81 90 | 1 32 | 27·9 | 17·0 | 105 30 |

In the case of heifers with their first calves, charges for feed include the consumption from a date approximately two months prior to parturition to the time of being dried off preparatory to their second calving. In the case of cows with their second 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 feeds, the following values were used:—

| | $ |
|---|---|
| Pasture per month | 2 00 |
| Meal and other concentrates | 34 00 |
| Hay | 6 75 |
| Roots | 3 00 |
| Silage (corn) | 3 35 |
| Green feed | 6 00 |

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

In calculating the value of the product, the actual cash values were used, which amounted to forty-five cents per pound for butter, and thirty cents per hundredweight for skim-milk.

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.

## OFFICIAL RECORD

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 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 1, 1927 TO MARCH 31, 1928

| Name and Number of Cow | Breed | Age at commencement of test | Number of days milking | Pounds milk | Pounds fat | Average per cent fat |
|---|---|---|---|---|---|---|
| Catlin's Barbara—70085— | Ayrshire | 11 | 365 | 12,495 | 467 | 3·74 |
| Dalfibble Orange Blossom—83935— | " | 4 | 300 | 8,819 | 354 | 4·01 |
| Hardcroft Dewdrop 3rd—70084— | " | 11 | 305 | 10,113 | 370 | 3·66 |
| Hardcroft Dewdrop 3rd—70084— | " | 12 | 287 | 10,700 | 444 | 4·15 |
| Oldhall Maggie 9th—70088— | " | 14 | 335 | 10,765 | 398 | 3·70 |
| Ottawa Auchinbay Mina—77136— | " | 4 | 305 | 8,656 | 366 | 4·23 |
| Ottawa Auchinbay Mina 2nd—86590— | " | 2 | 305 | 6,802 | 282 | 4·15 |
| Ottawa Kyle Blossom—87406— | " | 2 | 340 | 8,217 | 346 | 4·21 |
| Ottawa Maud 3rd—87294— | " | 2 | 299 | 7,946 | 321 | 4·04 |
| Ottawa Supreme Lillian—90346— | " | 2 | 318 | 9,392 | 348 | 3·71 |
| Relief Lucy—83933— | " | 4 | 305 | 10,305 | 396 | 3·84 |
| Helena Plus Perfect—118447— | Holstein | 2 | 298 | 9,408 | 355 | 3·77 |
| Johanna Canary Maid—94258— | " | 4 | 282 | 11,139 | 414 | 3·72 |
| Johanna Helena Perfect—118446— | " | 2 | 331 | 10,214 | 358 | 3·50 |
| Johanna Pietertje Ormsby—90067— | " | 5 | 269 | 13,016 | 478 | 3·67 |
| Johanna Pietertje Perfect—114910 | " | 2 | 323 | 10,437 | 401 | 3·84 |
| Korndyke Evergreen March—124279— | " | 2 | 305 | 9,400 | 368 | 3·91 |
| Ottawa Faforit Perfect—115103— | " | 2 | 365 | 14,897 | 504 | 3·38 |
| Ottawa Francy Bos DeKol—75342— | " | 6 | 305 | 11,474 | 421 | 3·67 |
| Ottawa March Francy—91580— | " | 5 | 305 | 11,228 | 404 | 3·60 |
| Ottawa March Johanna—105018— | " | 3 | 359 | 14,596 | 545 | 3·73 |
| Perfect Butter Maid—119903— | " | 2 | 305 | 11,676 | 432 | 3·70 |
| Ottawa Burma Lady 4th—22730— | Jersey | 3 | 365 | 7,696 | 369 | 4·79 |
| Ottawa Gamboge Eclipse—26170— | " | 2 | 360 | 5,576 | 316 | 5·67 |
| Ottawa Milly 2nd—23475— | " | 2 | 365 | 6,275 | 319 | 5·08 |

## THE DAIRY

All milk produced by the herds at the Central Experimental Farm passes through the Farm dairy. The quantity of milk delivered to the dairy during the past year was 398,720 pounds, from which was manufactured 12,089 pounds of butter, this being the main channel of marketing. For reasons already stated, the dairy herds were subject to serious losses with consequent reduction in milk production and lowered output from the dairy.

Aside from the manufacture of high-class dairy butter for special city trade, the making of Cheddar cheese has been carried on in quantities necessarily limited. This cheese put up in the ten-pound size, well cured and full flavoured, has proven very popular. Meilleur cheese, as already described in previous reports, has been manufactured regularly, and has met with ready sale to the discriminating consumer, indicating distinct commercial possibilities. Buttermilk cheese as made according to methods originating here has been turned out in smaller quantities as is the case with cream cheese.

From time to time, considerable assistance is given to farmers, dairymen and manufacturing concerns in the way of milk and cream testing, advice and suggestion with reference to various problems and methods of manufacture, the testing of new devices, etc. The following paragraphs illustrate one phase of this work.

Request was made for a trial of an attachment for barrel churns—known as a "breaker"—such device being claimed to greatly lessen the churning time under ordinary conditions.

Six tests were made and the results of these are summarized in the following table.

SUMMARY OF CHURNING TESTS

| — | With breaker | | | | | | Without breaker | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Temperature of cream | Fat per cent of cream | Time required to complete churning | Per cent fat in buttermilk | | | Temperature of cream | Fat per cent of cream | Time required to complete churning | Per cent fat in buttermilk | | |
| | | | | Babcock | Acid-alcohol | Official extraction | | | | Babcock | Acid-alcohol | Official extraction |
| | ° | | ′ | | | | ° | | ′ | | | |
| 1 | 48·0 | 25·0 | 10·0 | 0·25 | 0·44 | 0·415 | 48·0 | 25·0 | 14·0 | 0·20 | 0·35 | 0·365 |
| 2 | 44·0 | 25·0 | 20·0 | ..... | 0·40 | 0·320 | 44·0 | 25·0 | 18·0 | ..... | 0·36 | 0·325 |
| 3 | 50·0 | 24·31 | 13·0 | ..... | ..... | 0·40 | 50·0 | 24·31 | 12·0 | ..... | ..... | 0·40 |
| 4 | 48·0 | 24·7 | 10·0 | 0·33 | 0·40 | 0·44 | 48·0 | 24·7 | 0·18 | 0·14 | 0·20 | 0·28 |
| 5 | 48·0 | 26·8 | 19·0 | 0·18 | 0·45 | 0·43 | 53·0 | 26·8 | 21·0 | 0·15 | 0·37 | 0·36 |
| 6 | 46·0 | 30·7 | 17·0 | 0·40 | 0·78 | 0·63 | 46·0 | 30·7 | 21·0 | 0·37 | 0·66 | 0·63 |
| Average | 47·3 | 26·1 | 14·8 | 0·29 | 0·494 | 0·439 | 48·2 | 26·1 | 17·3 | 0·215 | 0·388 | 0·393 |

CONCLUSIONS.—While the value of the results obtained concerning the efficiency of the attachment itself are possibly of secondary importance, certain incidental and decidedly interesting facts are disclosed.

1. The Babcock test is not shown to be in close agreement with other methods, and there are indications that it may be both unsatisfactory and misleading.

2. The Acid-alcohol test generally gives results approximating those obtained by the official extraction method.

3. On the average the "breaker" saved 2·5 minutes per churning, or 14·4 per cent, while it was apparently responsible for a loss of 0·046 per cent fat or 11·7 per cent.

In work of this kind this Division is frequently much indebted to the Division of Bacteriology, which maintains a small but well-equipped laboratory in the farm dairy building. Co-operation has facilitated the study of milk production problems: the factors influencing clean milk production and their relative importance, the effect of the milking machine on the quality of milk, the efficiency of cleaning and sterilizing processes on milking machine parts, etc.

## SWINE

As for the past few years the herd of swine at Ottawa is composed of Yorkshires and Berkshires. Of these two, the Yorkshires are the more numerous, there being thirty-two brood sows, two aged boars, two young boars, forty-five feeders and one hundred young pigs as compared with nine Berkshire brood sows and gilts, one aged boar, four young boars, eleven feeders and four spring pigs.

The health of the herd has been very good and apart from a few isolated cases of pneumonia in unthrifty individuals there is nothing to report.

The demand for breeding stock was not so active as for the previous year. In all, ninety-five head of breeding stock of all ages were sold. Of this number, sixty-eight were Yorkshire boars, nineteen Yorkshire sows, seven Berkshire boars and one Berkshire sow.

At certain times of the year orders are received for breeding stock which cannot be accepted because suitable stock is not available, although a determined effort is made to fill as many orders as possible. While the herd supplies much breeding stock to farmers and stockmen, it is also required to furnish a large number of hogs which are needed for experimental work and these two demands must be kept in mind when accepting orders for breeding stock and outlining experimental work.

In addition to the sales of breeding stock 30,110 pounds of pork were sold on the hoof and 3,575 pounds as dressed pork.

## EXPERIMENTAL WORK

As in the past, experimental investigations have been conducted with an eye to the immediate and future demands of the hog industry. The scope of this work is necessarily limited, because of insufficient housing facilities, equipment, and the number of pigs available for research investigations. The past year's work, however, has contributed much information that is distinctly of value, particularly with respect to breeding, feeding, production costs, and effect of feeds on type.

### ANALYSIS OF FEEDS

The Division of Animal Husbandry is indebted to Dr. F. T. Shutt, the Dominion Chemist, for the analyses of feeds submitted below and elsewhere in this report of experimental work with swine.

| Laboratory number | Nature of feed | Manufacturer or producer | Moisture | Protein | Fat | Carbohydrates | Fibre | Ash |
|---|---|---|---|---|---|---|---|---|
| | | | % | % | % | % | % | % |
| 89109 | Barley chop | C.E.F., Ottawa | 12·81 | 12·22 | 1·92 | 65·63 | 4·68 | 2·74 |
| 89110 | Oil cake meal | Sherwin Williams | 7·71 | 31·65 | 9·77 | 36·74 | 8·02 | 6·11 |
| 89111 | Middlings | Maple Leaf Milling Co. | 11·37 | 16·61 | 4·69 | 59·26 | 4·75 | 3·32 |
| 89112 | Shorts | " " | 12·54 | 17·20 | 5·98 | 53·22 | 7·04 | 4·02 |
| 89113 | Oat chop | Western Oats | 11·72 | 12·22 | 4·80 | 57·19 | 10·96 | 3·11 |

## SELF-FEEDING VS. TROUGH-FEEDING

*Objects of Experiments.*—1. To compare meal rations which for purposes of identification will be designated as "Western" and "C.E.F." rations, these to be self-fed and trough-fed in both cases.

2. To compare dry meal feeding vs. dry meal supplemented with milk in separate troughs.

3. To determine the influence of these rations and feeding methods on the type of the finished hogs.

*Outline of Experiment:*

| Lot | Number of hogs | Duration of test (days) | How fed | Meal ration* | | Other feeds |
|---|---|---|---|---|---|---|
| 1 | 7 | 128 | Trough-fed | *Weaning to 80 pounds—* | | |
| | | | | Middlings | 200 pounds | |
| | | | | Oats | 100 " | |
| | | | | Barley | 50 " | |
| | | | | Shorts | 50 " | |
| | | | | Oil Meal | 3 per cent | |
| | | | | Tankage | 6 " | |
| | | | | *80 to 125 pounds—* | | |
| | | | | Middlings | 200 pounds | |
| | | | | Oats | 100 " | |
| | | | | Barley | 100 " | |
| | | | | Shorts | 50 " | |
| | | | | Oil Meal | 3 per cent | |
| | | | | Tankage | 6 " | |
| | | | | *125 to 150 pounds—* | | |
| | | | | Oats | 200 pounds | |
| | | | | Barley | 150 " | |
| | | | | Shorts | 100 " | |
| | | | | Oil Meal | 3 per cent | |
| | | | | Tankage | 6 " | |
| | | | | *150 pounds to Finish—* | | |
| | | | | Oats | 150 pounds | |
| | | | | Barley | 200 " | |
| | | | | Shorts | 100 " | |
| | | | | Oil Meal | 3 per cent | |
| | | | | Tankage | 6 " | |
| 2 | 7 | 128 | Self-fed | Same as lot 1 | | |
| 3 | 8 | 128 | Trough-fed | *Weaning to 80 pounds—* | | |
| | | | | Oats | 300 pounds | |
| | | | | Barley | 100 " | |
| | | | | Tankage | 10 per cent | |
| | | | | *80 to 125 pounds—* | | |
| | | | | Oats | 200 pounds | |
| | | | | Barley | 100 " | |
| | | | | Tankage | 10 per cent | |
| | | | | *125 to 150 pounds—* | | |
| | | | | Oats | 100 pounds | |
| | | | | Barley | 100 " | |
| | | | | Tankage | 5 per cent | |
| | | | | *150 pounds to finish—* | | |
| | | | | Oats | 100 pounds | |
| | | | | Barley | 200 " | |
| 4 | 8 | 157 | Self-fed | Same as lot 3 | | |
| 5 | 7 | 132 | Self-fed | Same as lot 1 | | Buttermilk. |
| 6 | 7 | 154·5 | Trough-fed | Same as lot 1 | | Buttermilk. |

*The meal was fed at the rate of four per cent of the live weight.

The meal ration fed to lots 1, 2, 5 and 6 is the one termed "C.E.F.", while that fed to lots 3 and 4 is the "Western."

*Housing.*—The hogs were housed and fed inside and had free access to small runs. The test was conducted under summer conditions.

*Prices Charged for feeds:—*

| | |
|---|---|
| Barley, per ton | $ 40 00 |
| Oats, per ton | 44 00 |
| Middlings, per ton | 43 50 |
| Shorts, per ton | 34 00 |
| Oil meal, per ton | 50 00 |
| Tankage, per ton | 60 00 |
| Buttermilk, per ton | 5 00 |

NUTRITIVE RATIO AND PERCENTAGE PROTEIN IN RATIONS

| Lots | — | Weaning to 80 pounds | 80 to 125 pounds | 125 to 150 pounds | 150 lb. to finish |
|---|---|---|---|---|---|
| 1 and 2 "C.E.F." ration. | Nutritive ratio | 1: 3·75 | 1: 3·81 | 1: 4·04 | 1: 4·19 |
| | Percentage of protein....% | 21·06 | 20·78 | 19·85 | 19·28 |
| 3 and 4 "Western" ration. | Nutritive ratio | 1: 4·0 | 1: 4·01 | 1: 4·68 | 1: 5·67 |
| | Percentage protein....% | 20·05 | 19·96 | 17·61 | 14·99 |
| 5—Self-fed "C.E.F." ration and milk. | Nutritive ratio | 1: 3·07 | 1: 3·24 | 1: 3·34 | 1: 3·42 |
| | Percentage protein....% | 24·53 | 23·55 | 23·02 | 22·60 |
| 6—Trough-fed "C.E.F." ration and milk. | Nutritive ratio | 1: 2·81 | 1: 3·22 | 1: 3·32 | 1: 3·42 |
| | Percentage protein....% | 26·24 | 23·67 | 23·13 | 22·61 |

SELF-FEEDING VS. TROUGH-FEEDING

| — | "C.E.F." meal rations | | "Western" meal rations | | "C.E.F." meal rations and buttermilk | |
|---|---|---|---|---|---|---|
| | Trough-fed | Self-fed | Trough-fed | Self-fed | Self-fed | Trough-fed |
| Lot | 1 | 2 | 3 | 4 | 5 | 6 |
| Original number of pigs on test... No. | 7 | 7 | 8 | 8 | 7 | 7 |
| Initial weight, gross... lb. | 205 | 199 | 242 | 255 | 266 | 223 |
| Final number of pigs on test... lb. | 7 | 5 | 6 | 6 | 7 | 7 |
| Initial weight, gross... lb. | 205 | 142 | 182 | 191 | 266 | 222 |
| Average initial weight... lb. | 29·3 | 28·4 | 30·3 | 31·6 | 38 | 31·8 |
| Final weight, gross... lb. | 974 | 679 | 797 | 1,127 | 1,519 | 1,535 |
| Average final weight... lb. | 139·1 | 135·8 | 132·8 | 187·8 | 217 | 219·3 |
| Total gain in period... lb. | 769 | 537 | 615 | 936 | 1,253 | 1,312 |
| Number of days on test... days | 128 | 128 | 128 | 157 | 132 | 154·5 |
| Average daily gain per hog... lb. | ·858 | ·839 | ·801 | ·994 | 1·36 | 1·21 |
| Total meal consumed... lb. | 2,750 | 2,008 | 2,231 | 4,103 | 3,575 | 4,155 |
| Total buttermilk consumed... lb. | ..... | ..... | ..... | ..... | 6,390 | 7,915 |
| Meal consumed per pound gain... lb. | 3·58 | 3·74 | 3·63 | 4·41 | 2·85 | 3·17 |
| Milk consumed per pound gain... lb. | ..... | ..... | ..... | ..... | 5·10 | 6·03 |
| Total cost of feed... $ | 58 84 | 43 27 | 48 54 | 88 77 | 91 16 | 106·74 |
| Cost of feed per head... $ | 8 46 | 8 65 | 8 09 | 14 80 | 13 02 | 15 25 |
| Cost of feed per head per day... cts. | 6·56 | 6·76 | 6·32 | 9·42 | 9·86 | 9·86 |
| Cost of feed per pound gain... cts. | 7·65 | 8·06 | 7·89 | 9·48 | 7·29 | 8·13 |

*Remarks.*—The dry meal method of feeding, when used from the time the pigs were weaned, was apparently responsible for a number of deaths, and for several of the pigs becoming unthrifty. The addition of buttermilk obviously prevented this condition since the two lots fed dry meal and supplied buttermilk in separate troughs did not suffer any losses from this cause.

The losses in the various lots were the result of digestive disorders, dry food impactions in the stomach and general unthriftiness. The hogs that survived for 128 days in lots 1, 2 and 3 were also unthrifty and made very slow gains averaging only 0·859 of a pound per hog per day, 0·839 of a pound and 0·801 of a pound respectively for the "C.E.F." trough-fed lot, the "C.E.F. self-fed lot and the "Western" trough-fed lot.

In view of the very unthrifty condition of the hogs and the immediate danger of further losses being suffered, these three lots were removed from the test. The other three lots were carried through to market weights in order to determine the influence of these feeds and feeding methods on the type of the hogs when graded alive and on the rail, which was the purpose of the test.

Two pigs were removed fom lot 2, one at the end of 102 days and one at the end of 108 days. The first pig removed died on test and the latter was in immediate danger of death.

Two pigs were also very unthrifty in lot 3 and were taken out on the 106th day. The lack of thrift first became evident after the hogs were about two months on test.

There was also one death in lot 4 at the end of two months from the start of the test. Another hog died at the end of 148 days. This latter pig was in equally as good flesh and weighed as much as any of the other pigs at that time. A post mortem examination showed a compaction of dry meal in the stomach. This latter lot was doing somewhat better than the other three lots on dry meal and water at the end of the 128-day period, the day these lots were removed from the test, and for that reason it was determined to carry the lot through to market weights. Slow gains were made, however, and at the end of 157 days on test, the average weight was only 187·8 pounds, an average daily gain per hog of 0·994 of a pound. As digestive disturbances were again evident in three of the pigs, characterized by unsteadiness of gait and dizziness and a thick, wrinkly skin, it was determined to remove the pigs at that time and slaughter them.

In the case of the lots fed dry meal supplemented with buttermilk, no losses were experienced.

This phase of the test clearly illustrates the need of succulent feed in the rations when the meal is fed dry.

In order to demonstrate this more fully, these hogs were placed on a meal and buttermilk diet fed as a slop, for a period of fifty-three days. They averaged 139 pounds at the start of the period and 200 at the end, an average daily gain per pig of 1·16 pounds, and made these gains with a feed consumption of 3·5 pounds of meal and 2·96 pounds of buttermilk per pound of gain produced and at a feed cost of approximately 8 cents per pound of gain. These results indicate fairly conclusively that the ration was at fault and not the pigs, emphasizing the need of milk by-products or succulence in some other form in the ration of growing pigs.

In view of the unsatisfactory results obtained from feeding the meal dry, when not supplemented with buttermilk, lots 1, 2 and 3 attained an average weight of less than 140 pounds after 128 days on test, and it was found necessary to remove them from the test. These lots, therefore, were not available for the slaughter test.

As these three lots were not to be available for comparisons of type and conformation when finished, it was deemed advisable to procure measurements of the various hogs at the end of the 128-day period. Some difficulty was experienced in this as there was no suitable device such as a squeeze, to hold the pigs while measuring them.

MEASUREMENTS OF HOGS

| Lot | Number of pigs | How fed | Side measurements | | Shoulder measurements | |
|---|---|---|---|---|---|---|
| | | | Total length | Length, point of shoulder to hook bones | Height | Width |
| | | | in. | in. | in. | in. |
| 1 | 6 | Trough (C.E.F.) | 46·3 | 33·6 | 23·9 | 10·2 |
| 2 | 5 | Self-fed (C.E.F.) | 46·1 | 32·1 | 23·2 | 9·6 |
| 3 | 6 | Trough (Western) | 43·5 | 31·7 | 23·2 | 9·7 |
| 4 | 7 | Self-fed (Western) | 44·6 | 32·6 | 24·7 | 10·6 |

At this stage of the test there was little to choose between the self-fed and the trough-fed hogs, with the exception that the trough-fed lot on "C.E.F." meal gave evidence of developing greater stretch than the other lots. Of the lots fed dry meal and water in separate troughs, only lot 4 reached market weights. The two lots on dry meal supplemented with buttermilk finished satisfactorily. One hog in the trough-fed lot on the latter ration suffered an injury which resulted in slower gains for this lot as a whole and also a greater feed requirement per pound of gain. This, however, fails to explain the entire reason for the greater meal and milk consumption per pound of gain as compared with the self-fed lot. It is noteworthy that the food consumption of the self-fed lot is unusually low. The fact that the self-fed lot made their gains with a lower food consumption and at a lower cost is at variance with most previous findings at this Farm.

These three lots, which were finished within bacon weights, were graded alive by officials of the Live Stock Branch, Department of Agriculture, Ottawa, and also scored on the rail after slaughter, the score card used being that adopted by the Live Stock Branch for Canadian Wiltshires.

The weights of the carcasses and the various cuts were taken and the scoring done with the leaf lard in and the head and feet on. The accompanying score card presents the results obtained from each lot, and will illustrate the relative conformation of the hogs in the three lots. These are expressed in terms of averages.

The trough-fed lot which received the "C.E.F." meal and buttermilk scored a total of 94·6 per cent, the self-fed lot on a similar meal ration and buttermilk 89·7 per cent, and the lot on the "Western" ration 84·3 per cent.

The trough-fed hogs gave superior carcasses in all respects except two—the thickness of belly and the covering of fat on the loin.

Out of a total of seven hogs, the trough-fed lot gave six Wiltshire carcasses and one unfinished; the self-fed lot on similar feeds gave five Wiltshire carcasses, one unfinished and one unsuitable for a Wiltshire, and the third lot gave three Wiltshires and three unfinished carcasses.

| Rations | Identity | Score Card for Canadian Wiltshires | | | | | | | | | | | | | | | | | | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Yield—10 | | | | | | | Length | Conformation—42 | | | | | | | | | | | | Quality—48 | | | | | | | | |
| | | | | | | | | | | Middle | | | | | | | Shoulder | | Ham | | | | | | | | | | | |
| | | Live wt. | Dressed wt. | % Dressed wt. | Wt. of Wiltshire | % Wiltshire (32% is perfect) | Score on Wiltshire yield | | Length from round bone to first rib (min. length 28 inches) | Width behind shoulder | Width at loin | Score uniformity of width | Wt. of middle | Thickness of belly (inches) | Score conformation of middle | | Wt. of shoulder | Score conformation of shoulder | Wt. of ham | Score conformation of ham | Extreme measurement of fat on shoulder | Extreme measurement of fat on loin | Score uniformity of back fat | Mixture of lean and fat in streak | Development of eye of lean in loin | Firmness of fat | Texture of lean | Quality of skin | | |
| | | Maximum Score | | | | | 10 | | | In. | In. | 10 | lb. | In. | 12 | | lb. | 10 | lb. | 10 | In. | In. | 10 | 10 | 8 | 10 | 5 | 5 | | |
| "C.E.F." Meal and Milk (Trough-fed) | Lot 6 | 219·3 | 167·1 | 76·2 | .... | .... | .... | | 32·4 | 14·1 | 11·2 | 9·4 | 34·1 | 1·11 | 11·1 | | 29·9 | 9·46 | 18·1 | 9·6 | 1·71 | 1·11 | 8·61 | 9·36 | 7·64 | 10 | 5 | 5 | | 6 Wiltshires, 1 Unfinished. |
| "C.E.F." Meal and Milk (Self-fed) | Lot 5 | 217 | 162 | 74·7 | .... | .... | .... | | 31·64 | 13·6 | 10·6 | 8·7 | 34·3 | 1·18 | 10·1 | | 30.14 | 8·64 | 17·1 | 9·5 | 1·8 | 1·21 | 8·21 | 9 | 7·71 | 9·71 | 4·25 | 4·92 | | 1 Unsuitable for Wiltshire, 5 Wiltshires, 1 Unfinished. |
| "Western" Ration (Self-fed) | Lot 4 | 187·8 | 140·5 | 74·8 | .... | .... | .... | | 30·79 | 12·9 | 6·10 | 8·5 | 29·8 | 1·16 | 9·22 | | 26·1 | 8·66 | 15·2 | 8·9 | 1·66 | 1·08 | 7·25 | 8·66 | 7·58 | 8·42 | 4·25 | 4·42 | | 3 Wiltshires, 3 Unfinished. |

NOTE.—Weights taken with leaf lard in and heads on.

DEDUCTIONS

1. The feeding of dry meal in troughs or when self-fed, unless supplemented with milk, resulted in unthrifty hogs when the lots were fed in this way from weaning.

2. There was little to choose between the so-called "C.E.F." and "Western" meal rations used in this test, although up to the end of 128 days at which time three lots were removed, the "C.E.F." rations produced pork more economically both in quantity of feeds consumed and in the cost of gains for a given gain in weight. Of the three lots which finished within bacon weights, the two which were fed the "C.E.F." meal and buttermilk gave vastly superior results to the lot fed the barley and oat ration supplemented only with tankage. On the other hand, the only lot of those fed dry meal and water, to finish within bacon weights, was the self-fed lot receiving the "Western" meal ration. Whether the virtue was in the pigs or the ration would be difficult to determine, but the indications were that these pigs were somewhat more thrifty and vigorous than those in the other lots.

3. Self-fed hogs, when supplied a well-balanced meal ration and buttermilk compared favourably in bacon type with trough-fed hogs and finished three weeks earlier. As already mentioned, one hog in the trough-fed lot suffered an injury which affected the rate of gains and economy of gains of this lot.

4. The lack of a clear-cut line of demarkation indicating the economy of self-feeding as compared with trough-feeding in this test, makes any deductions unsatisfactory, but the unusually low feed consumption and relatively low cost of production shown by lot 5 is noteworthy.

5. The nutritive ratio of the ration, including buttermilk fed to lots 5 and 6, indicates that too much protein was being supplied particularly during the last period after the hogs reached 150 pounds in weight, and this resulted in the hogs continuing to grow frame and muscle and not carrying enough finish when slaughtered.

## ORGANIC SUPPLEMENTS FOR HOG FEEDING

*Object of Experiment.*—To determine the value of 60 per cent protein tankage, 45 per cent protein tankage, and 70 per cent protein fish meal in the ration of hogs.

*Outline of Experiment:—*

| Lot | Number of hogs | Days on test | How fed | Meal ration | Other feeds |
|---|---|---|---|---|---|
| | | | | *First 30 Days* | |
| 1 | 5 | 120 | As slop in trough | Middlings..... 200 pounds<br>Shorts..... 100 "<br>Oats..... 50 "<br>Barley..... 50 "<br>Bran..... 50 "<br>Oil meal..... 3 per cent | 6 per cent of 60 per cent protein tankage. |
| | | | | *Second 30 Days* | |
| | | | | Middlings..... 100 pounds<br>Oats..... 100 "<br>Shorts..... 100 "<br>Barley..... 100 "<br>Bran..... 50 "<br>Oil meal..... 3 per cent | Same as in first 30 days. |
| | | | | *Third 30 Days* | |
| | | | | Oats..... 200 pounds<br>Shorts..... 100 "<br>Barley..... 150 "<br>Oil meal..... 3 per cent | Same as in first 30 days. |
| | | | | *Fourth 30 Days* | |
| | | | | Oats..... 150 pounds<br>Shorts..... 100 "<br>Barley..... 200 "<br>Oil meal..... 3 per cent | Same as in first 30 days. |
| 2 | 5 | 120 | As slop in trough | Same as lot 1..... | 6 per cent of 45 per cent protein tankage. |
| 3 | 5 | 120 | As slop in trough | Same as lot 1..... | 6 per cent of 70 per cent protein fish meal. |
| 4 | 5 | 120 | As slop in trough | Same as lot 1..... | Buttermilk. |

The 60 per cent protein tankage and the 45 per cent protein tankage were both procured from the City Renderers Ltd., Montreal, P.Q. The fish meal is a product of the Fasterfat Limited, Halifax, N.S.

VALUATION PLACED ON FEEDS

| | | $ |
|---|---|---|
| Middlings | per ton | 43 20 |
| Shorts | " | 34 00 |
| Oats | " | 44 00 |
| Barley | " | 40 00 |
| Bran | " | 32 00 |
| Tankage (60 per cent protein) | " | 72 70 |
| Tankage (45 per cent protein) | " | 65 20 |
| Fish meal | " | 100 00 |
| Buttermilk | " | 6 00 |

CHEMICAL ANALYSIS

| — | Moisture | Protein | Fat | Ash | Fibre |
|---|---|---|---|---|---|
| Lab'y No. 91099. Fish meal | 7·83 | 76·37 | 1·90 | 15·83[1] | |
| Lab'y No. 91248. Tankage | 6·80 | 45·18 | 12·65 | 25·78[2] | 2·86 |
| Lab'y No. 83668. Tankage | 9·91 | 59·55 | 11·0 | 17·53[3] | 1·01 |

[1]Contains 12·54 per cent phosphate of lime, 1·16 per cent common salt.
[2]Contains 21·51 per cent phosphate of lime.
[3]Contains 14·03 per cent phosphate of lime.

TANKAGE VS. FISH MEAL VS. BUTTERMILK

| — | | 60 per cent protein tankage | 45 per cent protein tankage | 70 per cent protein fish meal | Buttermilk |
|---|---|---|---|---|---|
| Number of hogs | No. | 5 | 5 | 5 | 5 |
| Initial weight, total | lb. | 283 | 334 | 245 | 205 |
| Initial weight, average | " | 56·6 | 66·8 | 49 | 41 |
| Final weight, total | " | 998 | 1,001 | 971 | 1,010 |
| Final weight, average | " | 199·6 | 200·2 | 194·2 | 202 |
| Total gain in 120 days | " | 715 | 667 | 726 | 805 |
| Average gain per hog | " | 143 | 133·4 | 145·2 | 161 |
| Average daily gain per hog | " | 1·19 | 1·11 | 1·21 | 1·34 |
| Total meal consumed | " | 2,285 | 2,322 | 2,294 | 1,960 |
| Total supplements consumed | " | 145 | 148 | 146 | 5,110 |
| Meal eaten per pound gain | " | 3·195 | 3·48 | 3·16 | 2·43 |
| Supplements eaten per pound gain | " | 0·202 | 0·221 | 0·201 | 6·35 |
| Total cost of feed | $ | 51 65 | 51 82 | 53 76 | 55 00 |
| Cost of feed per head | $ | 10 33 | 10 36 | 10 75 | 11 00 |
| Cost of feed per pound gain | cts. | 7·23 | 7·77 | 7·40 | 6·83 |
| Selects on foot | No. | 3 | 4 | 4 | 5 |
| Thick smooths on foot | " | 2 | 1 | 1 | |

NUTRITIVE RATIO AND PROTEIN CONTENT OF RATIONS

| Lots | — | First 30 days | Second 30 days | Third 30 days | Fourth 30 days |
|---|---|---|---|---|---|
| 1. Tankage.....60% | Nutritive ratio | 1:3·62 | 1:3·79 | 1:4·04 | 1:4·19 |
| | Percentage of protein | 21·66 | 20·86 | 19·85 | 19·28 |
| 2. Tankage.....45% | Nutritive ratio | 1:3·79 | 1:3·98 | 1:4·25 | 1:4·41 |
| | Percentage of protein | 20·56 | 20·08 | 19·04 | 18·47 |
| 3. Fish meal.....70% | Nutritive ratio | 1:3·45 | 1:3·6 | 1:3·82 | 1:3·96 |
| | Percentage of protein | 22·48 | 21·73 | 20·73 | 20·17 |
| 4. Buttermilk..... | Nutritive ratio | 1:3·2 | 1:3·18 | 1:3·67 | 1:3·73 |
| | Percentage of protein | 23·81 | 23·93 | 21·39 | 21·14 |

*Remarks.*—The supplementing of the meal with six per cent of 70 per cent fish meal, resulted in 1·54 per cent more rapid gains than the 60 per cent tankage lot, while the food requirements for a given gain in weight was 1·2 per cent less.

The fish meal therefore had only a slight advantage in these respects. Because of the higher purchase price of the fish meal, this lot of hogs shows a slightly higher cost per pound of gain, about 2·3 per cent more.

In rapidity of gains and food consumption per pound of gain, the lots ranked as follows: buttermilk, 70 per cent fish meal, 60 per cent tankage, and 75 per cent tankage. In feed cost per pound gain the buttermilk lot again led, while the 45 per cent tankage lot was last. The standing of the other two lots was reversed because of the higher cost of the fish meal pound for pound as compared with the 60 per cent tankage.

In this test, 1,960 pounds of meal and 5,110 pounds of buttermilk had a feeding value equal to 2,544 pounds of meal and 162 pounds of fish meal, and to 2,802 pounds of meal and 179 pounds of 45 per cent tankage, and to 2,572 pounds of meal and 163 pounds of 60 per cent tankage.

With the meal costing $40.50 per ton and buttermilk $6 per ton, the fish meal had a relative value of $43.60 per ton, the 60 per cent tankage a relative value of $35.82 per ton and the 45 per cent tankage a minus value of $19.43 per ton. These costs are, of course, all relative.

The cost of the meal ration here is very high and the value given the supplements depends on the cost of this and the corresponding cost of the buttermilk. With the meal ration costing $37 per ton and buttermilk valued at 35 cents per hundred pounds, the fish meal then has a relative feeding value in these rations of $87.56, the 60 per cent tankage $80.56 and the 45 per cent tankage $25.78 per ton.

In order to procure further information concerning these feeds in their effect on the carcasses of the hogs, more particularly with reference to the type and finish, the hogs were put through the slaughter test. Previous to this they were graded alive.

This grading gave the following results:—

| Supplementary feed used for lot | Number of hogs fed | Grading of hogs |
|---|---|---|
| Buttermilk | 5 | 5 selects. |
| Fish meal | 5 | 4 selects, 1 thick smooth. |
| 45 per cent tankage | 5 | 4 selects, 1 thick smooth. |
| 60 per cent tankage | 5 | 3 selects, 2 thick smooth. |

The live grade, therefore, showed the buttermilk lot to give the best results, with all hogs grading select. The fish meal and 45 per cent protein tankage lots were tied for second place with each four selects and one thick smooth. The 60 per cent protein tankage gave three selects and two thick smooth hogs. The accompanying chart shows the results obtained from the slaughter test.

| Description of Feeds Compared | Identity | Score Card for Canadian Wiltshires | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Yield—10 | | | | | | Length | Conformation—42 | | | | | | | | | | | | | Quality—48 | | | | | | | | | |
| | | | | | | | | | | Middle | | | | | | Shoulder | | Ham | | | | | | | | | | | | | | |
| | | Live wt. | Dressed wt. | % Dressed wt. | Wt. of Wiltshire | % Wiltshire (82% is perfect) | Score on Wiltshire yield | | Length from round bone to first rib (min. length 28 inches) | Width behind shoulder | Width at loin | Score uniformity of width | Wt. of middle | Thickness of belly inches | Score conformation of middle | Wt. of shoulder | Score conformation of shoulder | Wt. of ham | Score conformation of ham | Extreme measurement of fat on shoulder | Extreme measurement of fat on loin | Score uniformity of back fat | Mixture of lean and fat in streak | Development of eye of lean in loin | Firmness of fat | Texture of lean | Quality of skin | | | | | |
| | | | Maximum Score | | | | 10 | | | | | 10 | | | 12 | | 10 | | 10 | | | 10 | 10 | 8 | 10 | 5 | 5 | | | | |
| Tankage 60% Prot..... | ..... | 199·6 | 149·2 | 74·8 | .... | .... | .... | | 29·8 | 13·05 | 10·3 | 8·55 | 28·6 | 1·28 | 9·8 | 18·7 | 8·3 | 16·2 | 8·25 | 1·98 | 1·5 | 8·35 | 8·3 | 6·85 | 7·2 | 5 | 5 | 3 Wiltshires, 2 Unsuitable. Total Score 84%. |
| Tankage 45% Prot..... | ..... | 218·2 | 153·6 | 70·1 | .... | .... | .... | | 30·2 | 12·9 | 9·5 | 7·9 | 26·2 | 1·33 | 9·25 | 19·25 | 8·95 | 17·05 | 8·35 | 1·55 | 1·25 | 8·35 | 8·4 | 6·7 | 7·1 | 5 | 5 | 3 Wiltshires, 2 Unsuitable. Total Score 83·3%. |
| Fish Meal 70% Prot.... | ..... | 194·2 | 141·2 | 75·2 | .... | .... | .... | | 30·95 | 13·05 | 9·82 | 8·1 | 25·4 | 1·15 | 9·1 | 17·75 | 8·8 | 15·55 | 8·1 | 1·55 | 1·18 | 7·9 | 8·3 | 6·45 | 7·2 | 5 | 5 | 3 Wiltshires, 2 Unsuitable. Total Score 82·1%. |
| Buttermilk..... | ..... | 202 | 153·2 | 75·8 | .... | .... | .... | | 30·55 | 13·05 | 9·55 | 8·3 | 27·6 | 1·25 | 10·3 | 18·95 | 9 | 16·6 | 8·55 | 1·73 | 1·45 | 8·95 | 9 | 7·1 | 7·4 | 5 | 5 | Five Wiltshires. Score 87·3%. |

NOTE.—The shoulders, middles and hams were weighed with leaf lard out, trimmed, and heads off.
All figures are averages for five pigs.

### DEDUCTIONS

1. A ration of meal supplemented with buttermilk at an average rate of three pounds of buttermilk to one of meal, gave the most rapid gains and the most economical gains as compared with the other three lots, and when graded both alive and on the rail gave one hundred per cent select hogs and Wiltshire sides.

2. The supplementing of the meal ration with six per cent of 60 per cent protein tankage gave results very similar as when supplementing the ration with six per cent of 70 per cent protein fish meal. The greater cost of the fish meal, however, raised the cost of production above that of the 60 per cent tankage ration, although this tankage lot gave slightly lower gains and a slightly greater feed consumption per pound of gain produced. An interesting feature of the test is found in the fact that the fish meal fed hogs showed slightly more length than those in any of the other lots. This difference, however, was only 0·4 of an inch more than the average length of the buttermilk fed lot, 0·75 of an inch more than the 45 per cent tankage lot, and 1·15 inches longer than the 60 per cent tankage lot.

3. The 45 per cent protein tankage gave the poorest gains and the largest meal consumption per pound of gain of any lot in this test. With the meal ration valued at $40.50 per ton and buttermilk at $6 per ton, this tankage showed a minus value. These results for the lower protein tankage are at variance with those obtained in two previous tests, as slightly better results were obtained from the 45 per cent than from the 60 per cent protein tankage.

## MILK SUBSTITUTES FOR HOG FEEDING

### BUTTERMILK VS. BUTTERMILK POWDER

This test was undertaken with a buttermilk powder which was manufactured by the Ottawa Dairy Ltd., Ottawa.

In appearance this powder was very finely pulverized and slightly sticky to the touch but would dissolve readily and completely in water.

*Object of Experiment.*—To determine the value of buttermilk powder as a substitute for buttermilk for hog feeding.

*Outline of Experiment:*—

| Lot | Number of pigs | Duration of test | How fed | (1) Meal ration | Other feeds |
|---|---|---|---|---|---|
| 1 | 5 | 98 | Trough | Same as fed lot 1 in self-fed test vs. trough-fed test. | Buttermilk. |
| 2 | 5 | 98 | Trough | Same as above..... | (2)Buttermilk powder. |

(1) Meal was fed at the rate of four per cent of the live weight of the hogs.
(2) Buttermilk powder was mixed in water at the rate of two pounds to eight gallons (80 pounds) of water, and this solution fed at approximately the same rate as the buttermilk.

### VALUATION PLACED ON FEEDS

The cost prices of the feeds were the same in this test as for the test reported under "Self-feeding vs Trough-feeding." Buttermilk powder cost eight cents per pound. Buttermilk was valued at 30 cents per hundred pounds which was the cost price.

The chemical analysis[1] of the buttermilk powder shows it to contain:—

| | |
|---|---|
| Moisture | 5·03 per cent |
| Protein | 32·99 " |
| Fat | 5·03 " |
| Carbohydrates | 48·45 " |
| Ash | 8·5 " |

RESULTS OF BUTTERMILK VS. BUTTERMILK POWDER EXPERIMENT

| —— | | Buttermilk powder | Buttermilk |
|---|---|---|---|
| Number of pigs per lot | No. | 5 | 5 |
| Initial weight, gross | lb. | 295 | 208 |
| Initial weight, average | lb. | 59 | 41·6 |
| Final weight, gross | lb. | 930 | 870 |
| Final weight, average | lb. | 186 | 174 |
| Total gain | lb. | 635 | 662 |
| Average gain per hog in 98 days | lb. | 127 | 132·4 |
| Average daily gain per hog | lb. | 1·30 | 1·35 |
| Total meal consumed | lb. | 1,550 | 1,460 |
| Total buttermilk consumed | lb. | ..... | 3,970 |
| Total buttermilk powder consumed | lb. | 146 | ..... |
| Meal eaten per pound gain | lb. | 2·44 | 2·20 |
| Milk eaten per pound gain | lb. | ..... | 6·00 |
| Powder eaten per pound gain | lb. | ·23 | ..... |
| Total cost of feed | $ | 44·55 | 42·82 |
| Cost of feed per head | $ | 8 91 | 8 56 |
| Costs of feed per pound gain | cts. | 7·02 | 6·47 |

*Remarks.*—The buttermilk powder lot made very good gains as compared with the buttermilk fed lot, the gains for the latter lot being only 3·78 per cent more rapid. Somewhat more meal was required by the powder lot, however, this lot requiring an average of 2·44 pounds of meal and 0·23 of a pound of powder to produce a pound of gain in weight while the control lot consumed 2·2 pounds of meal and 6 pounds of buttermilk per pound of gain. On the feed cost per pound of gain basis the powder lot showed a feed cost of $7.02 per hundred and the buttermilk lot $6.47 per hundred pounds of pork produced, a difference of 55 cents.

In this test 1,616 pounds of meal and 152 pounds of buttermilk powder were equal in feeding value to 1,460 pounds of meal and 3,970 pounds of buttermilk, or with meal valued at $42 per ton and buttermilk at $6 per ton, the powder had a relative value of 3·53 cents per pound or $70.60 per ton.

BUTTERMILK VS. BUTTERMILK POWDER—SECOND TEST

A second test was undertaken with this buttermilk mixed in water at the rate of three pounds of buttermilk to eight gallons of water.

The meal rations used were the same as those employed in the test entitled "Organic Supplements for Hog Feeding."

The prices charged for feeds were the same as in the previous test.

[1] This analysis was made by Dr. F. T. Shutt, the Dominion Chemist.

RESULTS OF SECOND EXPERIMENT WITH BUTTERMILK VS. BUTTERMILK POWDER

| —— | | Buttermilk powder | Buttermilk |
|---|---|---|---|
| Number of hogs | No. | 7 | 7 |
| Initial weight, gross | lb. | 347 | 329 |
| Initial weight, average | lb. | 49·6 | 47 |
| Final weight, gross | lb. | 1,319 | 1,383 |
| Final weight, average | lb. | 188·4 | 197·6 |
| Total gain in 125 days | lb. | 972 | 1,054 |
| Average daily gain per hog | lb. | 1·11 | 1·2 |
| Total meal consumed | lb. | 3,010 | 2,595 |
| Total buttermilk consumed | lb. | ..... | 6,185 |
| Total powder consumed | lb. | 387 | ..... |
| Meal eaten per pound gain | lb. | 3·097 | 2·72 |
| Buttermilk eaten per pound gain | lb. | ..... | 6·48 |
| Powder eaten per pound gain | lb. | ·399 | ..... |
| Total cost of feed | $ | 92 86 | 70 80 |
| Cost of feed per head | $ | 13 26 | 10 11 |
| Cost of feed per pound gain | cts. | 9·55 | 6·72 |

*Remarks.*—In this test the powder gave results inferior to those obtained in the former test. The hogs on this feed showed a total gain in weight of 972 pounds in 125 days, an average daily gain per hog of 1·11 pounds as compared with a total gain of 1,054 pounds, an average of 1·2 pounds per hog per day for those fed buttermilk. The lot fed buttermilk consumed 2·72 pounds of meal and 6·48 pounds of buttermilk per pound of gain as compared with 3·097 pounds of meal and 0·4 of a pound of powder in the case of the buttermilk powder lot.

In this test, 3,264 pounds of meal and 420 pounds of buttermilk powder were equal in value to 2,595 pounds of meal and 6,185 pounds of buttermilk. With meal valued at $40.50 per ton and buttermilk at 30 cents per hundred pounds, the 420 pounds of powder had a relative value of only $4.85 or 1·15 cents per pound.

DEDUCTIONS

1. From these tests it would appear that this buttermilk powder cannot be used profitably as a substitute for buttermilk, when fed in dilutions of two pounds to eight gallons and three pounds to eight gallons of water respectively.

2. While buttermilk powder is capable of producing relatively good gains in the dilutions used as compared with buttermilk, its use would not be justified under ordinary conditions.

| Rations | Identity | Score Card for Canadian Wiltshires | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Yield—10 | | | | | Length | Conformation—42 | | | | | | | | | | | | | Quality—48 | | | | | | | | | |
| | | | | | | | | | Middle | | | | | | | Shoulder | | Ham | | | | | | | | | | | | | |
| | | Live wt. | Dressed wt. | % Dressed wt. | Wt. of Wiltshire | % Wiltshire (82% is perfect) | Score on Wiltshire yield | Length from round bone to first rib (min. length 28 inches) | Width behind shoulder | Width at loin | Score uniformity of width | Wt. of middle | Thickness of belly inches | Score conformation of middle | Wt. of shoulder | Score conformation of shoulder | Wt. of ham | Score conformation of ham | Extreme measurement of fat on shoulder | Extreme measurement of fat on loin | Score uniformity of back fat | Mixture of lean and fat in streak | Development of eye of lean in loin | Firmness of fat | Texture of lean | Quality of skin | |
| | | | Maximum Score | | | | 10 | | | | 10 | | | 12 | | 10 | | 10 | | | 10 | 10 | 8 | 10 | 5 | 5 | |
| | | lb. | lb. | | | | | In. | In. | | | | | | | | | | | | | | | | | | | | | |
| Buttermilk Powder Lot (Average, 7 hogs) | | 188·4 | 133·4 | 70·8 | | | | 30·03 | 12·3 | 8·57 | 8·43 | 24 | 1·03 | 9·57 | 16·2 | 7·96 | 14·6 | 8·11 | 1·45 | 1·02 | 7·71 | 8·1 | 6·4 | 8·5 | 4·9 | 5 | 4 Wiltshires, 3 Unsuitable. |
| Buttermilk Lot (Average, 7 hogs) | | 197·6 | 143 | 72·4 | | | | 30·35 | 12·6 | 8·96 | 8·54 | 25·7 | 1·14 | 9·89 | 17·1 | 8·54 | 15·8 | 8·57 | 1·41 | 1·02 | 8·03 | 8·4 | 7·6 | 8·8 | 5 | 5 | 5 Wiltshires, 2 Unsuitable. |

NOTE.—The shoulders, middles and hams were weighed with heads off, leaf lard out, and trimmed.
All figures are averages for seven hogs

## PROVENDINE FOR HOG FEEDING

Provendine is described by the manufacturers as a condiment for use in the ration of pigs suffering from rickets, scurvy or general lack of thrift, or, on the other hand, for use in the ration of healthy stock as an aid in more rapid fattening. Among other constituents, Provendine contains lime or calcium, a material which is not available in sufficient quantities in many rations. This calcium or lime is essential for the proper development of bone and it also aids in the neutralization of acids in the digestive tract. Lactic acid is frequently troublesome when large quantities of skim-milk or buttermilk are being fed to young pigs, and the excessive accumulation of this acid in the digestive tract tends to produce a rickety condition of the pigs, due to decalcification of the bones.

The value of sunlight for the treatment of rickets is fully appreciated, but under winter feeding conditions, the pigs must of necessity be closely confined.

The usual rations recommended for pig feeding contain the active principles known as vitamins, but in many instances the unthrifty hog or other animal seems to have lost the faculty to utilize these vitamins from the food in sufficient quantities to maintain normal growth.

With these deficiencies of some rations in mind, the manufacturers of Provendine have incorporated in their food product an active substance which has been treated with ultra violet rays. These rays were developed by means of a quartz mercury lamp and have the same influence on feeds and animals as direct sunlight. This treatment activates this material and this, in turn, supplies the necessary vitamins for healthy growth.

In order to give the Provendine a trial, eight unthrifty and stunted pigs were selected and divided into two lots of four pigs each.

Provendine was fed to four of these pigs at the rate of one tablespoonful per hog per day.

The chemical analysis of the Provendine, as supplied by Dr. F. T. Shutt, the Dominion Chemist, is as follows:—

| | |
|---|---|
| Moisture | 8·66 per cwt. |
| Ether extract (fat) | 3·00 " |
| Protein | 8·40 " |
| Ash* | 25·23 " |

*Containing 10·3 per cent phosphate of lime and 9·96 per cent carbonate of lime.

" Traces only of chlorides and sulphates. Free from iodides, neutral to litmus. Microscopical examination shows corn starch.

" This preparation appears to be a mixture of corn meal, phosphate of lime and carbonate of lime."

The outline of the first test is as follows:—

| Lot | Number of pigs | Days on test | Meal ration | Other feeds |
|---|---|---|---|---|
| 1 | 4 | 29 | Oats..... 1½ parts<br>Barley..... 1½ "<br>Bran..... 1 "<br>Oil meal..... 3%<br>Tankage..... 3% | Buttermilk.<br>Provendine. |
| 2 | 4 | 29 | Same as lot 1 | Buttermilk. |

RESULTS OF EXPERIMENT WITH PROVENDINE

| —— | | Provendine | No Provendine |
|---|---|---|---|
| Number of hogs on test | No. | 4 | 4 |
| Initial weight, gross | lb. | 223 | 239 |
| Initial weight, average | " | 55·6 | 59·7 |
| Final weight, gross | " | 312 | 299 |
| Final weight, average | " | 78 | 74·7 |
| Total gain in 29 days | " | 89 | 60 |
| Average daily gain per hog | " | 0·769 | 0·517 |
| Total meal consumed | " | 196 | 196 |
| Total buttermilk consumed | " | 675 | 675 |
| Total Provendine consumed | " | 8 | ..... |
| Meal eaten per pound gain | " | 2·2 | 3·26 |
| Buttermilk eaten per pound gain | " | 7·58 | 11·25 |
| Total cost of feed | *$ | 6 19 | 6 19 |
| Feed cost per head | $ | 1 55 | 1 55 |
| Feed cost per pound gain | cts. | 6·96 | 10·32 |

*Provendine not included.

In this test, 196 pounds of meal, 675 pounds of buttermilk and 8 pounds of Provendine had a value equal to 290·7 pounds of meal and 1,001 pounds of buttermilk. With meal costing $42.60 per ton and buttermilk 30 cents per hundred, the Provendine had a value of 37·4 cents per pound.

The lot fed Provendine therefore gave an exceptionally good account of itself making slightly more than a quarter of a pound more rapid gains per hog per day than the control lot, on the same quantity of feed. During a period of thirty-five days subsequent to this test, no Provendine was fed to either lot. One of the hogs which had been receiving Provendine suffered from some disturbance which could not be remedied by feeding, and therefore this hog was discarded for purposes of making comparisons. During this period, the average gain per hog was 38 pounds for each hog on the lot previously fed Provendine and 40.7 pounds per hog for those which did not receive Provendine.

A second test was then undertaken with these same hogs with a slightly changed meal ration, but with Provendine fed at the same rate, that is, one tablespoonful per hog per day.

This second meal ration was compiled as follows for both lots: Oats, 200 pounds; barley, 150 pounds; shorts, 100 pounds; middlings, 100 pounds; oil meal, 3 per cent.

To this meal ration was added buttermilk at the rate of 2½ pounds of milk to one pound of meal.

RESULTS OF SECOND TEST WITH PROVENDINE

| —— | | Provendine | No Provendine |
|---|---|---|---|
| Number of hogs | No. | 3 | 4 |
| Initial weight, gross | lb. | 358 | 462 |
| Initial weight, average | " | 119·3 | 115·5 |
| Final weight, gross | " | 524 | 671 |
| Final weight, average | " | 178 | 167·8 |
| Total gain in 30 days | " | 166 | 209 |
| Average daily gain per hog | " | 1·84 | 1·74 |
| Total meal consumed | " | 368 | 490 |
| Total buttermilk consumed | " | 918 | 1,225 |
| Total Provendine consumed | " | 6·75 | ..... |
| Meal eaten per pound gain | " | 2·21 | 2·34 |
| Buttermilk eaten per pound gain | " | 5·53 | 5·86 |
| Total cost of feed | $ | 10 38 | 13 77 |
| Feed cost per pound gain | cts. | 6·25 | 6·6 |

In this test, 463 pounds of meal, 1,156 pounds of buttermilk, and 6·75 pounds of Provendine had a feeding value equal to 490 pounds of meal and 1,225 pounds of buttermilk. With meal valued at $42.60 per ton and buttermilk at 30 cents per hundred, the Provendine had a relative value of 78 cents for the 6·75 pounds fed. The lot fed Provendine at the rate of one tablespoonful per hog per day made 5·5 per cent more rapid gains on a 5·5 per cent lower feed consumption.

DEDUCTIONS

The use of Provendine for unthrifty and runty pigs would appear to be of considerable value, especially for younger pigs.

Larger quantities than those fed in these tests might be employed but would certainly increase the cost of the rations appreciably. For older pigs which had received Provendine during the earlier periods of their lives, the value of this food material was less marked, when again introduced into the ration after an interval when no Provendine was fed.

## ACID UTAL FOR FEEDING GROWING PIGS

*Object of Experiment.*—To determine whether the addition of Acid Utal to the ration of newly weaned pigs is capable of increasing the thrift, vigour, general health and also the rate and economy of gains of the pigs.

*Plan of Experiment:—*

| Lot | Number of pigs | Days on test | How fed | Meal ration | | Other feeds |
|---|---|---|---|---|---|---|
| 1 | 5 | 97 | Trough | *First 30 days—* | | |
| | | | | Middlings | 200 pounds | Buttermilk, Acid Utal. |
| | | | | Oats | 100 " | |
| | | | | Shorts | 50 " | |
| | | | | Barley | 50 " | |
| | | | | Bran | 50 " | |
| | | | | Oil meal | 3 per cent | |
| | | | | *Second 30 days—* | | |
| | | | | Middlings | 100 pounds | Buttermilk, Acid Utal. |
| | | | | Oats | 100 " | |
| | | | | Shorts | 100 " | |
| | | | | Barley | 100 " | |
| | | | | Bran | 50 " | |
| | | | | Oil meal | 3 per cent | |
| | | | | *Third 30 days—* | | |
| | | | | Oats | 200 pounds | Buttermilk, Acid Utal. |
| | | | | Shorts | 100 " | |
| | | | | Barley | 150 " | |
| | | | | Oil meal | 3 per cent | |
| | | | | *After 90 days—* | | |
| | | | | Oats | 150 pounds | Buttermilk, Acid Utal. |
| | | | | Shorts | 100 " | |
| | | | | Barley | 200 " | |
| | | | | Oil meal | 3 per cent | |
| 2 | 7 | 90 | Trough | Same as lot 1 | | Buttermilk. |

The Utal was analysed by the Dominion Chemist, Central Experimental Farm, Ottawa, and the following composition found:—

**Acid Utal Lab'y. No. 90775:**

| | |
|---|---|
| Sodium formate | 15·26 per cent |
| Free formic acid | 9·18 " |
| Water | 33·88 " |
| Silica | 40·00 " |
| Undetermined | 1·68 " |
| | 100·00 " |

In connection with this analysis, Dr. F. T. Shutt, the Dominion Chemist, makes the following observations:—

"Our analysis of this preparation shows that its active ingredient is formic acid.

"Formic acid is a powerful stimulant of muscular action; it retards fatigue; in small doses it improves appetite and general nutrition."

*Housing.*—The pigs were housed in pens which were provided with sleeping berths. They were also allowed free access to small outside yards after the first thirty days on test.

*Cost of Feeds.*—The meal rations for the full period were charged at $1.85 per hundred pounds and the buttermilk at 25 cents per hundred. No charge was placed on the Utal.

ACID UTAL VS. NO ACID UTAL FOR GROWING PIGS

| —— | | Acid Utal | No Acid Utal |
|---|---|---|---|
| Number of pigs | No. | 5 | 7 |
| Initial weight, gross | lb. | 171 | 329 |
| Initial weight, average | lb. | 34·2 | 47 |
| Final weight, gross | lb. | 667 | 953 |
| Final weight, average | lb. | 133·4 | 136·1 |
| Total gain | lb. | 496 | 624 |
| Average gain per hog | lb. | 99·2 | 89·1 |
| Number of days on test | days | 97 | 90 |
| Average daily gain per hog | lb. | 1·02 | ·98 |
| Total meal consumed | lb. | 1,145 | 1,475 |
| Total buttermilk consumed | lb. | 3,420 | 4,335 |
| Meal eaten per pound gain | lb. | 2·31 | 2·36 |
| Milk eaten per pound gain | lb. | 6·895 | 6·947 |
| Acid Utal consumed | boxes | 2·5 | ..... |
| Total cost of feed | $ | 29 73 | 38 12 |
| Cost of feed per head | $ | 5 94 | 5 45 |
| Cost of feed per pound gain | cts. | 6·00 | 6·11 |

*Summary.*—In this test 1,475 pounds of meal and 4,335 pounds of buttermilk were equal in feeding value to 1,440 pounds of meal, 4,302 pounds of buttermilk and 3·1 boxes of Acid Utal. With meal valued at $1.85 per hundred and buttermilk at 25 cents per hundred pounds, the 3·1 boxes of Utal had a feeding value in this test of 73·3 cents.

A further test with this material will be conducted next year with the object of determining the value of the Utal when fed to unthrifty pigs. In the test just completed, the pigs were thrifty and vigorous and apparently did not require this material to stimulate growth.

While slightly more rapid gains were made by the pigs in the lot receiving the Acid Utal, these gains were not sufficiently greater than those of the check lot to be significant.

## IRON OXIDE FOR BROOD SOWS

*Object of Experiment.*—To determine the nutritional value of iron oxide when fed in the ration of brood sows.

*Plan of Experiment.*—Two lots of five brood sows were selected for this test. Each sow in one lot was fed a level tablespoonful of iron oxide in her feed a few days before farrowing and during the nursing period. A similar lot of sows farrowing at approximately the same time and housed and fed in a similar manner was selected as controls. The condition of the litters at birth, the number of pigs born and the weight of the pigs at birth were recorded.

Data were also collected at weaning (eight weeks). Representative pigs were selected from both groups of sows after weaning and subsequently fed for a period of 128 days.

The farrowing and weaning records are as follows:—

| —— | | Iron Oxide Lot | No Oxide Lot |
|---|---|---|---|
| *Results at Birth*— | | | |
| Number of sows | No. | 5 | 5 |
| Total pigs farrowed | No. | 65 | 66 |
| Average number of pigs per litter | No. | 13 | 13·2 |
| Total good pigs farrowed | No. | 38 | 53 |
| Total small and weak pigs farrowed | No. | 17 | 7 |
| Total dead pigs farrowed | No. | 10 | 6 |
| Total weight of pigs at birth | lb. | 146 | 136 |
| Average weight per pig at birth | lb. | 2·24 | 2·06 |
| *Results at Weaning* (8 weeks)— | | | |
| Total pigs weaned | No. | 38 | 40 |
| Total good pigs weaned | No. | 33 | 34 |
| Total small pigs weaned | No. | 5 | 6 |
| Percentage pigs raised of those farrowed | % | 55·4 | 60·6 |
| Percentage good pigs raised | % | 50·8 | 51·5 |
| Total weight of pigs at 8 weeks | lb. | 997 | 1,018 |
| Average weight per pig at 8 weeks | lb. | 26·2 | 25·4 |

*Remarks.*—The use of iron oxide in the ration of nursing sows, when fed at the rate of approximately one-half ounce per sow per day, failed to demonstrate that any appreciable benefit could be credited to its use. The results at weaning time were no more significant than would be expected from two different groups of sows.

In order to further trace the influence, if any, exerted by the iron oxide on the litters, seven pigs were selected at weaning from the litters which were farrowed by the oxide fed sows and a similar number of pigs from the control sows which did not receive oxide. This portion of the test was as follows:—

*Plan of Experiment:*—

| Lot | Number of pigs | Days on test | Meal ration | | Other feeds |
|---|---|---|---|---|---|
| 1 | 7 | 128 | *Weaning to 80 pounds* | | |
| | | | Middlings | 200 pounds | Pigs from the iron oxide fed sows |
| | | | Shorts | 50 " | |
| | | | Barley | 50 " | |
| | | | Oats | 100 " | |
| | | | Oil meal | 3 per cent | |
| | | | Tankage | 6 " | |
| | | | *80 to 125 lb.* | | |
| | | | Middlings | 200 pounds | |
| | | | Shorts | 50 " | |
| | | | Barley | 100 " | |
| | | | Oats | 100 " | |
| | | | Oil meal | 3 per cent | |
| | | | Tankage | 6 " | |
| | | | *125 to 150 lb.* | | |
| | | | Shorts | 100 pounds | |
| | | | Barley | 150 " | |
| | | | Oats | 200 " | |
| | | | Oil meal | 3 per cent | |
| | | | Tankage | 6 " | |
| | | | *150 lb. to Finish* | | |
| | | | Shorts | 100 pounds | |
| | | | Barley | 200 " | |
| | | | Oats | 150 " | |
| | | | Oil meal | 3 per cent | |
| | | | Tankage | 6 " | |
| 2 | 7 | 128 | Same as lot 1 | | Pigs from sows not fed oxide. |

The method of feeding the meal which was adopted was that of trough-feeding the meal dry. Drinking water was supplied in separate troughs.

VALUE OF FEEDS

| | $ |
|---|---|
| Middlings, per ton | 43 50 |
| Shorts | 34 00 |
| Barley, per ton | 40 00 |
| Oats, per ton | 44 00 |
| Oil meal, per ton | 50 00 |
| Tankage, per ton | 60 00 |

THE RESULTS OBTAINED FROM THE FEEDING TEST WERE AS FOLLOWS:

| — | | Pigs from sows fed iron oxide | Pigs from sows not fed iron oxide |
|---|---|---|---|
| No. of pigs at start of test | No. | 7 | 7 |
| Total initial weight | lb. | 205 | 261 |
| No. of pigs at end of test | No. | 7 | 4 |
| Total initial weight | lb. | 205 | 149 |
| Average initial weight | lb. | 29·3 | 37·3 |
| Total final weight | lb. | 974 | 585 |
| Average final weight | lb. | 139·1 | 146·2 |
| Total gain in 128 days | lb. | 769 | 438 |
| Average daily gain per hog | lb. | 0·858 | 0·855 |
| Total meal consumed | lb. | 2,750 | 1,557 |
| Meal consumed per pound gain | lb. | 3·58 | 3·55 |
| Total cost of feed | $ | 58 84 | 33 23 |
| Average cost of feed per head | $ | 8 46 | 8 31 |
| Average cost of feed per head per day | cts. | 6·56 | 6·49 |
| Feed cost per pound gain | cts. | 7·65 | 7·59 |

*Remarks.*—Here again the lot of pigs selected from those farrowed by the oxide fed sows failed to show any particular value which the feeding of oxide might exert on the litters. It will be observed that three pigs were lost from the control lot. Two of these pigs died from digestive troubles and were making equally as good gains as the other pigs on the test up until the time of their death. The reason for these losses was apparently the result of the feeding of the meal dry, and a lack of succulence in the ration. The third pig proved very unthrifty and was removed at the end of 98 days.

DEDUCTIONS

1. The feeding of iron oxide to brood sows during the nursing period failed to demonstrate that it was of value for the nursing pigs. 2. The feeding of iron oxide to brood sows failed to indicate that any beneficial influence was imparted to the young pigs as indicated by their gains in weight or in the economy of gains produced as illustrated in a subsequent feeding test.

## COST OF BACON PRODUCTION

### A. COST OF RAISING PIGS TO WEANING

A test was commenced on December 2, 1926, and continued for the subsequent twelve months in order to procure the feed requirement of brood sows for a year and also the number of pigs which would be raised to weaning age. The rations fed the brood sows during the periods before and after weaning consisted of meal, roots, and hay and during the nursing period, meal and skim-milk were fed.

The composition of the meal mixtures were as follows:—

COMPOSITION OF MEAL MIXTURES

| Before and after nursing | | Nursing ration | |
|---|---|---|---|
| Bran | 1 part | Bran | 1 part |
| Shorts | 1 part | Shorts | 1 part |
| Oats | 1 part | Oats | 2 parts |
| Oil meal | 3 per cent | Middlings | 1 part |
| Tankage | 3 per cent | Barley | 1 part |
| | | Oil meal | 3 per cent |
| | | Tankage | 3 per cent |

*Valuation Placed on Feeds*

| | $ |
|---|---|
| Bran, per ton | 32 00 |
| Shorts, per ton | 34 00 |
| Oats, per ton | 44 00 |
| Middlings | 43 50 |
| Barley, per ton | 40 00 |
| Oil meal, per ton | 50 00 |
| Tankage, per ton | 60 00 |

*Statement of Feeds Consumed by Sows and Costs for One Year*

| | | $ | $ |
|---|---|---|---|
| 10,295 pounds meal while nursing | at | 40 13 per ton | 206 57 |
| 11,802 pounds meal before and after nursing | at | 37 67 " " | 222 29 |
| 9,690 pounds skim-milk | at | 5 00 " " | 24 23 |
| 4,940 pounds roots | at | 3 75 " " | 9 26 |
| Total feed cost for 8 sows | | | 462 35 |

SUMMARY OF DATA AT WEANING

| | | |
|---|---|---|
| Number of sows in group | No. | 8 |
| Total number of pigs raised in year | No. | 112 |
| Average number of pigs raised per sow | No. | 14 |
| Number of litters farrowed in the year | No. | 14 |
| Average number of pigs raised per litter | No. | 8 |
| Total meal consumed by group | lb. | 22,097 |
| Total skim-milk consumed by group | lb. | 9,690 |
| Total roots consumed by group | lb. | 4,940 |
| Total meal consumed per sow | lb. | 2,762 |
| Total skim-milk consumed per sow | lb. | 1,211·2 |
| Total roots consumed per sow | lb. | 617·5 |
| Total cost of feed for eight sows for year | $ | 462 35 |
| Average cost of feed per sow | $ | 57 79 |
| Feed cost per litter at weaning | $ | 33 03 |
| Average feed cost per pig at weaning | $ | 4 13 |

B. COST OF RAISING HOGS FROM WEANING TO MARKET WEIGHTS

In order to determine the cost of feeding pigs from weaning to that of reaching market weights, fourteen of these pigs were selected and fed until finished. These pigs were fed the following meal rations and milk:—

1. *From weaning to 80 pounds—*

| | |
|---|---|
| Middlings | 200 pounds |
| Shorts | 50 " |
| Barley | 50 " |
| Oats | 100 " |
| Oil meal | 3 per cent |
| Tankage | 6 " |

2. *From 80 to 125 pounds—*

| | |
|---|---|
| Middlings | 200 pounds |
| Shorts | 50 " |
| Barley | 100 " |
| Oats | 100 " |
| Oil meal | 3 per cent |
| Tankage | 6 " |

3. *From 125 to 150 pounds—*

| | |
|---|---|
| Shorts | 100 pounds |
| Barley | 150 " |
| Oats | 200 " |
| Oil meal | 3 per cent |
| Tankage | 6 " |

4. *From 150 pounds to Finish—*

| | |
|---|---|
| Shorts | 100 pounds |
| Barley | 200 " |
| Oats | 150 " |
| Oil meal | 3 per cent |
| Tankage | 6 " |

COST OF FEEDING PIGS FROM WEANING TO FINISHING

| | | |
|---|---|---|
| Number of pigs fed | No. | 14 |
| Initial weight, gross | lb. | 489 |
| Initial weight, average | lb. | 34·9 |
| Final weight, gross | lb. | 3,054 |
| Final weight, average | lb. | 218·1 |
| Total gain | lb. | 2,565 |
| Average gain per hog | lb. | 183·2 |
| Number of days on test | dys. | 143 |
| Average daily gain per hog | lb. | 1·28 |
| Total meal consumed | lb. | 7,730 |
| Total milk consumed | lb. | 14,305 |
| Meal eaten per pound gain | lb. | 3·013 |
| Skim-milk eaten per pound gain | lb. | 5·58 |
| Total cost of meal | $ | 146 53 |
| Total cost of feed | $ | 182 29 |
| Feed cost per head | $ | 13 02 |
| Feed cost per pound gain | cts. | 7 11 |

*Summary—Cost of Bacon Production*

| | $ |
|---|---|
| Average feed cost per pig at weaning | 4 13 |
| Average feed cost per hog (weaning to 218 pounds) | 13 02 |
| Average feed cost per hog when finished | 17 15 |
| Feed cost per hundred pounds of pork produced | 7 86 |

## FARROWING AND WEANING RECORDS

### DATA RE THE BERKSHIRE HERD

As seen from the table there have been only seven litters farrowed this year. As compared with the previous year there has been a 14 per cent decrease in the number of pigs farrowed in these litters, and about nine per cent fewer good pigs. There was also a decrease in the number of good pigs raised to weaning, the average size of the litters at weaning being 4·57 pigs as compared with an average of 6·87 for the previous year. There was 61·54 per cent of the pigs raised of those farrowed while for the previous twelve months the percentage was 79·7.

### DATA RE THE YORKSHIRE HERD

During the last year 43 Yorkshire litters were farrowed, these giving a total of 521 pigs, an average per litter of 12·11 pigs. This was an increase of approximately one per cent more than the average for the last three years. The percentage of good pigs, however, has shown a decrease of ten per cent as compared with the previous year an increase of 5·5 per cent of small and weak pigs and an increase of 3·77 per cent of dead pigs. Of the total number of pigs farrowed, 53·74 per cent were raised to eight weeks or 5·15 per cent less than for the previous year. The records therefore show considerably larger numbers of pigs produced during the year, but hardly as high a percentage of good stock as shown by the records for the previous year.

## Yorkshire and Berkshire Farrowing and Weaning Records 1927–28

| — | Total number of sows | Total number of pigs farrowed | Average number of pigs per litter | Total number of good pigs at birth | Per cent of good pigs | Total number of small and weak pigs at birth | Per cent of small and weak pigs | Total number of dead pigs at birth | Per cent of dead pigs | Total number of living pigs at 8 weeks | Total losses during first eight weeks | Per cent of losses during first eight weeks | Average number pigs per litter at eight weeks | Per cent of pigs raised to eight weeks | Number fit for breeding purposes | Per cent fit for breeding purposes | Number fit only for breeding purposes | Per cent fit only for feeding purposes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yorkshire | 43 | 521 | 12·11 | 354 | 67·95 | 114 | 21·88 | 53 | 10·17 | 280 | 241 | 46·26 | 6·51 | 53·74 | 193 | 69 | 87 | 31 |
| Berkshire | 7 | 52 | 7·43 | 42 | 80·76 | 8 | 15·58 | 2 | 3·85 | 32 | 20 | 38·46 | 4·57 | 61·54 | 21 | 65·6 | 11 | 34·4 |
| **Records for 1926–27** | | | | | | | | | | | | | | | | | | |
| Yorkshires | 31 | 343 | 11·06 | 265 | 77·26 | 56 | 16·3 | 22 | 6·4 | 202 | 141 | 41·11 | 6·51 | 58·89 | 148 | 73·26 | 54 | 26·74 |
| Berkshires | 8 | 69 | 8·63 | 62 | 89·85 | 3 | 4·3 | 4 | 5·79 | 55 | 14 | 20·29 | 6·87 | 79·71 | 38 | 69·09 | 17 | 30·9 |
| **Records for 1925–26** | | | | | | | | | | | | | | | | | | |
| Yorkshires | 28 | 310 | 11·07 | 269 | 86·77 | 32 | 10·3 | 9 | 2·9 | 199 | 111 | 35·48 | 7·10 | 64·02 | ..... | ..... | ..... | ..... |
| Berkshires | 18 | 159 | 8·83 | 144 | 90·5 | 14 | 8·8 | 1 | 0·6 | 119 | 40 | 25·16 | 6·61 | 74·84 | ..... | ..... | ..... | ..... |
| **Records for 1924–25** | | | | | | | | | | | | | | | | | | |
| Yorkshires | 31 | 366 | 11·8 | 302 | 82·5 | 44 | 12·02 | 20 | 5·43 | 228 | 138 | 37·7 | 7·3 | 62·3 | 175 | 76·7 | 53 | 22·2 |
| Berkshires | 19 | 156 | 8·21 | 136 | 87·2 | 15 | 9·61 | 5 | 3·20 | 90 | 66 | 42·3 | 4·74 | 57·7 | 65 | 72·2 | 25 | 27·7 |

## OLD HICKORY SMOKED SALT CURE FOR PORK

One Berkshire hog, approximately 160 pounds in weight, was slaughtered on June 20, 1927. The carcass was hung for twenty-four hours and then cut. One side was cured by the dry curing method and the other was brine cured. Both were cured in hardwood barrels, which had previously been prepared by partially filling with boiling water and then covered for twelve hours, in order to permit the steam to thoroughly penetrate the fibres of the barrel. The water was then emptied out and the barrels allowed to cool.

Both the brine cure and the dry cure were prepared according to the directions outlined in the pamphlet which was enclosed in each carton of the Smoked Salt. The brine cure was prepared twenty-four hours before being used, in order to permit it to cool thoroughly. The cuts from one side of the pork were then carefully packed in the barrel, and the brine poured over it. The weighted top of the barrel was then placed on the pork, in order to keep it below the surface of the brine.

In the case of the dry cured pork, the various cuts were given a thorough rubbing with part of the dry cure and then carefully packed in the second barrel, care being taken to keep the skin of the pork to the outside of the barrel as much as possible.

The prevailing temperature of the curing cellar varied between 57 to 60 degrees Fahrenheit. The lots were then allowed to remain in the cures until July 7, when both were overhauled. In the case of the brine cure it was deemed advisable at this time to boil it. The brine was then thoroughly cooled and placed in the barrel again. At this time, also, the remainder of the dry cure was applied to the larger cuts, which appeared to need it. Both lots were again over-hauled on July 21. At this time the smaller cuts were removed, as it was considered that they had been sufficiently cured. The larger cuts were allowed to remain until August 9, when all were removed from the cure. As there were 50 pounds of pork available for each cure, just one-half of the formula prescribed for 100 pounds of pork was used.

When removed from the cure, it was observed that the dry pork was darker in colour than the brine cured, while in the case of the brine cured pork the colour was almost similar to that of fresh pork. All cuts were used shortly after being taken from the cures and, therefore, were not wrapped. When cooked, it was found that both the dry cured and the brine cured pork were very salty. Steeping in water or boiling remedied this to some extent. In this connection it might be here mentioned that in view of the warm weather prevailing at the time of the cure, it was thought advisable to leave the pork in the cures longer than would have been the case in cool weather, and this may, no doubt, have resulted in too much of the salt being absorbed.

Another objectionable feature was that the meat was hard in texture, this being more particularly true with the dry cure. This condition could possibly be remedied by reducing the amount of salt and, also, the quantity of saltpetre in a given quantity of pork, but for summer curing it would not appear advisable to use less salt in either of the cures. Apart from the texture of the meat, the flavour was fairly good, but whether the meat could be described as possessing a smoked flavour was not definitely determined, but it certainly possessed a flavour quite distinguished from pork cured with ordinary salt.

## PIGGERY EQUIPMENT

When considering the replacing of equipment in the piggery or contemplating the purchase of new equipment the farmer is sometimes at a loss to know what to select and for this reason a few timely hints or suggestions may be of value.

Such things as feeding troughs, feed hoppers, feed mixing or storing devices, feed cookers, heaters or stoves, breeding crates, shipping crates, portable hog cabins, piggery plans and identification marks for swine are discussed briefly.

### FEEDING TROUGHS

These are usually constructed of wood, galvanized iron or concrete. Wooden troughs have been found to be the most serviceable and also have the further advantage that they may be constructed at home. The dimensions of these will depend on the age of the pigs and the number of pigs to be fed.

The V-shaped trough is preferable to any other type, since it is more resistant to hard usage and less labour and material are required to construct it. Only four pieces of material are required to construct it, the two sides which are securely nailed together in the shape of a V and the two ends which are nailed one on each end of this V. These ends should be extended at least twelve inches beyond the edge or lip of the trough in order to make it more stable and less easily dumped by the hogs while feeding.

In selecting material choose pine, spruce, hemlock or similar woods. This material should be two inches in thickness and eight or ten inches wide for most feeding purposes. The upper edges and part of this upper surface should be sheeted with galvanized iron in order to prevent the hogs chewing the trough. For a single sow or boar a trough 24 inches long is sufficient and for each additional hog an additional two feet should be allowed.

These troughs should not be nailed down and can then be readily moved from place to place for convenience in feeding. When not attached to the floor they are more easily cleaned when they become filled with litter or filth.

Concrete troughs are often installed when putting a concrete floor in the piggery. They are much more difficult to keep sanitary than a movable trough. When installing a concrete trough it is well to have the bottom of the trough slightly above the floor level. A small metal pipe should be imbedded in the face of the trough and a wooden plug inserted. Such an arrangement makes the cleaning of the trough easier, since it may then be flushed out with water.

Galvanized iron troughs are not capable of withstanding the same severe treatment as will wooden troughs. When crushed or broken they are difficult to repair satisfactorily. When giving liquid feed or slops in metal troughs in cold weather, these feeds will chill more rapidly and give more trouble than when fed in wooden troughs.

### SELF-FEEDERS

Self-feeders are not entirely satisfactory for the feeding of bacon hogs throughout the entire feeding period. This is particularly so in the case of newly weaned pigs, although a well-balanced protein ration supplemented with milk by-products would appear to permit of the use of the self-feeder for the younger classes of bacon type hogs. Some surprisingly good results have been obtained from using the self-feeder throughout the entire feeding period, but experience at the Central Experimental Farm would indicate that self-feeding will tend to result in a rather thicker type of hog than will trough-feeding.

### FEEDING PAILS

Galvanized iron pails are recommended over wooden or tinned pails for use in the piggery. Wooden pails cause considerable trouble from shrinking and opening at the joints or on the other hand, by swelling and bursting the bottom, sides or hoops. The twelve-quart size is recommended. A dipper and meal scoop in half-gallon or gallon sizes are also of much practical use and assistance in feeding.

### FEED MIXING BARRELS

Hardwood barrels constructed with metal hoops are useful for mixing slop feeds and can be more readily moved about in the piggery or when feeding outside than is the case with a feed tank or small vat. Suitable barrels are frequently difficult to procure and are expensive and, for these reasons, a feed mixing tank may be advisable. It would be advisable to separate it into two compartments for the reason that mature stock will not be given the same rations as young pigs and these rations must, therefore, be prepared separately. Such a tank will give better service if lined with sheet metal.

### FEED STORAGE BINS

A covered box or bin divided into different compartments is a useful piece of equipment in the piggery and helps to prevent loss of meal through the ravages of vermin. The different meal mixtures can then be prepared when convenient, and stored for daily use. The size of the bin will depend on the amount of feed to be stored. One bushel of grain is contained in 1¼ cubic feet, therefore, one hundred bushels would be contained in a box or bin measuring 5 feet long by 5 feet wide by 5 feet high.

Tongued and grooved lumber should be used for the construction of this box.

### HEATING DEVICES AND FEED COOKERS

It is necessary to provide a stove or other heating device in the piggery when winter litters are farrowed. This may also be used for heating water or cooking feed. Many farmers use large iron pots or kettles on a stove, or a brick fireplace, or hearth for cooking feed. The sort of kettle originally used for the making of potash is admirable for the purpose. Specially constructed feed cookers are also available on the market. Such a device may be conveniently located in the feed room. The feed room and one farrowing pen should be partitioned off from the remainder of the piggery in order to ensure sufficient heat being available to keep the winter farrowed litter comfortable.

### FARROWING PENS

These should be floored with wood and equipped with a guard rail. This rail is placed around the walls and helps in preventing young pigs being crushed. Provision for a creep in one corner of the pen is recommended. A small trough placed in this soon teaches the pigs to consume milk and meal. An exit to an outside yard is highly desirable in order to encourage the pigs to take regular exercise or, lacking facilities to provide this, exercise should be encouraged inside the piggery.

### BREEDING CRATES

When breeding a small sow to a large boar or when the reverse is the case, a breeding crate is useful. It reduces danger of injury. Some difficulty is experienced with the boar in some instances when using this device and a little patience at first is required in order to permit him to become accustomed to it.

### SHIPPING CRATES

These must be light in weight but strong and rigid. In constructing, first nail the floor firmly onto the two floor skids, assemble each side and attach as a unit and nail in one end. The other end should consist of a removable gate set into grooves. Cross members should be placed across the top, binding the two sides together. Spruce or pine should be used or a similar light wood. The floor skids should be two inches square and of the required length. The lower slats on each side and on the ends should be flush with the floor. The

spacing between the side slats should not exceed 2 or 2½ inches. These are bound together with two uprights or for the large crates, a third one may be placed in the centre.

The crate may be constructed entirely of 4 inch material, five-eighths of an inch in thickness, but for the lower slats on each side, seven or eight inch pieces may be used. The floor skids should not be less than two inches square.

The following suggestions as to sizes of crates will be of value:—

| Weight of animal | Dimensions of crates | | |
|---|---|---|---|
| | Width | Height | Length |
| Up to 75 pounds | 9 in. | 2 ft. | 2 ft. 10 in. |
| 75 to 100 pounds | 10 in. | 2 ft. 2 in. | 3 ft. |
| 100 to 150 pounds | 1 ft. | 2 ft. 6 in. | 3 ft. 8 in. |
| 150 to 200 pounds | 1 ft. 2 in. | 2 ft. 6 in. | 4 ft. |

## PORTABLE CABINS

Cabins which are so constructed that they may be conveniently moved from place to place are a decided asset to any piggery plant. They may be used to relieve a congested condition in the main piggery, for housing brood sows under winter conditions or under summer conditions when on pasture, or as a shelter for pigs in summer when on dry lot or pasture. A cabin with a floor area of 50 square feet will comfortably house five adult brood sows when fed outside and given the run of the yard. Such a structure is inexpensive and may, in many instances, be constructed from material which is found on the farm.

## PIGGERY PLANS

Plans of various types of piggeries are available for free distribution to farmers and swine raisers who contemplate the construction of such buildings. Advice concerning the value and utility of the various types of piggeries may also be obtained from the Dominion Animal Husbandman. Some of the more important requisites of a suitable piggery are enumerated herewith.

## LOCATION OF THE PIGGERY

The position of the piggery in relation to the other buildings and also with regard to windbreaks, drainage and sunlight is a consideration which will materially affect the convenience of the operator in attending to the pigs and also the general health and comfort of the pigs.

When a number of sows are kept, it is desirable to have a self contained building which will comfortably house them and their litters. This will reduce the labour of feeding and caring for them to a minimum. Feed and water should be placed in the building or else near at hand.

## THE CHIEF REQUISITES OF A PIGGERY

*Warmth.*—The building should be sufficiently well built to ensure the comfort of the pigs in severe weather. Cold, draughty piggeries predispose the pigs of pneumonia, rheumatism, crippling, unthriftiness and expensive gains.

*Dryness.*—Ensure dry, well drained floors and sleeping berths by installing a suitable drainage system, or constructing the floors so that water will not lie on them. Particular care must be taken to maintain dry sleeping berths.

*Sanitation.*—The hog is normally a clean animal and appreciates a clean pen. Reasonable care and attention in maintaining clean pens will repay the feeder in the improved health of the pigs and in more economical gains.

*Sunlight.*—The piggery will give better satisfaction if supplied with plenty of light. The dark piggery is usually the unhealthy one. Sufficient windows should be installed in the piggery so that direct sunlight could penetrate to all parts of the interior at some time during the day. Sunlight has a strong germicidal effect and is therefore a valuable agent in the control of disease. Upwards of 20 square feet of glass per 100 square feet of floor space is desirable. Too much glass is likely to result in a colder piggery in severe winter weather and a hot one in very warm weather.

*Ventilation.*—If there is one thing more than another that is likely to give trouble in the piggery it is the difficulty of establishing a proper system of ventilation. Insufficient ventilation will often result in the precipitation of moisture on the ceiling and walls and, as this moisture accumulates, it drips on to the pigs and the litter. A ventilation system will not operate efficiently in a cold piggery. The temperature of the interior must be maintained sufficiently above the outside temperature to stimulate a flow of fresh air into the building. The cold air from outside is heavier than the warm air enclosed in the piggery and this air drops down to the floor, thereby forcing the warm air upwards. This warm air in turn carries off the moisture and impurities through the outlets.

## IDENTIFICATION MARKS FOR SWINE

All pigs which are intended for breeding purposes should be marked in some way or other so that they may be identified readily. When a number of brood sows are kept, this is absolutely essential in order to keep a correct record of their blood lines and also that of their litters. Many methods are in vogue.

One method which is inexpensive and which is followed to some extent is that of nicking the ears, the pigs of each litter being marked on a similar part of their ears. By means of various combinations quite a large number of different litters may be marked and subseqeuntly identified. This method is faulty in that the ears may be torn and the marks destroyed, and also it does not serve to identify individual pigs within a litter.

Various types of metal tags are also used for marking. These tags are stamped with combinations of letters or figures, and as each tag has a different combination from any other, a ready means of identification is ensured. The most satisfactory type is that which is self-clinching and when inserted in the ear, remains there permanently unless torn out. When this happens, which is but rarely, a duplicate may be inserted. In order to avoid confusion, the tags should be inserted in the ears at or before weaning.

By keeping a private herd book showing the sire and dam, the date of farrowing, and the numbers assigned to that particular litter, an accurate record of the pigs is assured.

For marking swine in Great Britain, the tattoo is used almost exclusively and is the mark officially recognized by the National Pig Breeders' Association. As a permanent mark of identification in this country, it has not given entire satisfaction as yet. Even on swine imported from Great Britain the marks apparently become less legible in a short time and it is sometimes comparatively difficult to identify tattooed animals by means of a superficial examination of the ear, although the marks of the tattooing points are doubtless still retained in the cartilage of the ear. This method of marking is undergoing tests at the present time with the object of determining its value as a means of identifying swine in this country.

## SHEEP

The flock of sheep at this Farm consists of pure-bred Leicesters, pure-bred Shropshires and cross-breds of these two breeds. On March 31, 1928, there were 161 breeding ewes on hand. The composition of the entire flock was as follows:—

| | | | |
|---|---|---|---|
| *Leicesters*— | | | |
| Breeding ewes | No. | 28 | |
| Breeding ewes (cross-breeding) | " | 45 | |
| Shearling ewes | " | 17 | |
| Lambs | " | 75 | |
| Rams | " | 2 | |
| | | | 167 |
| *Shropshires*— | | | |
| Breeding ewes | No. | 47 | |
| Breeding ewes (cross-breeding) | " | 41 | |
| Shearling ewes | " | 29 | |
| Lambs | " | 83 | |
| Rams | " | 2 | |
| | | | 202 |
| *Ewe lambs* (cross-breds) | No. | 16 | 16 |
| Total number | | | 385 |

### LAMBING DATA

The lambing results for the spring of 1927 show that 139 ewes produced 215 lambs, an average of 1·55 per ewe. In order to compare the results, the ewes are divided into four groups, those which produced pure-bred lambs and those which produced cross-bred lambs. These cross-bred lambs were either from the Leicester—Shropshire cross or the Shropshire—Leicester cross.

| — | | Pure-bred Shropshires | Cross-breds (Shropshire dams) | Pure-bred Leicesters | Cross-breds (Leicester dams) |
|---|---|---|---|---|---|
| Total number of ewes | No. | 48 | 21 | 24 | 46 |
| Total lambs born | " | 70 | 34 | 38 | 73 |
| Average lambs per ewe | " | 1·46 | 1·62 | 1·58 | 1·59 |
| Total weight of lambs at birth | lb. | 5,620 | 2,736 | 2,985 | 5,985 |
| Total lambs weighed | No. | 70 | 33 | 36 | 72 |
| Average weight of lambs at birth | lb. | 8·03 | 8·29 | 8·29 | 8·31 |

The pure-bred Shropshires gave poorer results both in number of lambs born and in weight of lambs at birth than did either the pure-bred Leicesters or the cross-breds from either crosses.

### WOOL

As has been the practice followed in past years, the wool was sold subject to grade to the Canadian Co-operative Wool Growers, Limited. Each fleece was marked and weighed as it was taken off the sheep and when graded at the warehouse, the grade of the fleece was recorded on the attached tag. These tags were then returned to the farm and the grading of the individual fleeces thereby procured.

SUMMARY—WEIGHTS AND GRADING OF FLEECES

| — | | Shropshire fleeces | Leicester fleeces |
|---|---|---|---|
| Number of fleeces | No. | 114 | 94 |
| Total weight | lb. | 792·75 | 691·75 |
| Average weight per fleece | " | 6·95 | 7·36 |
| Grading:— | | | |
| Medium staple—(⅜) fleeces | No. | 21 | |
| Percentage | % | 18·42 | |
| Low staple—(Low ½) fleeces | No. | 5 | 19 |
| Percentage | % | 4·39 | 20·21 |
| Low staple—(Low ½) hard cotts | No. | ..... | 7 |
| Percentage | % | ..... | 7·45 |
| Coarse and braid | No. | ..... | 31 |
| Percentage | % | ..... | 32·98 |
| C and B, hard cotts | No. | ..... | 33 |
| Percentage | % | ..... | 35·11 |
| Ungraded | No. | 6 | 4 |
| Percentage | % | 5·26 | 4·26 |

In all, 1,500 pounds of wool were sold. The gross sale price was $349.18, and after handling charges were deducted, the net price was $309. The average net price per pound was therefore 20·6 cents. The gross price range was from 28 cents for medium staple wool to 17 cents for hard cotts and coarse dead wool.

## ANIMAL HYBRIDIZATION AT BUFFALO PARK, WAINWRIGHT, ALTA.

(Under the immediate direction of Mr. A. G. Smith, Superintendent, Buffalo Park)

The inventory of animals in the animal hybridization project at the Buffalo Park, Wainwright, Alta., as on March 31, 1928, shows an interesting variety:—

| | Male | Female |
|---|---|---|
| Bison | 2 | 6 |
| Domestic cattle | 2 | 9 |
| Yak | 1 | 3 |
| True cattalo | – | 3 |
| Bison-domlestic hybrids | – | 5 |
| Domestic-bison " | 1 | – |
| Domestic-yak " | 1 | 1 |
| Yak-domestic " | 4 | 6 |
| Yak-bison " | – | 1 |
| 75 per cent bison, 25 per cent domestic | – | 2 |
| 50 per cent yak, 25 per cent bison and 25 per cent domestic | 2 | 1 |
| 75 per cent yak, 25 per cent domestic | 1 | – |
| 75 per cent domestic, 25 per cent yak | 5 | – |
| 75 per cent domestic, 25 per cent bison | 1 | 2 |
| 50 per cent domestic, 25 per cent bison and 25 per cent yak | – | 1 |
| 50 per cent bison, 25 per cent yak and 25 per cent domestic | – | 1 |

It will be noted that the increase in the herd for the year, as reported, shows certain interesting advances in the animal hybridization project.

(1) The mating of a domestic bull with a bison cow resulted in a hybrid male calf under normal delivery and itself normal in every way as evidenced at birth. This mating has been regarded by several investigators as practically impossible. Further, in the history of parturition and pregnancy of domestic cows bred to bison bulls in the Wainwright herd, two observations have been common: (1) premature delivery; heavy mortality, both in the case of the dam and calf at time of parturition; abnormal conditions of dam during pregnancy and parturition, mainly evidenced by excess amniotic fluid (hydramnios); (2) failure to secure a live male hybrid; in the case of males, abortion has occurred, both dams and calves have been lost at calving time,

"Three in One"—Bison, Domestic and Yak.
The work of the animal husbandman deals largely with practical problems. But rarely has he the opportunity of venturing upon the uncharted sea of "new varieties". The above depicts one of the many interesting second cross hybrids developed at Wainwright, Alta., in hybridization experiments based upon practical objectives.

A hybrid male calf (domestic x bison) with bison dam. The most interesting development of the year and the first hybrid of this origin to be produced at Wainwright. The sire was a pure bred Aberdeen Angus. This calf was born in May, 1927.

A first generation hybrid male; (domestic) x (yak x domestic); 75 per cent domestic, 25 per cent yak; born May, 1927.

A "three-quarter" domestic; male first generation hybrid; (domestic) x (bison x domestic); 75 per cent domestic, 25 per cent bison. Born May, 1927. Much interest is centred in the future breeding possibilities of this calf.

calves have been still-born or have lived for a few hours only. In reference to the latter, rather prodigious efforts have been made to retain the spark of life in two cases of apparently normal male calves alive at birth, but to no avail.

In the case of the domestic-bison cross, however (1) little or no unusual symptoms accompanied parturition; (2) an apparently normal male calf was secured, which lived and has developed splendidly. It must be remembered that only one hybrid of this extraction has been secured to date. Indeed, it would appear that this is the first case on record by any investigator. No opinion or deduction is possible therewith until a number of similar crosses have been made. During the next two years, further information should be available. Further, it will be some time before any evidence can be secured concerning the breeding powers of this domestic x bison hybrid male. The probabilities are that he may prove sterile.

It will be noted, as well, that a yak x domestic hybrid bull mated with a yak x domestic hybrid female produced a female calf. While the latter was found dead and believed to have been still-born, the possibility of the cross is proven as well as the fertility of the hybrid sire.

Another new combination is represented by the cross of a bison sire with a hybrid yak x domestic dam, resulting in a normally presented female calf. There would seem to be evidence in this case that the infusion of yak blood has favourably affected what has been proven to be a violent cross, i.e., bison x domestic; similar cases during the year do not substantiate this statement.

### ADDITIONS TO HERD

Five Aberdeen Angus cows were received from the Experimental Station, Lacombe, Alta., to replace cows removed from the domestic herd on account of their being difficult or non-breeders.

### DECREASE IN HERD

The records reveal the following losses and disposals for the year:—

1. April, 1927. A yak x domestic cow in calf to a bison bull died early in 1927, evidently due to the effects of the cross, and such as were absent in a similar cross previously commented upon.

2. June, 1927. A domestic cow was lost following the birth of a calf, the result of a bison x domestic mating. In view of numerous observations already made in other reports concerning this project, it is apparent that the percentage of such losses is very high with this violent cross.

A male bison x domestic calf survived twenty-four hours after birth. This represents the closest approach, to date, to securing, or rather, developing a bison x domestic male, in which connection see previous comment.

A yak x domestic hybrid female crossed with a bison bull died after calving.

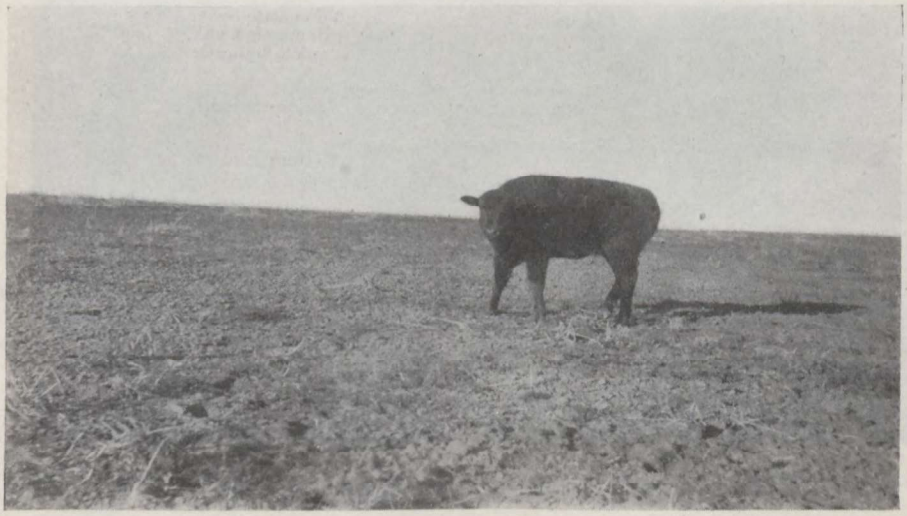
3. September, 1927. Five domestic cows, non-breeders, were disposed of.

4. December, 1927. A (domestic) x (yak x domestic) yearling male died as a result of injury.

5. January, 1928. One of the survivors of the original Mossom Boyd herd,—Seal, an aged bison x domestic hybrid was slaughtered.

6. March, 1928. A domestic cow in calf to a bison was lost. Losses are common during the period of pregnancy in the females involved in this cross.

A female first generation hybrid; (yak) x (bison x domestic); 50 per cent yak, 25 per cent domestic, 25 per cent bison; born May, 1927.



A female first generation hybrid; (bison) x (yak x domestic); 50 per cent bison, 25 per cent domestic, 25 per cent yak; born June, 1927.

GROUP MATINGS FOR THE 1927 BREEDING SEASON

| | | |
|---|---|---|
| Group I | Yak bull | 2 bison cows (3 years). |
| Group II | Bison bull | 8 domestic cows (mature). |
| | | 3 yak-domestics (4 years). |
| | | 2 yaks (mature). |
| Group III | Hybrid bulls | 2 domestics (mature). |
| | (Dom-yak 3 years) | 1 bison (3 years). |
| | (Yak-dom 3 years) | 1 bison-domestic (3 years). |
| | | 1 yak (mature). |
| Group IV | Domestic bulls | 2 bison (5 and 3 years). |
| | | 2 bison-domestics (4 years). |
| | | 1 yak-bison (4 years). |
| | | 1 50 per cent domestic, 25 per cent bison and 25 per cent yak (1 year). |
| | | 2 75 per cent domestic and 25 per cent bison (1 year). |
| | | 3 yak-domestics (2–2 years and 1–1 year). |
| | | 1 domestic-yak (2 years). |

PROPOSED GROUP MATINGS FOR 1928 BREEDING SEASON

It is proposed to arrange the following groups for the 1928 breeding season:—

| | *Males* | *Females* |
|---|---|---|
| Groups 1 and 2 | Domestic bull | 6 bison cows. |
| | Domestic bull | 1 yak x 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 bison, 25 per cent yak. |
| | | 1 50 per cent yak, 25 per cent bison, 25 per cent domestic. |
| | | 3 bison x domestic. |
| Group 3 | 2 bison bulls | 3 domestic cows. |
| | | 1 domestic x yak. |
| | | 3 yak x domestic. |
| Group 4 | 2 50 per cent yak, 25 per cent bison, 25 per cent domestic | 2 domestic cows. |
| Group 5 | 75 per cent domestic, 25 per cent yak | 3 domestic cows. |
| Group 6 | Yak-domestic 5 year old, dom-yak 4 year old | 3 yak cows. |
| | | 3 yak-domestic. |
| | | 1 domestic. |

It will be noted that arrangements have been made so that more light may be thrown on the domestic x bison cross.

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