DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

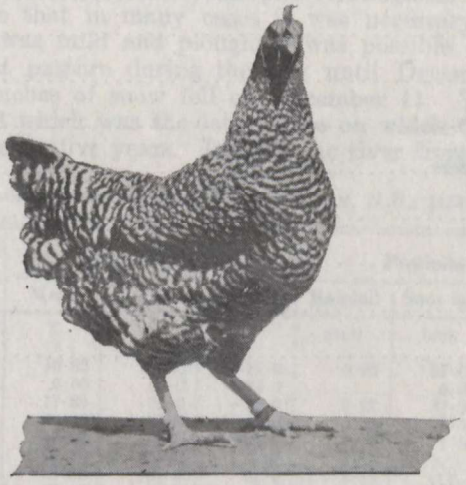
# EXPERIMENTAL STATION

## FREDERICTON, N.B.

## REPORT OF THE SUPERINTENDENT

C. F. BAILEY, B.S.A.

## FOR THE YEAR 1923



Barred Rock hen "Fredericton No. 18." Born May 2, 1922. Record, 306 eggs, Nov. 1, 1922-Oct. 30, 1923. One of 10 hens in pen 20 in the New Brunswick Egg Laying Contest, Fredericton, 1922-1923, whose record was 2,463 eggs.

Printed by authority of the Hon. W. R. Motherwell, Minister of Agriculture, Ottawa, 1925

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# EXPERIMENTAL STATION, FREDERICTON, N.B.

## REPORT OF THE SUPERINTENDENT, C. F. BAILEY, B.S.A.

### SEASONAL NOTES

The total snowfall during the winter of 1922-23 was 150.75 inches. The snow was partly removed by a rain on the 1st and 2nd of January. The wind drifted the snow which fell in January, February and March, leaving the hills bare. February, March and April were the coldest on record at the Station. The spring was cold and late. A heavy rain the last two days of April delayed farm operations. Ploughing was begun on May 14 as compared with April 17 in 1922 and April 14 in 1921. The first dates of seeding were as follows: wheat and potatoes, May 25; oats, May 28. The summer was dry and cool. Most of the rain fell in short, sharp showers which ran off the land. Owing to the dry, cool weather the growth was poor. Practically all the clover winter-killed. The hay was poor on the uplands and very good on the intervals especially on the new seeded land. Corn, sunflowers and mangels were very poor crops. Grain and turnips were good crops. Strawberries and bush fruits were exceptionally heavy crops. Apples, plums and cherries were very light crops. September was free from frosts. Most of the grain was harvested in October. The total precipitation from May to October was 12.67 inches as compared with an average of 18.27 inches for the last ten years. Brooks and springs dried up and pastures were poor throughout the whole season. They became so bare that in many cases it was necessary to feed stock in October. November was mild and ploughing was possible on all except four days. Cattle were at pasture during the day until December 10, when the ground froze. Two inches of snow fell on December 11. The St. John river froze on December 18 which was the latest date on which the river was open for navigation for seventy-five years. In 1878 the river froze on the same day.

METEOROLOGICAL RECORDS AT FREDERICTON, N.B., 1923

| Month | Temperature F. | | | Precipitation | | | Bright Sunshine |
|---|---|---|---|---|---|---|---|
| | Mean | Highest | Lowest | Rainfall | Snow fall | Total | |
| | ° | ° | ° | inch | inch | inch | hours |
| January | 10·82 | 445·0 | −31·0 | 0·95 | 37·00 | 4·65 | 104·70 |
| February | 6·50 | 34·0 | −34·0 | ..... | 9·00 | 0·90 | 160·00 |
| March | 17·83 | 50·0 | −19·0 | 0·23 | 37·00 | 3·93 | 167·45 |
| April | 36·40 | 61·0 | − 4·0 | 3·25 | 7·50 | 4·00 | 164·90 |
| May | 49·60 | 75·0 | 28·0 | 1·55 | 1·50 | 1·70 | 193·55 |
| June | 60·20 | 93·0 | 37·0 | 2·53 | ..... | 2·53 | 195·85 |
| July | 63·08 | 88·0 | 41·0 | 2·21 | ..... | 2·21 | 188·50 |
| August | 60·60 | 85·0 | 37·0 | 2·02 | ..... | 2·02 | 207·45 |
| September | 56·50 | 75·0 | 35·0 | 2·05 | ..... | 2·05 | 179·00 |
| October | 47·40 | 70·0 | 21·0 | 2·16 | ..... | 2·16 | 166·30 |
| November | 36·4 | 56·5 | 11·0 | 3·94 | ..... | 3·94 | 79·90 |
| December | 27·56 | 54·0 | − 4·5 | 2·45 | 17·75 | 4·22 | 60·00 |
| Totals | ..... | ..... | ..... | 23·34 | 109·75 | 34·31 | 1,867·60 |
| Totals for five growing months | ..... | ..... | ..... | 10·36 | 1·50 | 10·51 | 964·35 |

## ANIMAL HUSBANDRY

Excellent progress can be reported for this division during the year. The general health has been excellent. The cattle have been free from tuberculosis since November 3, 1921, and the herd became fully accredited on February 16, 1923.

### DAIRY CATTLE

The stock on December 31, 1923, totalled sixty head, made up as follows:—

*Pure-bred Breeding Stock*

Ayrshires: 9 milch cows, 11 heifers, 2 bulls.
Holsteins: 8 milch cows, 4 heifers, 1 bull.
Shorthorns: 5 milch cows, 11 heifers, 1 bull, 2 steers.

*Grade Stock*

Ayrshires: 1 steer.
Shorthorns: 1 steer.
Working cattle: 4 oxen.

Thirty-seven head of grade cattle were disposed of during the year. They included nineteen Ayrshires, six Holsteins and twelve Shorthorns. These were cattle that had been used in the grading-up experiment which had been conducted at this Station since 1914. (Results can be found in report of Experimental Station, Fredericton, for 1922.) The different families of Shorthorns and Ayrshires had been so broken up by tuberculosis some years ago that the work with these breeds was discontinued in February. In September it was decided that as the work with Holsteins was being carried on at Nappan Experimental Farm, there was no need for duplicating it at this station, and the remaining cattle were sold in October.

#### AYRSHIRE

Six cows completed lactation periods during the year, and one cow completed two lactation periods. Three cows qualified in the Record of Performance. The herd sire, Ravenwood Ivanhoe—72901—, was obtained from Charlottetown in April, 1920. His dam, Buttercup of Glenholm —56491—, has a four-year-old record of 16,444 pounds of milk and 662 pounds of butter fat in one year. While this bull was a fine individual, unfortunately his heifers developed very plain heads. A young bull, Ravenwood Comrade —83515—, born March 1, 1923, was obtained from the Charlottetown Station this year. His dam, Lily of Melrose —30634—, had an official record of 12,154 pounds of milk and 469 pounds of butter fat in one year as a mature cow.

#### HOLSTEIN

Four cows completed lactation periods during the year. One qualified in the Canadian Record of Performance and two, purchased from F. R. Mallory, had freshened before coming to this Station. Four other cows that were making excellent records did not complete their lactation periods before December 31, and will be reported next year. The former herd sire, Johanna Beauty Boy —84966— was sold for beef in November. He had a drooping rump and his calves were showing the same defect. He was replaced by May Echo Alcartra Plus —54997—, a bull born May 1, 1922, and purchased with dam at F. R. Mallory's dispersion sale. He is rather compact, but apart from that he is a good individual.

SHORTHORN

Five heifers were sold for beef during their first lactation period. Three of these heifers were sired by the herd sire, Kentville Champion. This bull's progeny were disappointing as milk producers and the majority were sold for beef. The herd sire, Major Maud —116374— was transferred to the Kentville Experimental Station for six months beginning November 19, in exchange for the Kentville herd sire, Brandon Conjuror —144189—. Five heifers were transferred from the Kentville Station to Fredericton on November 14.

METHOD OF FEEDING CATTLE

*Summer Feeding.*—The cows were turned to pasture on June 6. The pastures were poor and they were supplemented as follows:—

| — | Grain | Green feed or Silage | Hay |
|---|---|---|---|
| | lbs. | lbs. | lbs. |
| June 6–July 31 inclusive | 3–6 | ..... | ..... |
| Aug. 1–Aug. 20 " | 6–9 | ..... | ..... |
| Aug. 21–Sept. 30 " | 6–9 | 24–30 | ..... |
| Oct. 1–Oct. 20 " | 6–9 | 24–30 | 6 |
| Oct. 21–Oct. 31 " | 6–9 | 30–35 | 7 |

Cows under test were fed a somewhat heavier grain ration. The value of silage for summer feeding was again demonstrated, but the O.P.V. silage fed this year did not prove as satisfactory as the corn silage fed the previous year.

*Winter Feeding.*—The ration fed the milch cows per head per day was as follows:—

| | |
|---|---|
| Corn silage | 15–30 pounds |
| Hay | 8–12 " |
| Roots | 15–30 " |
| Meal | 6–20 " |

The meal mixture fed the cows in heavy milk during the year consisted for the most part of equal parts bran, crushed oats, brewer's grain and oilcake. The meal mixture fed dry cattle and those nearing end of lactation period consisted of bran, two parts; crushed oats, one part; brewer's grain, one part; and oilcake, one part. Salt was added to the meal mixture at the time of mixing.

MILK PRODUCTION OF PURE-BRED COWS

The following table shows the milk records of all the pure-bred cows and heifers which finished lactation periods during the year 1923. None of the high-producing cows were among the group that completed lactation periods during this period. In the case of heifers with their first calf, feed is charged from date of freshening. In the case of cows with previous lactation periods, the charge for feed includes the period during which they were dry before beginning the present lactation priod. The following prices were charged for feed:—

| | |
|---|---|
| Hay | $ 9.88 per ton |
| Roots | 3.59 " |
| Ensilage | 4.69 " |
| Green feed | 4.00 " |
| Grain ration during dry period | 34.00 " |
| Grain ration for cows producing milk | 40.00 " |
| Pasture | 1.00 per month |

Grain is charged at cost price and roughage at cost of production.

MILK PRODUCTION OF PURE-BRED COWS

| Name of Animal | Age in years | Days in lactation period | Pounds of milk for period | Daily Average yield milk | Average per cent fat in milk | Pounds butter produced in period | Feed Eaten in Period | | | | | Total cost of feed for period | Cost to produce 100 lbs. milk | Cost to produce 1 lb. butter |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Meal eaten | Roots and ensilage eaten | Hay eaten | Green feed eaten | Months on pasture | | | |
| | yrs. | days | lbs. | lbs. | p.c. | lbs. | lbs. | lbs. | lbs. | lbs. | months | $ cts. | $ cts. | $ cts. |
| *Ayrshire—* | | | | | | | | | | | | | | |
| Sapphire of Fredericton | 3 | 301·5 | 8,010·5 | 26·5 | 4·0 | 381·81 | 4,443 | 14,365 | 2,732 | 3,930 | 2·00 | 144 16 | 1 79 | 0·377 |
| Pansy of Fredericton 2nd | 2 | 428·0 | 7,853·6 | 18·3 | 4·5 | 424·31 | 3,625 | 11,620 | 2,161 | 3,410 | 7·10 | 123 06 | 1 56 | 0·290 |
| Lass of Fredericton | 2 | 378·0 | 7,832·4 | 20·7 | 4·1 | 385·14 | 3,947 | 12,480 | 2,264 | 3,410 | 4·80 | 129 73 | 1 65 | 0·336 |
| Pansy's Best | 2 | 377·0 | 7,786·0 | 20·6 | 4·4 | 406·84 | 3,955 | 11,960 | 2,016 | 620 | 3·00 | 119 57 | 1 53 | 0·293 |
| Topaz of Fredericton | 4 | 265·5 | 7,136·3 | 26·8 | 4·2 | 355·01 | 3,085 | 7,974 | 2,054 | ..... | 4·80 | 94 27 | 1 32 | 0·265 |
| Torchlight | 4 | 309·0 | 6,480·4 | 20·9 | 4·7 | 359·90 | 3,117 | 10,884 | 2,168 | ..... | 4·84 | 101 57 | 1 56 | 0·282 |
| Topaz of Fredericton | 3 | 335·0 | 6,204·9 | 18·5 | 4·4 | 323·01 | 2,222 | 9,850 | 1,672 | 620 | 4·80 | 79 93 | 1 28 | 0·247 |
| Diana's Sally | 2 | 163·5 | 1,785·3 | 10·9 | 4·3 | 91·08 | 1,224 | 7,285 | 1,242 | ..... | ..... | 46 41 | 2 59 | 0·509 |
| *Holsteins—* | | | | | | | | | | | | | | |
| Fredericton Lee Keyes | 2 | 304·0 | 8,361·7 | 27·5 | 3·8 | 382·43 | 3,882 | 10,770 | 1,911 | 3,720 | 4·80 | 123 05 | 1 47 | 0·321 |
| May Echo Plus Model | 3 | 307·0 | 8,276·7 | 26·9 | 3·4 | 338·61 | 2,097 | 9,530 | 1,839 | 1,525 | 5·00 | 80 59 | 0 97 | 0·238 |
| May Echo Frances | 4 | 285·0 | 7,433·4 | 26·0 | 3·1 | 274·72 | 1,881 | 8,770 | 1,547 | 1,525 | 4·80 | 72 84 | 0 97 | 0·265 |
| Echo Ormsby Lee Keyes | 3 | 333·5 | 5,631·1 | 16·8 | 3·3 | 222·25 | 3,702 | 14,460 | 2,935 | 2,635 | 4·80 | 130 33 | 2 31 | 0·586 |
| *Shorthorns—* | | | | | | | | | | | | | | |
| Charlotte of Fredericton | 3 | 344·0 | 3,992·7 | 11·6 | 4·9 | 231·99 | 2,115 | 10,480 | 1,812 | 620 | 4·80 | 79 81 | 1 99 | 0·344 |
| Champion Princess | 2 | 260·5 | 1,945·0 | 7·4 | 4·0 | 93·00 | 974 | 7,315 | 1,218 | 620 | 3·80 | 46 58 | 2 39 | 0·500 |
| Kentville Molly 2nd | 2 | 91·5 | 941·0 | 10·28 | 4·3 | 47·54 | 582 | 3,255 | 645 | ..... | 1·00 | 23 45 | 2 49 | 0·493 |
| Nellie of Fredericton | 2 | 78·5 | 891·3 | 11·25 | 4·2 | 44·56 | 624 | 3,350 | 624 | ..... | ..... | 22 90 | 2 56 | 0·513 |
| Beauty of Fredericton | 2 | 97·5 | 705·6 | 7·23 | 4·1 | 34·26 | 784 | 4,230 | 784 | ..... | ..... | 28 78 | 4 07 | 0·840 |
| Kentville Victoria 5th | 2 | 17·5 | 93·3 | 5·33 | 4·6 | 5·04 | 126 | 585 | 132 | ..... | 0·68 | 5 22 | 5 59 | 1·035 |

The Ayrshire heifer, Diana's Sally, and the Shorthorn heifers, Champion Princess, Kentville Molly 2nd, Nellie of Fredericton, Beauty of Fredericton and Kentville Victoria 5th proved unsatisfactory as milk producers and were sold before they they finished their lactation periods. The Holstein cows, May Echo Plus Model and May Echo Frances had freshened before they were purchased.

RATIONS FED DAIRY HEIFERS

| Age | Whole milk | Skim-milk | Meal | Hay | Roots |
|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | lbs. | lbs. |
| 1– 4 weeks | 10–12 | ..... | ..... | ..... | ..... |
| 4– 8 " | 8 | 8 | 0·5 | 0·5 | 1 |
| 2– 4 months | ..... | 20 | 2·0 | 1·0 | 5 |
| 4– 6 " | ..... | 20 | 3·5 | 2·0 | 12 |
| 6– 8 " | ..... | 15 | 4·0 | 44·0 | 20 |
| 8–10 " | ..... | 10 | 4·0 | 5·0 | 25 |
| 10–12 " | ..... | ..... | 4·0 | 5·0 | 30 |

The meal mixture consisted of bran, one part; crushed oats, two parts; corn meal, two parts; and oilcake, two parts. Yearlings and heifers not in milk were at pasture during the summer. In the winter they were fed a ration consisting of corn silage, roots and hay or straw, but no grain except in cases of low condition. The cost of raising heifers was greatly increased by the fact that all the available pasture was unimproved bush land of very low natural fertility which made it necessary to supplement the pastures with either green feed or silage in September. The feed costs are shown in the following table:—

AVERAGE COST OF FEED—FIRST YEAR

| Breed of animals | Ayrshire | Holstein | Shorthorn |
|---|---|---|---|
| Number of animals | 9 | 1 | 3 |
| New milk at $1.50 per cwt. lbs. | 626 | 410 | 608 |
| Skim-milk at 20c. per cwt. lbs. | 4,091·8 | 3,358 | 4,347·6 |
| Meal at $2.10 per cwt. lbs. | 1,309·1 | 1,261 | 1,333·3 |
| Ensilage at $4.69 per ton. lbs. | 1,135·4 | 426 | 1,739 |
| Roots at $3.59 per ton. lbs. | 1,162·5 | 1,655 | 392·3 |
| Hay at $9.88 per ton. lbs. | 899·3 | 999 | 1,099·3 |
| Green feed at $4 per ton. lbs. | 47·1 | ..... | ..... |
| Pasture at $1 per month. mos. | 0·094 | ..... | ..... |
| Cost of feed first year. $ | 54.39 | 48.33 | 56.60 |

The lower cost of rearing the Holstein heifer the first year was due to a different method of feeding. As it was a very large calf it was given less whole milk, and skim milk. The Ayrshire and Shorthorn calves were fed liberally as they were all calves of rather small heifers.

AVERAGE COST OF FEED—SECOND YEAR

| Breed of animals | Ayrshire | Holstein | Shorthorn |
|---|---|---|---|
| Number of animals | 3 | 2 | 1 |
| Skim-milk at 20c. per cwt. lbs. | 366·6 | ..... | ..... |
| Meal at $1.70 per cwt. lbs. | 468·6 | 301 | 746 |
| Ensilage at $4.69 per ton. lbs. | 5,048·3 | 6,425 | 2,345 |
| Roots at $3.59 per ton. lbs. | 3,298·3 | 2,450 | 4,770 |
| Hay at $9.88 per ton. lbs. | 1,406·3 | 2,087 | 1,201 |
| Straw at $4 per ton. lbs. | ..... | ..... | 114 |
| Pasture at $1 per month. mos. | 5.00 | 4.82 | 5.10 |
| Cost of feed second year. $ | 38.38 | 39.69 | 37·98 |

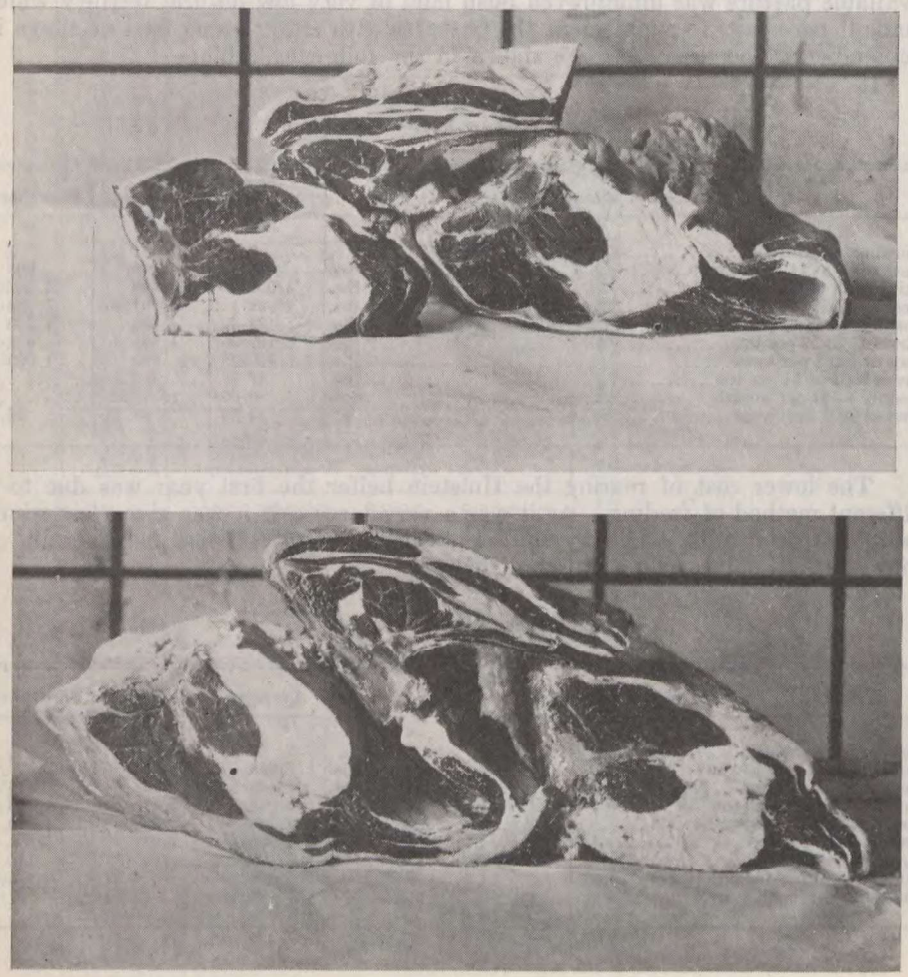
AVERAGE COST OF FEED—FROM SECOND YEAR TO DATE OF CALVING

| Breed of animals | Ayrshire | Holstein | Shorthorn |
|---|---|---|---|
| Average age at date of calving | 2 y. 6 m. 14 d. | 2 y. 4 m. 19 dy. | 2 y. 9 m. 28 d. |
| Number of animals | 3 | 3 | 4 |
| Meal at $1.70 per cwt.....lbs. | 562·3 | 360·3 | 459·2 |
| Ensilage at $4.69 per ton.....lbs. | 3,663·3 | 2,581·3 | 4,523·7 |
| Roots at $3.59 per ton.....lbs. | 2,143·3 | 816·6 | 1,922·5 |
| Hay at $9.88 per ton.....lbs. | 1,115·3 | 798 | 1,325 |
| Straw at $4 per ton.....lbs. | ..... | ..... | 250 |
| Pasture at $1 per month.....mos. | 2·02 | 2·05 | 3·92 |
| Cost of feed for period..... $ | 31.68 | 19.63 | 32.82 |
| Average feed cost from birth to date of calving..... $ | 122.27 | 107.65 | 127.40 |

The difference in cost of feeding the various breeds from two years to date of calving is largely due to the age at which the heifers freshened.

COST OF PRODUCING BEEF FROM DAIRY HEIFERS

Owing to the grading-up experiment being discontinued a number of grade heifers were sold to the butcher. Feed cost, age and weight when sold are shown in the following table. The feed was charged at the same rate as in the three preceding tables.



CUTS OF BEEF
(Above) From grade Ayrshire steer. (Below) From grade Shorthorn steer.

89782—2

| — | | Ayrshire | | | | | | | Shorthorn | | | | Holstein |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Kate 1-A-1 | Blossom 1-A-1 | Julia 1-A-1 | Kate 1-A-2 | Maggie 1-A-2 | *Tiny 1-A-2 | Blossom 1-A-2 | Brownie 2-S-2 | Maggie 1-S-3 | Blossom 1-S-3 | Sally 1-S-1-2 | Sally 1-H-1-1 |
| Age when sold | | 27m., 23d. | 24m., 10d. | 23m., 22d. | 13m., 30d. | 13m., 15d. | 13m., 2d. | 10 m. | 26m., 27d. | 23m., 19d. | 23m., 19d. | 9m., 20d. | 20m., 8d. |
| *First year*— | | | | | | | | | | | | | |
| New milk | lbs. | 856 | 612 | 420 | 476 | 440 | 468 | 296 | 770 | 438 | 308 | 512 | 410 |
| Skim-milk | " | 3,033 | 3,479 | 3,579 | 3,152 | 3,054 | 5,516 | 5,118 | 3,201 | 4,208 | 4,048 | 4,766 | 3,358 |
| Meal | " | 1,391 | 1,277 | 1,332 | 1,221 | 1,315 | 1,241 | 1,093 | 1,362 | 1,437 | 1,395 | 1,083 | 1,261 |
| Roots | " | 480 | 1,860 | 2,220 | 1,655 | 1,655 | 1,453 | 1,357 | 1,239 | 2,250 | 2,370 | 1,337 | 1,655 |
| Ensilage | " | 3,388 | 1,174 | 1,204 | 486 | 746 | 475 | 376 | 2,673 | 978 | 998 | 583 | 426 |
| Hay | " | 989 | 762 | 826 | 978 | 1,069 | 667 | 473 | 1,004 | 833 | 866 | 515 | 999 |
| Feed cost | $ | 61·79 | 52·78 | 52·30 | 48·01 | 50·30 | 51·11 | 43·26 | 59·98 | 55·58 | 52·86 | 46·24 | 48·23 |
| *Second year*— | | | | | | | | | | | | | |
| Skim-milk | lbs. | ..... | 600 | 500 | ..... | ..... | ..... | ..... | ..... | 484 | 420 | ..... | ..... |
| Meal | " | 672 | 407 | 327 | 247 | 195 | 150 | ..... | 660 | 317 | 277 | ..... | 490 |
| Roots | " | 4,065 | 3,095 | 2,735 | ..... | ..... | ..... | ..... | 5,715 | 5,155 | 5,975 | ..... | ..... |
| Ensilage | " | 3,575 | 5,655 | 5,915 | 990 | 730 | 435 | ..... | 2,030 | 3,095 | 2,585 | ..... | 2,910 |
| Hay | " | 1,257 | 1,468 | 1,494 | 305 | 240 | 175 | ..... | 1,090 | 917 | 1,454 | ..... | 811 |
| Straw | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 220 | 620 | ..... | ..... | ..... |
| Feed cost | $ | 38·29 | 39·17 | 37·70 | 8·01 | 6·20 | 4·43 | ..... | 37·05 | 33·60 | 34·50 | ..... | 22·99 |
| *Third year*— | | | | | | | | | | | | | |
| Roots | lbs. | 2,505 | ..... | ..... | ..... | ..... | ..... | ..... | 2,260 | ..... | ..... | ..... | ..... |
| Ensilage | " | 1,375 | 290 | ..... | ..... | ..... | ..... | ..... | 1,340 | ..... | ..... | ..... | ..... |
| Hay | " | 800 | 90 | ..... | ..... | ..... | ..... | ..... | 423 | ..... | ..... | ..... | ..... |
| Straw | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 440 | ..... | ..... | ..... | ..... |
| Feed cost | $ | 11·66 | 1·12 | ..... | ..... | ..... | ..... | ..... | 10·15 | ..... | ..... | ..... | ..... |
| Total feed cost | $ | 111·74 | 93·07 | 90·00 | 56·02 | 56·50 | 55·54 | 43·26 | 107·18 | 89·18 | 87·36 | 46·24 | 71·22 |
| Weight when sold | lbs. | 770 | 755 | 820 | 545 | 585 | 440 | 560 | 975 | 825 | 815 | 589 | 755 |
| Cost per cwt. live weight | $ | 14·51 | 12·32 | 10·97 | 10·27 | 9·65 | 12·62 | 7·72 | 10·99 | 10·80 | 10·71 | 7·85 | 9·43 |

*Tiny 1-A-2 was a very unthrifty heifer, and should be disregarded when studying the table. When she is eliminated the table shows that the cost per hundredweight, live weight, increased with the age of the heifers.

## COST OF PRODUCING BABY BEEF

Two steers, one a third-cross Shorthorn and the other a third-cross Ayrshire, were fed in order to compare the merits of dual-purpose Shorthorn steers with steers of the dairy breed for the production of baby beef. The method of feeding was the same as that used for dairy heifers. The steers, however, were fed a more liberal ration. The results are shown in the following table:—

COST OF PRODUCING BABY BEEF

| Breed | Third-cross Shorthorn | Third-cross Ayrshire |
|---|---|---|
| Age when slaughtered | 14 m. 13 d. | 14 m. 9 d. |
| Total live weight....lbs. | 916 | 799 |
| Total dressed weight....lbs. | 556·5 | 468 |
| Dressing percentage....% | 60·75 | 58·56 |
| New milk consumed at $1.50 per cwt....lbs. | 738 | 650 |
| skim-milk consumed at 20c. per cwt....lbs. | 5,456 | 5,360 |
| Crushed oats consumed at $2 per cwt....lbs. | 614 | 596 |
| Bran consumed at $1.45 per cwt....lbs. | 307 | 298 |
| Oilcake consumed at $2.75 per cwt....lbs. | 614 | 596 |
| Corn meal consumed at $1.90 per cwt....lbs. | 412 | 409 |
| Roots consumed at $3.59 per ton....lbs. | 2,390 | 2,390 |
| Corn silage consumed at $4.69 per ton....lbs. | 1,416 | 1,416 |
| Green feed consumed at $4 per ton....lbs. | 150 | 150 |
| Hay consumed at $9.88 per ton....lbs. | 1,548 | 1,548 |
| *Statement of Cost* | | |
| Value of calf at birth....$ | 2·00 | 2·00 |
| Total cost of feed....$ | 78·983 | 76·429 |
| Total cost....$ | 80·983 | 78·429 |
| Cost per cwt., live weight, labour neglected....$ | 8·84 | 9·81 |
| Cost per cwt, dressed weight, hide and labour neglected....$ | 14·55 | 16·75 |

*Deductions.*—1. Dual-purpose Shorthorn steers will cost less per hundred pounds live weight than steers from the dairy breed.

2. Dual-purpose Shorthorn steers will have a higher dressing percentage.

3. Dual-purpose Shorthorn steers' carcasses have a higher percentage of high priced meat.

## TEST OF TURNIPS, CORN AND SUNFLOWER SILAGE AS SUCCULENT FEED FOR DAIRY COWS

Owing to the increased interest in silos and silage crops in the district it was thought advisable to conduct a series of experiments to determine the relative value of turnips, corn and sunflower silage as succulent feed for dairy cattle. This experiment was conducted during the winter of 1922-23 and again in the fall of 1923. The cows were divided into three groups of three cows each and fed according to the following plan:—

*Group 1.*—Fed turnips first period; corn silage second period, and sunflower silage third period.

*Group 2.*—Fed corn silage first period; sunflower silage second period, and turnips third period.

*Group 3.*—Fed sunflower silage first period; turnips second period, and corn silage third period.

In both experiments the cows had been milked an average of five months at the beginning of the experiment. They were on each feed for three weeks. The milk and percentage of butter fat were taken for the last week only; the other two weeks were taken as a period in which the cows became accustomed to the feeds. One of the cows in group 2 of the first experiment refused to eat

sunflowers. This reduced her milk flow so much that she had to be eliminated. One cow was therefore taken out of groups 1 and 3 in order to have an equal number of cows in each group. The meal ration consisted of equal parts of bran, crushed oats, oilcake and brewer's grain, and remained constant for each group throughout the entire feeding period. The hay was good quality mixed clover and timothy. The corn silage used in the first experiment was cut in the milk stage; the corn silage in the second experiment was cut when only twenty per cent was in silk. The sunflowers used were cut when the first blossoms showed, and the turnips were a well matured crop. The results are shown in the following tables:—

TABLE I.—TEST OF TURNIPS, CORN AND SUNFLOWER SILAGE AS SUCCULENT FEED FOR DAIRY COWS (EXPERIMENT 1)

| — | | Corn | Sunflowers | Turnips |
|---|---|---|---|---|
| Number of cows in test | | 6 | 6 | 6 |
| Number of days taken for test | | 7 | 7 | 7 |
| Total milk produced in 7-day period | lbs. | 741·4 | 710·3 | 776·2 |
| Average per cent fat in milk | % | 4·26 | 4·15 | 4·30 |
| Total butterfat produced in 7-day period | lbs. | 31·63 | 29·50 | 33·41 |
| Total meal eaten in 7-day period | lbs. | 357 | 357 | 357 |
| Total hay eaten in 7-day period | lbs. | 420 | 420 | 420 |
| Total corn silage eaten in 7-day period | lbs. | 2,100 | ..... | ..... |
| Total sunflower silage eaten in 7-day period | lbs. | ..... | 2,100 | ..... |
| Total turnips eaten in 7-day period | lbs. | ..... | ..... | 2,100 |
| Meal consumed per 100 lbs. milk produced | lbs. | 48·15 | 50·26 | 45·99 |
| Hay consumed per 100 lbs. milk produced | lbs. | 56·64 | 59·12 | 54·10 |
| Corn silage consumed per 100 lb. milk produced | lbs. | 283·24 | ..... | ..... |
| Sunflower silage consumed per 100 lbs. milk produced | lbs. | ..... | 295·64 | ..... |
| Turnips consumed per 100 lbs. milk produced | lbs. | ..... | ..... | 270·54 |
| *Statement of Cost* | | | | |
| Cost of meal mixture at $2 per cwt | $ | 7·14 | 7·14 | 7·14 |
| Cost of hay at $9.88 per ton | $ | 2·07 | 2·07 | 2·07 |
| Cost of corn silage at $4.69 per ton | $ | 4·92 | ..... | ..... |
| Cost of sunflower silage at $4.78 per ton | $ | ..... | 5·01 | ..... |
| Cost of turnips at $3.59 per ton | $ | ..... | ..... | 3·76 |
| Total cost of feed | $ | 14·13 | 14·22 | 12·97 |
| Feed cost to produce 100 lb. milk | $ | 1·90 | 2·00 | 1·67 |
| Feed cost to produce 100 lbs. butterfat | $ | 44·67 | 48·20 | 38·82 |

TABLE II.—TEST OF TURNIPS, CORN AND SUNFLOWER SILAGE AS SUCCULENT FEED FOR DAIRY CATTLE (EXPERIMENT 2)

| — | | Corn | Sunflowers | Turnips |
|---|---|---|---|---|
| Number of cows in test | | 9 | 9 | 9 |
| Number of days taken for test | | 7 | 7 | 7 |
| Total milk produced in 7-day period | lbs. | 1,423·3 | 1,470·1 | 1,438·1 |
| Average per cent fat in milk | % | 3·61 | 3·53 | 3·48 |
| Total butterfat produced in 7 days | lbs. | 51·42 | 52·01 | 50·08 |
| Total meal eaten in 7 days | lbs. | 693 | 693 | 693 |
| Total hay eaten in 7 days | lbs. | 560 | 518 | 560 |
| Total corn silage eaten in 7 days | lbs. | 3,360 | ..... | ..... |
| Total sunflower silage eaten in 7 days | lbs. | ..... | 3,360 | ..... |
| Total turnips eaten in 7 days | lbs. | ..... | ..... | 3,360 |
| Meal consumed per 100 lb. milk produced | lbs. | 48·68 | 47·13 | 48·18 |
| Hay consumed per 100 lbs. milk produced | lbs. | 39·34 | 35·23 | 38·94 |
| Corn silage consumed per 100 lb. milk produced | lbs. | 236·07 | ..... | ..... |
| Sunflower silage consumed per 100 lbs. milk produced | lbs. | ..... | 228·55 | ..... |
| Turnips consumed per 100 lbs. milk produced | lbs. | ..... | ..... | 233·64 |
| *Statement of Cost* | | | | |
| Cost of meal mixture at $2 per cwt | $ | 13·86 | 13·86 | 13·86 |
| Cost of hay at $9.88 per ton | $ | 2·76 | 2·55 | 2·76 |
| Cost of corn silage at $4.69 per ton | $ | 7·87 | ..... | ..... |
| Cost of sunflower silage at $4.78 per ton | $ | ..... | 8·03 | ..... |
| Cost of turnips at $3.59 per ton | $ | ..... | ..... | 6·03 |
| Total cost of feed | $ | 24·49 | 24·44 | 22·65 |
| Feed cost to produce 100 lbs. milk | $ | 1·72 | 1·66 | 1·57 |
| Feed cost to produce 100 lbs. butterfat | $ | 47·62 | 46·99 | 45·22 |

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TABLE III.—SHOWING EFFECT OF DIFFERENT SUCCULENT FEEDS ON WEIGHT OF COWS IN TABLE I AND TABLE II

| | 1st Experiment | | 2nd Experiment | |
|---|---|---|---|---|
| | Total | Average | Total | Average |
| Number of cows in experiment | 6 | ..... | 9 | ..... |
| Number of cows in each group | 2 | ..... | 3 | ..... |
| *Group I.* | | | | |
| Weight at beginning of experiment.....lbs. | 1,960·0 | 980·0 | 3,610·0 | 1,203·3 |
| Gain, 1st period when fed turnips.....lbs. | −7·5 | −3·75 | 105·0 | 35·0 |
| Gain, 2nd period when fed corn silage.....lbs. | 0 | 0 | 40·0 | 13·3 |
| Gain, 3rd period when fed sunflower silage.....lbs. | 65·0 | 32·5 | −80·0 | −26·6 |
| *Group II* | | | | |
| Weight at beginning of experiment.....lbs. | 2,350·0 | 1,175 | 2,660·0 | 88·6 |
| Gain, 1st period when fed corn silage.....lbs. | 100·0 | 50·0 | 60·0 | 20·0 |
| *Gain, 2nd period when fed sunflower silage.....lbs. | −92·5 | −46·25 | 60·0 | 20·0 |
| Gain, 3rd period when fed turnips.....lbs. | 135·0 | 67·5 | −85·0 | −28·3 |
| *Group III* | | | | |
| Weight at beginning of experiment.....lbs. | 1,940·0 | 970·0 | 3,295·0 | 1,098·3 |
| Gain, 1st period when fed sunflower silage.....lbs. | 47·5 | 23·75 | 100·0 | 33·3 |
| Gain, 2nd period when fed turnips.....lbs. | −67·5 | −33·75 | −105·0 | −35·0 |
| Gain, 3rd period when fed corn silage.....lbs. | 82·5 | 41·75 | 85·0 | 28·3 |
| *Summary* | | | | |
| Gains made on corn silage.....lbs. | 182·5 | 30·41 | 185·0 | 20·55 |
| Gains made on turnips.....lbs. | 60·0 | 10·00 | 80·0 | 8·88 |
| Gains made on sunflower silage.....lbs. | 20·0 | 3·33 | −85·0 | −9·44 |

*There was difficulty in getting this group to eat sunflowers.

*Deductions.*—1. Mature corn silage (table 1) has a greater value for milk production than sunflower silage. Immature corn silage (table 2) has a smaller value for milk production than sunflower silage.

2. Corn is better relished by cattle than sunflower silage. While the yields of corn per acre were smaller at this station, it cost less per ton to put corn in the silo. There is less shrinkage in corn in the silo than in sunflowers.

3. Turnips will keep up the milk flow fairly well but they have less food value per pound than either corn or sunflower silage.

4. Cows fed corn silage will make larger gains in weight than those fed sunflower silage or turnips.

5. When cows eat sunflower silage readily they will make larger gains than on turnips.

## STRAW VERSUS HAY FOR WINTERING GROWING HEIFERS

*Object of Experiment.*—To study the practicability of replacing part of the hay ration of growing heifers with straw.

The heifers were divided into two lots of seven each and fed the following ration:—

*Lot I.*—Fed 5 pounds of hay in the morning, a liberal allowance of oat straw at night, and 35 pounds of corn silage.

*Lot II.*—Fed 10 pounds of hay and 35 pounds of corn silage. No grain was fed either group. The heifers in lot I did not eat their straw allowance clean. The amount consumed was found by weighing the straw which the heifers left. They consumed on an average 5 pounds per day. The refuse straw was used to bed the heifers. The experiment was begun on January 29, and was continued for twenty-eight days. Owing to the silage freezing it was discontinued on that date. The results are shown in the following table:—

| — | Lot I | Lot II |
|---|---|---|
| Number of animals in experiment | 7·0 | 7·0 |
| Length of feeding period.....days | 28·0 | 28·0 |
| Gross weight at beginning of experiment.....lbs. | 5,860·0 | 5,972·5 |
| Average weight at beginning of experiment.....lbs. | 837·14 | 853·21 |
| Gross weight at end of experiment.....lbs. | 6,180·0 | 6,432·5 |
| Average weight at end of experiment.....lbs. | 882·85 | 918·92 |
| Gain per group.....lbs. | 320·0 | 460·0 |
| Average gain per animal.....lbs. | 45·7 | 65·71 |
| Average daily gain per animal.....lbs. | 1·65 | 2·34 |
| Total silage fed in period.....lbs. | 6,860·0 | 6,860·0 |
| Total hay fed in period.....lbs. | 980·0 | 1,960·0 |
| Total straw fed in period.....lbs. | 980·0 | ..... |
| Silage fed per 1 lb. gain.....lbs. | 21·43 | 14·91 |
| Hay fed per 1 lb. gain.....lbs. | 3·06 | 4·26 |
| Straw fed per 1 lb. gain.....lbs. | 3·06 | ..... |
| *Statement of Costs* | | |
| Cost of silage at $4.69 per ton.....$ | 16·08 | 16·08 |
| Cost of hay at $9.88 per ton.....$ | 4·84 | 9·68 |
| Cost of straw at $4.00 per ton.....$ | 1·96 | ..... |
| Total cost of feed.....$ | 22·88 | 25·76 |
| Cost of silage fed per 100 lb. gain.....$ | 5·02 | 3·49 |
| Cost of hay fed per 100 lb. gain.....$ | 1·51 | 2·10 |
| Cost of straw fed per 100 lb. gain.....$ | 0·59 | ..... |
| Cost of feed per 100 lb. gain.....$ | 7·15 | 5·60 |

*Deductions.*—Heifers will make fair growth on corn silage, hay and straw, but will not make quite as large gains as when fed corn silage with a full allowance of hay. A farmer wishing to winter heifers cheaply, however, would be justified in feeding straw.

## HORSES

The horses on December 31, 1923, numbered fifteen and consisted of one aged stallion, two mature mares, one two-year-old mare, one two-year-old gelding, one yearling mare and one horse foal, all pure-bred Clydesdales; also two grade Clydesdale geldings, one three-year-old grade Clydesdale mare, one yearling grade Clydesdale mare, one grade Percheron mare, one grade Percheron gelding and two general purpose mares sired by standard-bred horses. One foal purchased in dam was raised during the year.

As all the draught horses were at hard work during the winter no experimental work on the maintenance of idle horses was carried on. The daily ration for work horses varied from 12 to 22 pounds of grain, according to the nature of work and size of the horse. The horses were usually fed 2 pounds of bran each night and a bran mash on Saturday night. The hay allowance varied from 12 to 16 pounds per day. During the past year the horses worked 21,503 hours. The total cost for horseshoeing was $221.75. A summary of the work performed by eight draught horses is shown in the following table:—

COST OF HORSE LABOUR

| —— | Eight horses | Average |
|---|---|---|
| Total hours worked | 18,284·0 | 2,285·5 |
| Oats consumed.....lbs. | 52,772·0 | 6,596·5 |
| Bran consumed.....lbs. | 4,584·0 | 573·0 |
| Hay consumed.....lbs. | 43,275·0 | 5,409·3 |
| Roots consumed.....lbs. | 2,022·0 | 252·7 |
| Hours tending horses | 1,442·5 | 180·3 |
| *Statement of Cost* | | |
| Oats at 68c. per bushel.....$ | 1,055·44 | 131·93 |
| Bran at $1.45 per cwt.....$ | 66·46 | 8·30 |
| Hay at $9.88 per ton.....$ | 213·77 | 26·72 |
| Roots at $3.59 per ton.....$ | 3·62 | 0·45 |
| Labour tending horses at 25c. per hr.....$ | 360·62 | 45·07 |
| Horse-shoeing at $3.50 per set, and $2 for changing shoes.....$ | 152·00 | 19·00 |
| Total cost.....$ | 1,851·91 | 231·47 |
| Cost per hour, horse labour.....$ | 0·101 | ..... |

The eight horses referred to in the foregoing table were in the stable 2,885 days, or an average of 360.6 days per horse. Labour tending horses is charged at the rate of half an hour per day per horse at 25 cents per hour. They were to the blacksmith shop fifty-seven times during the year, an average of 7.1 trips per horse. No charge is made for the time lost by the teamsters in taking the horses to be shod, as in most cases there were no extra trips made for shoeing.

### FEED COST OF RAISING YOUNG HORSES

There were five young horses at the Station, two of them being two years old, two of them one year old, and one, a horse colt. The following table shows the cost of raising these colts:—

FEED COST OF RAISING YOUNG HORSES

| — | Birth to six months | Birth to one Year | | Birth to two Years | |
|---|---|---|---|---|---|
| | Fredericton Prince | Josie of Fredericton | Kitty | Gertie of Fredericton | Rose Spencer |
| Bran consumed.....lbs. | 167·0 | 304·0 | 324·0 | 529·0 | 521·0 |
| Oats consumed.....lbs. | 250·0 | 1,471·0 | 1,730·0 | 2,362·0 | 2,248·0 |
| Hay consumed.....lbs. | 738·0 | 2,068·0 | 2,184·0 | 5,076·0 | 5,044·0 |
| Roots consumed.....lbs. | ..... | 40·0 | 40·0 | 166·0 | 166·0 |
| Months on pasture | ..... | ..... | ..... | 5·0 | 5·0 |
| Weight at end of period.....lbs. | 630·0 | 770·0 | 810·0 | 1,010·0 | 950·0 |
| *Statement of Cost* | | | | | |
| Bran at $1.45 per cwt.....$ | 2·42 | 4·40 | 4·68 | 7·67 | 7·55 |
| Oats at 68c. per bush.....$ | 5·00 | 29·42 | 34·60 | 47·24 | 44·96 |
| Hay at $9.88 per ton.....$ | 3·64 | 10·21 | 10·78 | 25·07 | 24·91 |
| Roots at $3.59 per ton.....$ | ..... | 0·07 | 0·07 | 0·29 | 0·29 |
| Pasture at $1 per month.....$ | ..... | ..... | ..... | 5·00 | 5·00 |
| Total cost of feed.....$ | 11·06 | 44·10 | 50·13 | 85·27 | 82·71 |

The last six colts raised at the Station consumed on an average, 120 pounds of bran, 435 pounds of oats, 723 pounds of hay and 16 pounds of roots during the first six months. Charging the feed at the same price as in the table, these colts cost on an average $14.04. They weighed on an average 641 pounds at six months.

The last five foals raised at the Station consumed on an average 343 pounds of bran, 1,247 pounds of oats, 448 pounds of hay and 187 pounds of roots, during the first year. Charging the feed at the same prices as in the table these young horses cost on an average $42.33. Their average weight was 783 pounds.

The last three colts raised at the Station consumed on an average 655 pounds of bran, 2,320 pounds of oats, 5,234 pounds of hay, 347 pounds of roots and were five months at pasture during the first two years. Charging the feed at the prices in the table these young horses cost on an average $87.36 at two years. Their average weight was 1,088 pounds.

The costs do not cover the feed consumed by the dams while suckling these colts. The dams of Fredericton Prince and Gertie were not worked during the time they were suckling their colts.

## SHEEP

The sheep are an exceptionally creditable lot. The flock numbers twenty-nine, consisting of eighteen breeding ewes, ten spring lambs and one stock ram, all pure-bred Shropshires. Buttar 329 (Imp.)—38071—, a ram imported from Scotland last April, was used as a stock ram; he is an exceptionally fine individual. The Cheviot flock consisting of twenty-three animals was transferred to the LaFerme Experimental Station on December 10, 1923. The lambing season started on March 12. Seventeen Shropshire ewes produced twenty-eight lambs, sixteen of which were rams. Thirteen Cheviot ewes produced twenty lambs, thirteen of which were rams. The sheep were sheared on May 22. The grading and weight of the fleeces are shown in the following table:—

GRADING AND WEIGHT OF FLEECES

| Grade | Average weight | Price per pound | Value of fleece |
|---|---|---|---|
| | lb. | $ | $ |
| 24 Shropshires, all medium combing | 8·62 | 0·28 | 2·41 |
| 22 Cheviots, 10 medium combing | 6·02 | 0·28 | 1·68 |
| 12 low medium combing | 6·75 | 0·24 | 1·62 |

This table shows the Shropshires have an advantage over the Cheviots in both weight and grading of fleeces.

The sheep were turned to pasture on June 1. The ewes were put on rape pasture to flush on September 24. The ram was put with the ewes on October 16. They were housed in November in excellent condition. They will be wintered on a ration of mixed hay and turnips, no grain being fed until two weeks before the lambing season begins.

### EARLY VERSUS LATE WEANING EXPERIMENT

In order to further test the advantage of early weaning of lambs versus late weaning, the experiment begun in 1922 was repeated again this year. Sixteen lambs were used in the experiment. They were weighed on July 12. Eight of them were weaned, put on pasture and given a daily ration of half a pound of a grain mixture consisting of equal parts of crushed oats and cracked corn. The remaining eight lambs were returned to pasture with their dams, and received no grain ration. On August 14 both lots of lambs were weighed, and the lambs were then all put on rape with access to pasture. On September 14 both lots of lambs were again weighed. The results are shown in the following table:—

EARLY VERSUS LATE WEANING EXPERIMENT

| | Lot I, weaned July 12 | Lot II, weaned Aug. 14 |
|---|---|---|
| Number of lambs in experiment | 8·0 | 8·0 |
| Total days in experiment | 64·0 | 64·0 |
| Length of 1st period....days | 33·0 | 33·0 |
| Gross weight of group, July 12....lbs. | 445·5 | 438·5 |
| Average weight of lambs, July 12....lbs. | 55·69 | 54·81 |
| Gross weight of lambs, Aug. 14....lbs. | 540·5 | 529·0 |
| Average weight of lambs, Aug. 14....lbs. | 67·56 | 66·12 |
| Total gain per group, 1st period....lbs. | 95·0 | 90·5 |
| Total gain per animal, 1st period....lbs. | 11·87 | 11·31 |
| Daily gain per group, 1st period....lbs. | 2·878 | 2·742 |
| Daily gain per animal, 1st period....lbs. | 0·3597 | 0·3427 |
| Length of 2nd period....days | 31·0 | 31·0 |
| Gross weight of group, Sept. 14....lbs. | 664·5 | 650·0 |
| Average weight of lambs, Sept. 14....lbs. | 83·06 | 81·25 |
| Total gain per group, 2nd period....lbs. | 124·0 | 121·0 |
| Total gain per animal, 2nd period....lbs. | 15·50 | 15·12 |
| Daily gain per group, 2nd period....lbs. | 4·000 | 3·903 |
| Daily gain per animal, 2nd period....lbs. | 0·500 | 0·488 |
| Total gain per group during experiment....lbs. | 219·0 | 211·5 |
| Total gain per animal during experiment....lbs. | 27·37 | 26·43 |
| Daily gain per group during experiment....lbs. | 3·422 | 3·304 |
| Average daily gain per lamb....lbs. | 0·428 | 0·413 |
| Additional gain made by early weaned lambs....lbs. | 7·5 | ..... |
| Grain fed first period....lbs. | 132·0 | ..... |
| Value of grain fed during first period at 2·175c. per cwt....$ | 2·87 | ..... |
| Cost of grain fed per lb. additional gain....$ | 0·382 | ..... |

Pure-bred Shropshire ewe lambs bred at the Dominion Experimental Station, Fredericton. Sire, Nunnerley 39, Imp.

*Deductions.*—1. Lambs weaned in July when put on fresh pasture and fed one-half pound of grain per day will make slightly larger gains than lambs left with their dams on the average New Brunswick pasture, and will continue to make slightly larger gains in the period after the later weaned lambs are taken from their dams.

2. The increased gains are not made at a profit. The previous year an early weaning experiment was conducted in which lambs were put on rape (see report for this Station for 1922, page 19). In this experiment lambs were weaned on July 15 and put on rape. They made much larger gains than those left with their dams in pasture. It would therefore seem that for early weaning some succulent feed such as rape is necessary.

### RAPE AS FEED FOR SHEEP

Five acres of rape were grown at the Station this season. The original plan was to use this rape for finishing a car load of market lambs. It was found impossible to buy these at an advantage. This rape therefore was used as a sheep pasture and from August 14 to September 24, carried forty-one lambs. From September 24 to October 14 it carried thirty-one ewes and thirty lambs. From October 14 until November 5 it carried thirty-six sheep. No grain was fed to the ewes or lambs at any time while on this pasture.

### SHEEP DIPPING EXPERIMENT

In order to test the efficiency of three new dips an experiment was conducted in co-operation with the Entomological Branch. One ewe and two lambs were dipped with each preparation, Cooper's dip being used as a check against the other three dips. The sheep were dipped and turned to pasture on May 29. The two lots which were dipped in wettable sulphur were put in one pasture, and the two lots which were dipped in sodium fluoride and Cooper's dip respectively, were put in another pasture. These sheep were kept isolated from the rest of the sheep on the farm. They were examined for vermin on July 7, with the following results:—

SHEEP DIPPING EXPERIMENT

| Lot | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Dip used | Wettable sulphur (30 lb. to 100 gals. water). | Wettable sulphur (8 lb. to 100 gals. water). | Sodium fluoride (6 lb. to 100 gals. water). | Cooper's dip. |
| Results | Clean | Ewe and 1 lamb, clean. 1 lamb, ticks. | Clean | Ewe clean. 1 lamb, 4 ticks. 1 lamb, 6 ticks. |

*Deductions.*—Wettable sulphur (30 pounds to 100 gallons water) and sodium fluoride were one hundred per cent efficient. Wettable sulphur (8 pounds to 100 gals. water) gave slightly better results than the standard Cooper's dip.

## SWINE

The swine on December 31, 1923, numbered ten, consisting of one yearling boar, two yearling brood sows, four young sows and three barrows all pure-bred Yorkshires. The aged boar, Gramandyne Golden Link —73396—, was sold to a butcher. The new herd sire, Rogerfield Wonder —88844—, was imported by the Director of Experimental Farms last April. He was bred by McNaughton Brothers, Ballieston, Scotland. He is an exceptionally fine bacon type, with plenty of constitution, length and quality. The fall litters, however, indicate that his progeny lack uniformity; they were however, very thrifty and made splendid growth.

Results obtained from the breeding stock this spring were unsatisfactory from causes rather difficult to explain. Sows number 8 and 9 failed to breed during the winter; they were therefore sold to a drover. Both these sows had produced large litters of healthy pigs the two previous years. The young sows 127 and 128 produced both fall and spring litters.

COST OF RAISING YOUNG PIGS TO SIX WEEKS

Records were kept of feed consumed by sows during the year. Grain was charged at cost price. Cull potatoes were charged at 50 cents per barrel (25 cents being for the potatoes and the other 25 cents for labour and fuel used to cook them). No allowance was made for the three months the sows were on pasture. When sows had a previous litter all the feed consumed by the sow from the date of weaning the previous litter was charged. Young sows without previous litters were only charged with the feed consumed during the gestation period. Farrowing records and cost of raising litters to six weeks of age are shown in the following table:—

FARROWING RECORD

| Sow | Date of Birth | Date of farrowing | Number of pigs in litter | Male | Female | Number reared |
|---|---|---|---|---|---|---|
| 127 | May 11, 1922 | Mar. 30, 1923 | 6 | 6 | ..... | 4 |
| 128 | May 11, 1922 | April 1, 1923 | 8 | 4 | 4 | 6 |
| 127 | May 11, 1922 | Sept. 11, 1923 | 8 | 4 | 4 | 6 |
| 128 | May 11, 1922 | Oct. 11, 1923 | 9 | 3 | 6 | 9 |
| Total.. | ..... | ..... | 31 | 17 | 14 | 25 |

| | |
|---|---|
| Average number of pigs per spring litter | 7·0 |
| Average number of pigs raised per spring litter | 5·0 |
| Average number of pigs per fall litter | 8·5 |
| Average number of pigs raised per fall litter | 7·5 |

COST OF LITTER TO SIX WEEKS

| — | Average spring litters. sows, 127 and 128 | Fall litter Sow, 127 | Fall litter Sow, 128 |
|---|---|---|---|
| Number of pigs in litter | 5 | 6 | 9 |
| *Statement of Feed to Birth* | | | |
| Crushed oats at $2 per cwt. lbs. | ..... | 228·0 | 216·0 |
| Middlings at $2.05 per cwt. lbs. | ..... | 185·0 | 177·0 |
| Shorts at $1.70 per cwt. lbs. | 97·0 | ..... | ..... |
| Bran at $1.45 per cwt. lbs. | 48·0 | 87·0 | 97·0 |
| Rye at $2 per cwt. lbs. | ..... | 106·0 | 160·0 |
| Cull potatoes at 50c. per bbl. (165 lb.). lbs. | 1,160·0 | ..... | ..... |
| *Statement of Feed from Birth to Six Weeks* | | | |
| Skim milk at 20c. per cwt. lbs. | ..... | 420·0 | 1,890·0 |
| Crushed oats at $2 per cwt. lbs. | 200·0 | 168·0 | 92·0 |
| Middlings at $2.05 per cwt. lbs. | 200·0 | 168·0 | ..... |
| Bran at $1.45 per cwt. lbs. | ..... | ..... | 46·0 |
| Corn meal at $2 per cwt. lbs. | ..... | ..... | 92·0 |
| Oilcake at $2.75 per cwt. lbs. | ..... | ..... | 92·0 |
| *Statement of Cost* | | | |
| Boar service $ | 2·00 | 2·00 | 2·00 |
| Feed to birth $ | 5·86 | 11·73 | 12·56 |
| Feed, birth to six weeks $ | 8·10 | 7·64 | 10·66 |
| Total cost to six weeks $ | 15·96 | 21·37 | 25·22 |
| Average cost per pig to six weeks $ | 3·19 | 3·57 | 2·80 |

It will be noted that the cost per pig in the larger fall litters is less than cost per pig in the smaller fall litter.

## Feeding Hogs for Bacon Production

### I.—CORN VERSUS BARLEY

The experiment which was conducted during the summer of 1922 to compare barley (a home-grown grain) with corn (an imported grain) for finishing bacon hogs for the British market, was repeated under winter conditions. Eight pigs from a litter farrowed October 1, were used. They were weaned when seven weeks old, and fed until ten weeks old, a meal mixture consisting of equal parts crushed oats and middlings with skim milk. They consumed in this period an average of 18.25 pounds of meal and 153 pounds of skim milk. The cost was 64.3 cents per pig. They were then weighed and divided into two groups and fed in accordance with the plan outlined below:—

*Lot I.*—From ten to fourteen weeks: Oats, 2 parts; shorts, 1 part; middlings, 1 part; corn, 1 part, with skim-milk and mangels. Tankage in self feeders.

From fourteen to twenty weeks: Equal parts oats, shorts and corn with skim-milk and mangels. Tankage in self feeders.

From twenty weeks to date of slaughtering: Corn, 2 parts; shorts, 1 part; oats, 1 part, with skim-milk and mangels. Tankage in self feeders.

*Lot II.*—Fed in the same manner as lot I except that barley took the place of corn.

The following prices were charged for feed:—

| | |
|---|---|
| Oats | $2.00 per cwt. |
| Middlings | 1.70 " |
| Shorts | 1.45 " |
| Corn | 1.95 " |
| Barley | 1.60 " |
| Tankage | 2.75 " |
| Mangels | 0.25 " |
| Skim-milk | 0.20 " |

The results are shown in the following table:—

Corn Versus Barley

| — | Corn | Barley |
|---|---|---|
| Number of pigs in experiment | *3 | 4 |
| Gross weight at 10 weeks...lbs. | 118·5 | 161·5 |
| Average weight at 10 weeks...lbs. | 39·50 | 40·37 |
| Gross finished weight...lbs. | 650·0 | 795·0 |
| Average finished weight...lbs. | 216·66 | 198·75 |
| Total gain per group...lbs. | 531·5 | 633·5 |
| Average gain per animal...lbs. | 177·16 | 158·37 |
| Total dressed weight...lbs. | 507·0 | 602·0 |
| Dressing percentage...% | 78·0 | 75·72 |
| Meal eaten, 10–14 weeks...lbs. | 123·75 | 165·0 |
| Meal eaten, 14–20 weeks...lbs. | 346·50 | 462·0 |
| Meal eaten, 20 weeks to slaughtering...lbs. | 1,300·0 | 1,400·0 |
| Total meal eaten...lbs. | 1,770·25 | 2,027·0 |
| Total skim-milk fed...lbs. | 2,524·0 | 3,140·0 |
| Total mangels fed...lbs. | 900·0 | 1,200·0 |
| Total tankage fed...lbs. | 80·0 | 100·0 |
| Meal fed per 100 lbs. gain...lbs. | 333·0 | 319·9 |
| Skim-milk fed per 100 lbs. gain...lbs. | 474·8 | 495·6 |
| *Statement of Cost* | | |
| Cost of pigs to 10 weeks ($5 for pig and 64·3c. for feed)...$ | 16·92 | 22·57 |
| Cost of feed during experiment...$ | 41·87 | 45·97 |
| Total cost of pigs and feed...$ | 58·79 | 68·54 |
| Cost of pork per cwt., labour neglected...$ | 11·59 | 11·38 |
| Cost of feed per head...$ | 13·95 | 11·49 |
| Cost of feed to produce 100 lbs. gain...$ | 7·87 | 7·25 |

*One of the hogs on the corn ration died on April 4. One-quarter of the feed consumed up to this date was deducted.

The hogs were slaughtered on May 9. They were cooled for forty-eight hours and graded by the Plant Superintendent of the William Davies Company, Montreal. Owing to a flood which tied up railroad transportation for ten days the hogs were killed one week later than planned. This made the corn-fed hogs slightly larger than desirable. The hogs were all 221 days old when slaughtered. The weights and grading are shown in the following table:—

GRADING RESULTS

| Fattening Ration | Number of hog | Grading | Dressed weight |
|---|---|---|---|
| | | | lbs. |
| Corn | 1 | Prime | 176 |
| " | 2 | Lean | 154 |
| " | 3 | Prime | 177 |
| Barley | 1 | Leanest | 142 |
| " | 2 | Lean | 159 |
| " | 3 | Lean | 158 |
| " | 4 | Leanest | 143 |

This experiment confirms the following deductions from the experiment carried on the previous summer:—

1. Barley can be used to replace corn in a fattening ration.
2. Barley has not as great a feeding value, pound for pound, as corn.
3. Hogs finish a little more slowly on barley than on corn.
4. In the judgment of an expert, barley-fed hogs have a decidedly better finish than corn-fed hogs.

## FEEDING HOGS FOR BACON PRODUCTION

### II.—A COMPARISON OF CORN, BARLEY AND BUCKWHEAT

The work begun in testing the value of barley versus corn for the production of high grade bacon for the British market was continued during the summer. Buckwheat was also included in the test as a large number of New Brunswick hogs are finished with buckwheat. The pigs were purchased from neighbouring farmers and cost an average of $5.16 per pig when four weeks old. As these pigs were only four weeks old when purchased it was necessary to keep them for some time before entering them in the experiment. The feed consumed by each lot was added to the purchase price. The pigs were divided into nine lots and fed in accordance with the following plan.

*Lot I.*—From date of purchase to ten weeks of age: Oats and middlings in equal parts with buttermilk.

From ten to fourteen weeks: Oats, 2 parts; shorts, 1 part; middlings, 1 part, corn, 1 part, with buttermilk, green feed and tankage in self feeder.

From fourteen to twenty weeks: Equal parts of oats, shorts and corn with buttermilk, green feed and tankage in self feeder.

From twenty weeks to finish: Corn, 2 parts; shorts, 1 part; oats, 1 part, with buttermilk, green feed and tankage in self feeder.

*Lot II.*—Fed the same as lot I except that corn was replaced by barley.

*Lot III.*—Fed the same as lot I except that corn was replaced by buckwheat.

*Lot IV.*—Fed the same as lot I except that no tankage was fed.

*Lot V.*—Fed the same as lot II except that no tankage was fed.

*Lot VI.*—Fed the same as lot III except that no tankage was fed.

*Lot VII.*—Fed the same as lot I except that no tankage was fed, and one and a half pounds of a mixture (equal parts bone meal and charcoal) was added to each hundred pounds of the grain ration.

*Lot VIII.*—Fed the same as lot II, except that no tankage was fed and one and a half pounds of a mixture (equal parts bone meal and charcoal) was added to each hundred pounds of the grain ration.

*Lot IX.*—Fed the same as lot III, except that no tankage was fed, and one and a half pounds of a mixture (equal parts bone meal and charcoal) was added to each hundred pounds of the grain ration.

All feeds were charged at cost prices. The barley was crushed. The buckwheat was ground and the hulls removed by a mill in Fredericton. Three bushels produced 100.8 pounds of feed. Twenty cents was added for grinding. The following prices were charged for feeds:—

| | |
|---|---|
| Oats | $2.00 per cwt. |
| Middlings | 2.05 " |
| Shorts | 1.70 " |
| Corn | 2.35 " |
| Barley | 2.00 " |
| Buckwheat | 2.45 " |
| Tankage | 3.15 " |
| Buttermilk | 0.15 " |
| Edible bone meal | 2.76 " |
| Charcoal | 4.00 " |

A Comparison of Corn, Barley and Buckwheat

| — | Corn | | | Barley | | | Buckwheat | | |
|---|---|---|---|---|---|---|---|---|---|
| | Lot 1 | Lot 2 | Lot 3 | Lot 4 | Lot 5 | Lot 6 | Lot 7 | Lot 8 | Lot 9 |
| | With tankage | Without tankage | With mineral | With tankage | Without tankage | With mineral | With tankage | Without tankage | With mineral |
| Number of days in experiment | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| Number of pigs in experiment | 6 | 6 | 5 | 6 | 6* | 5 | 6 | 5 | 5 |
| Gross initial weight lbs. | 164·0 | 144·0 | 70·0 | 165·0 | 130·5 | 83·0 | 157·0 | 106·5 | 78·0 |
| Average initial weight lbs. | 27·33 | 24·0 | 14·0 | 27·50 | 21·75 | 16·60 | 26·16 | 21·30 | 15·60 |
| Gross finished weight lbs. | 1,190·0 | 1,050·0 | 860·0 | 1,090·0 | 950·0 | 835·0 | 1,205·0 | 865·0 | 885·0 |
| Average finished weight lbs. | 198·33 | 175·0 | 172·0 | 181·66 | 158·33 | 167·0 | 200·83 | 173·0 | 177·0 |
| Total gain per group lbs. | 1,026·0 | 906·0 | 790·0 | 925·0 | 819·5 | 752·0 | 1,048·0 | 758·5 | 807·0 |
| Average gain per animal lbs. | 171·0 | 151·0 | 158·0 | 154·16 | 136·58 | 150·40 | 174·66 | 151·70 | 161·40 |
| Average daily gain per animal lbs. | 1·39 | 1·22 | 1·28 | 1·25 | 1·11 | 1·22 | 1·42 | 1·23 | 1·31 |
| *Statement of Feed* | | | | | | | | | |
| Meal fed 1st period lbs. | 167·0 | 138·0 | 104·0 | 164·0 | 148·0 | 103·0 | 160·0 | 111·0 | 99·0 |
| Meal fed 2nd period lbs. | 339·0 | 307·0 | 296·0 | 344·0 | 325·0 | 297·0 | 320·0 | 271·0 | 291·0 |
| Meal fed 3rd period lbs. | 1,164·0 | 1,012·0 | 874·0 | 1,120·0 | 1,023·0 | 789·0 | 1,127·0 | 853·0 | 885·0 |
| Meal fed 4th period lbs. | 1,045·0 | 975·0 | 919·0 | 1,039·0 | 1,047·0 | 946·0 | 1,112·0 | 982·0 | 950·0 |
| Total meal fed lbs. | 2,715·0 | 2,432·0 | 2,193·0 | 2,667·0 | 2,543·0 | 2,135·0 | 2,719·0 | 2,217·0 | 2,225·0 |
| Total buttermilk fed lbs. | 5,512·0 | 5,142·0 | 4,751·0 | 5,588·0 | 5,124·0 | 4,860·0 | 5,476·0 | 4,514·0 | 4,817·0 |
| Total tankage fed lbs. | 250·0 | ..... | ..... | 246·0 | ..... | ..... | 270·0 | ..... | ..... |
| Total mineral fed lbs. | ..... | ..... | 33·0 | ..... | ..... | 32·0 | ..... | ..... | 33·0 |
| Meal fed per 100 lbs. gain lbs. | 264·6 | 268·4 | 277·5 | 288·3 | 310·3 | 283·9 | 259·4 | 292·1 | 275·7 |
| Buttermilk fed per 100 lbs. gain lbs. | 537·2 | 567·5 | 601·3 | 604·1 | 625·2 | 646·2 | 522·5 | 595·1 | 596·9 |
| Tankage fed per 100 lbs. gain lbs. | 24·3 | ..... | ..... | 26·5 | ..... | ..... | 25·7 | ..... | ..... |
| Mineral matter fed per 100 lbs. gain lbs. | ..... | ..... | 4·1 | ..... | ..... | 4·2 | ..... | ..... | 4·1 |
| *Statement of Costs* | | | | | | | | | |
| Cost of hogs (purchase price plus feed to beginning of experiment) $ | 33·95 | 33·20 | 25·80 | 33·99 | 32·69 | 26·28 | 33·69 | 27·16 | 26·10 |
| Total cost of meal fed $ | 55·63 | 49·88 | 45·01 | 51·45 | 48·93 | 40·98 | 56·77 | 46·37 | 46·53 |
| Total cost of buttermilk fed $ | 8·27 | 7·71 | 7·13 | 8·38 | 7·68 | 7·29 | 8·21 | 6·77 | 7·23 |
| Total cost of tankage fed $ | 7·87 | ..... | ..... | 7·75 | ..... | ..... | 8·51 | ..... | ..... |
| Total cost of mineral fed $ | ..... | ..... | 1·11 | ..... | ..... | 1·08 | ..... | ..... | 1·11 |
| Total cost of feed $ | 71·77 | 57·59 | 53·25 | 67·58 | 56·61 | 49·35 | 73·49 | 53·14 | 54·87 |
| Total cost of hogs $ | 105·72 | 90·79 | 79·05 | 101·57 | 89·30 | 75·63 | 107·18 | 80·30 | 80·97 |
| Cost per 100 lbs. gain $ | 6·99 | 6·35 | 6·74 | 7·30 | 6·78 | 6·56 | 7·01 | 7·00 | 6·79 |
| Cost per 100 lbs. live weight $ | 8·88 | 8·64 | 9·19 | 9·31 | 9·40 | 9·05 | 8·89 | 9·28 | 9·14 |

*One pig in this lot was an 85 pound runt.

At an average of four weeks of age the pigs cost $5.16 each. This raised the cost of production very considerably as we were able to raise spring pigs tc six weeks of age for $3.19.

1. The hogs which were fed tankage made the largest, but the most expensive, gains.

2. The smallest gains were made by the hogs fed neither mineral nor tankage.

3. The barley and buckwheat-finished hogs made the cheapest gains when fed one and one-half per cent mineral; the corn finished hogs, when fed neither mineral nor tankage.

4. Hogs finished a little more slowly on barley, and it has not as great a feeding value, pound for pound, as either corn or buckwheat.

5. Buckwheat and corn have practically the same feeding value but there is a slight tendency for the buckwheat-finished hogs to become overfat.

### TRIAL SHIPMENT OF HOGS TO MONTREAL

As the local market for fresh pork was limited, and there was danger of glutting the market, it was determined to make a trial shipment of hogs to Montreal to ascertain (1) the cost per hundredweight of shipping to Montreal, (2) whether Montreal could be considered a profitable outlet for the surplus hogs in this district, (3) how hogs produced from the average breeding in this district would grade on the Montreal market. On October 6 a car containing seventy-two hogs (Yorkshire, Berkshire and Chester) was shipped to Montreal.

The shipment weighed 13,000 pounds at Fredericton. Fitting car, feed on trip, wage and expenses of man with hogs, stockyard charges and commission amounted to $151.63, or $1.16 per hundredweight. The hogs arrived in splendid condition, and it is possible that a larger number could have been shipped in the car, thus reducing the expense per hundredweight.

The weight of the hogs at Montreal was 525 pounds less than weight at shipping point, *i.e.*, an average shrinkage of 7.289 pounds per hog, or 4.03 per cent. As the hogs were fed and watered before being weighed in Montreal it must be assumed that this was an average shrinkage.

*Summary of Grading.*—Of the seventy-two hogs shipped, forty-nine were shipped by this Station and twenty-three by five neighbouring farmers. Five graded "Select" and the remaining sixty-seven graded "Thick smooths," "Lights" and "Heavies". The selects weighed on an average 173 pounds and the other hogs weighed on an average 173.28 pounds. Owing to a misunderstanding the selects were mixed with the other hogs at the Wm. Davies Packing Plant. It was therefore impossible to get the ear tags off the hogs which graded select, but they were all hogs of Yorkshire breeding. The comparatively small number of selects was partly due to the different ages and to their having been finished on different rations. Those which received tankage were too well finished. Those which received no tankage were rather light. The hogs were graded on the rail by the grader for the Wm. Davies Company, Montreal. He pronounced fourteen hogs prime, twenty-seven lean, twenty-nine leanest, one extra fat, and one extra lean. Sixteen hogs were reserved for export. Seven of these were corn fed, two were barley fed, three were buckwheat fed, two were fed by farmers, and two could not be identified. As the dehairing machine tore the tags out of their ears, and the torch used for singeing burned the tatoo marks off them. Credit must be given to the manager and staff of the Wm. Davies Company for their assistance and courtesy in connection with grading this shipment of hogs.

REVENUE FROM TRIAL SHIPMENT OF HOGS TO MONTREAL

| | |
|---|---|
| Five Selects, 865 lbs. live weight at 10 cents per lb | $ 86.50 |
| Sixty-seven other hogs (thick smooths, lights and heavies), 11,610 lbs. live weight at 9¼ cents per lb | 1,073.92 |
| Gross value of shipment | 1,160.42 |
| Total expenses on shipment | 151.63 |
| Expenses per cwt. (Fredericton weight, 13,000) | 1.16 |
| Net value of shipment | 1,008.79 |
| Net price per cwt. (Montreal weight, 12,475 lbs.) | 8.08 |
| Net price per cwt. (Fredericton weight) | 7.75 |

*Montreal and Local Market Prices.*—On October 6 (the date of shipment to Montreal) hogs sold on the local market for $15 and $16 per hundredweight, dressed weight. The seventy-two hogs shipped from Fredericton weighed 13,000 pounds, live weight, at Fredericton. They weighed 12,475 pounds, live weight, and 9,419 pounds, dressed weight, at Montreal (a dressing percentage of 75.5). They netted $1,008.79, or slightly over $10.71 per hundredweight less dressed weight. This was approximately $4.29 per hundredweight less than Fredericton price on date of shipment. Assuming that the hogs would weigh the same if killed at Fredericton as at Montreal, viz., 9,419 pounds, they would have netted at $15 per hundredweight, $1,412.85, which would be $404.06 more than they brought at Montreal. This would be approximately $3.10 per hundredweight, live weight, more than was obtained at Montreal, taking the Fredericton weight of 13,000 pounds as a basis. The lowest price obtained for hogs on the Fredericton market during the past season was $12 per hundredweight, dressed weight, in December. Even at this price 9,419 pounds, dressed weight, would have netted $1,130.28, or $121.49 more than the hogs brought on the Montreal market on October 9. It is therefore evident that it was not profitable to ship hogs to Montreal during the past season. The Montreal market might be valuable as an outlet for surplus hogs as the local market is limited. Indeed it is possible that if these hogs had been placed on the local market it would have resulted in considerably lowering the price of pork.

## FIELD HUSBANDRY

The winter was severe, the spring and summer cool, and the fall mild. Hay, corn, sunflowers and mangels were poor crops. Turnips, wheat, oats and potatoes were good crops. Nearly all the crops were sown in June. The dates of first seeding were as follows: wheat, mangels and potatoes, May 25; oats, May 28; corn, June 5; sunflowers, June 8; and turnips, June 13. Records were kept of the cost of producing the different crops. An experiment was carried on comparing corn, sunflowers, oats, peas and vetches, and turnips when grown under the same conditions. A series of rotation experiments was begun.

### COST PER ACRE TO PRODUCE HAY IN A FOUR-YEAR ROTATION

The hay crop was light, especially on the newly-seeded land. Owing to the severe winter nearly all the clover winter-killed. The hay made very slight growth until July. The hay crop was saved from being a total failure by 2·6 inches of rain the last of June. A total of 111 tons 1,734 pounds of hay was produced at the station. Thirty-six acres of rotation land produced 55 tons 1,560 pounds of hay. Hay making started on July 17. The remainder of the crop was cut on plots, road sides, orchard and arboretum. The cost per acre on thirty-six acres of rotation land is shown in the following table:—

| | |
|---|---|
| Rent of land | $ 3.00 |
| Use of machinery | 3.00 |
| Manure at $1 per ton | 2.16 |
| Mowing, man and 2 horses, 1·28 hours at 49c | 0.63 |
| Tedding, man and 2 horses, 0·13 hours at 49c | 0.06 |
| Raking, man and 2 horses, 0·58 hours at 49c | 0.28 |
| Raking, man and 1 horse, 0·7 hours at 37c | 0.26 |
| Hauling in, man and 2 horses, 2·91 hours at 49c | 1.42 |
| Coiling, loading and unloading, man, 10·72 hours at 25c | 2.68 |
| Seed, timothy, ½ of 10 pounds at $11.35 per cwt | 0.57 |
| Seed, red clover, ½ of 8 pounds at $26.85 per cwt | 1.07 |
| Seed, alsike clover, ½ of 2 pounds at $16.85 per cwt | 0.17 |
| Total cost per acre | $ 15.30 |

Yield per acre, 1·549 tons
Cost per ton, $9.88
Value per acre, $17.71
Profit per acre, $2.89

## Cost per Acre of Producing Oats in a Four-Year Rotation

On June 2, eleven acres of land which had been in hoed crop the previous year was sown with Banner oats. The cost of production per acre was as follows:—

| | |
|---|---|
| Rent of land | $ 3.00 |
| Use of machinery | 3.00 |
| Manure, 30 per cent of 15 tons at $1 per ton | 4.50 |
| Acid phosphate, 142 lb. at $1·095 per cwt | 1.55 |
| Ploughing, 1 man and 2 horses, 6·36 hours at 49c | 3.11 |
| Harrowing, 1 man and 2 horses, 3·54 hours at 49c | 1.73 |
| Seeding, 1 man and 2 horses, 1·27 hours at 49c | 0.62 |
| Rolling, 1 man and 2 horses, 0·45 hour at 49c | 0.22 |
| Binding, 1 man and 2 horses, 1·54 hours at 49c | 0.75 |
| Stooking, 1 man, 3·09 hours at 25c | 0.77 |
| Hauling in, man and 2 horses, 3·81 hours at 49c | 1.86 |
| Loading and unloading, man, 7 hours at 25c | 1.75 |
| Threshing, 52·7 bushels at 10c. per bushel | 5.27 |
| Seed, 3 bushels at $1 per bushel | 3.00 |
| Twine, 3 pounds at 15c | 0.45 |
| Total cost per acre | $ 31.58 |

Yield per acre, 52·7 bushels grain
Yield per acre, 1·87 tons straw
Value per acre, 52·7 bushels grain at 50c., $26.35
Value per acre, 1·87 tons straw at $4, $7.48
Total value per acre, $33.83
Cost per bushel grain, 46·7c.
Cost per ton straw $3.73
Profit per acre, $2.25

## Cost per Acre of Producing Spring Wheat in a Four-Year Rotation

On May 25, one acre of land which had been in hoed crop the previous year, was sown with Huron wheat.

| | |
|---|---|
| Rent of land | $ 3.00 |
| Use of machinery | 3.00 |
| Manure, 30 per cent of 15 tons at $1 per ton | 4.50 |
| Acid phosphate, 100 lb. at $1·095 per cwt | 1.09 |
| Ploughing (twice), man and 2 horses, 16 hours at 49c | 7.84 |
| Harrowing, man and 2 horses, 5 hours at 49c | 2.45 |
| Seeding, man and 2 horses, 1 hour at 49c | 0.49 |
| Rolling, man and 2 horses, ½ hour at 49c | 0.25 |
| Binding, man and 2 horses, 2 hours at 49c | 0.98 |
| Stooking, man, 2 hours at 25c | 0.50 |
| Hauling in, man and 2 horses, 1 hour at 49c | 0.49 |
| Loading and unloading, man, 2 hours at 25c | 0.50 |
| Threshing, 37 bushels at 10c. per bushel | 3.70 |
| Seed, 2 bushels at $2 per bushel | 4.00 |
| Twine, 3 lb. at 15c. per lb | 0.45 |
| Total cost per acre | $ 33.24 |

Yield per acre, 37 bushels grain
Yield per acre, 1·75 tons straw
Value per acre, 37 bushels grain at $1.50, $55.50
Value per acre, 1·75 tons straw at $2, $3.50
Total value per acre, $59
Cost per bushel grain, 84·4c.
Cost per ton straw, $1.12
Profit per acre, $15.76

## Cost per Acre of Producing Swede Turnips in a Four-Year Rotation

On June 18, three acres of clay land which had been in hay the two previous years was sown with Nappan Monarch Swede turnips. The cost of production per acre was as follows:—

| | |
|---|---|
| Rent of land | $ 3.00 |
| Use of machinery | 3.00 |
| Manure, 40 per cent of 15 tons at $1 per ton | 6.00 |
| Nitrate of soda, 187·8 lb. at $3·095 per cwt. | 5.81 |
| Sulphate of ammonia, 112·8 lb. at $3·845 per cwt. | 4·33 |
| Acid phosphate, 160·8 lb. at $1·095 per cwt. | 1.76 |
| Muriate of potash, 135·3 lb. at $1·845 per cwt. | 2.49 |
| Ploughing (twice), man and tractor, 8 hours at 63c. | 5.04 |
| Ploughing, man and 2 horses, 1 hour at 49c. | 0.49 |
| Harrowing, man and tractor, 1·66 hours at 63c. | 1.04 |
| Sowing fertilizer, 2 men and 2 horses, 1 hour at 74c. | 0.74 |
| Rolling, man and 2 horses, 0·66 hours at 49c. | 0.32 |
| Ridging, man and 2 horses, 4 hours at 49c. | 1.96 |
| Seeding, man and 1 horse, 1·33 hours at 37c. | 0.49 |
| Cultivating (3 times), man and 1 horse, 6 hours at 37c. | 2.22 |
| Hoeing, man, 43 hours at 25c. | 10.75 |
| Hauling in, man and 2 horses, 23 hours at 49c. | 11.27 |
| Pulling, loading and unloading, man, 60 hours at 25c. | 15.00 |
| Seed, 2 lb. at 50c. | 1.00 |
| Total cost per acre | $ 76.71 |

Yield per acre, 21·36 tons
Cost per ton, $3.59
Value per acre, 21·36 tons at $1.91, $40.79
Loss per acre, $35.92

## Cost per Acre of Producing Mangels in a Three-Year Rotation

On May 25, one acre was sown with mangels. This land was one year old clover sod. It was ploughed in the fall and again in the spring. The cost of production per acre was as follows:—

| | |
|---|---|
| Rent of land | $ 3.00 |
| Use of machinery | 3.00 |
| Manure, 50 per cent of 15 tons at $1 per ton | 7.50 |
| Ploughing (twice), man and 2 horses, 10 hours at 49c. | 4.90 |
| Harrowing, man and 2 horses, 3·5 hours at 49c. | 1.71 |
| Drilling, man and 2 horses, 3 hours at 49c. | 1.47 |
| Seeding, man, 2 hours at 25c. | 0.50 |
| *Hoeing (twice), man, 90 hours at 25c. | 22.50 |
| Thinning, man, 48 hours at 25c. | 12.00 |
| Cultivating (6 times), man and 1 horse, 12 hours at 37c. | 4.44 |
| Pulling and loading, man, 20 hours at 25c. | 5.00 |
| Hauling in, man and 1 horse, 8 hours at 37c. | 2.96 |
| Seed, 8 lb. at 40c. | 3.20 |
| Total cost per acre | $ 72.18 |

Yield per acre, 9·48 tons
Cost per ton, $7.61
Value per acre, 9·48 tons at $1.91, $18.10
Loss per acre, $54.08

*Owing to the cold spring and summer the mangels grew so slowly that it was necessary to hoe the weeds out twice before the mangels were large enough to thin.

## Cost per Acre of Producing Corn in a Four-Year Rotation

On June 6, six acres of clay land which had been in hay the two previous years was sown with corn. The cost of production per acre was as follows:—

| | |
|---|---|
| Rent of land | $3 00 |
| Use of machinery | 3 00 |
| Manure, 40 per cent of 15 tons at $1 per ton | 6 00 |
| Nitrate of soda, 187·8 lb., at $3.095 per cwt | 5 81 |
| Sulphate of ammonia, 112·8 lb., at $3.845 per cwt | 4 33 |
| Acid phosphate, 171·7 lb., at $1.095 per cwt | 1 88 |
| Muriate of potash, 135·3 lb., at $1.845 per cwt | 2 49 |
| Ploughing (twice), man and tractor, 8 hours at 63c | 5 04 |
| Ploughing, man and 2 horses, 1 hour at 49c | 0 49 |
| Harrowing, man and tractor, 1·66 hours at 63c | 1 04 |
| Rolling, man and 2 horses, ·66 hour at 49c | 0 32 |
| Sowing fertilizer, 2 men and 2 horses, 1 hour at 74c | 0 74 |
| Seeding, man and 2 horses, 2 hours at 49c | 0 98 |
| Harrowing, man and 2 horses, 2 hours at 49c | 0 98 |
| Weeding, man and 1 horse, 1 hour at 37c | 0 37 |
| Cultivating (3 times), man and 2 horses, 5 hours at 49c | 2 45 |
| Cutting, man and 2 horses, 4·16 hours at 49c | 2 04 |
| Hauling in, man and 2 horses, 6·5 hours at 49c | 3 18 |
| Filling silo, man and tractor, 5·5 hours at 63c | 3 46 |
| Loading, unloading and tramping in silo, man, 30 hours | 7 50 |
| Rent of ensilage cutter and blower, 5·5 hours at 40c | 2 20 |
| Seed, 20 lb., at $2 per bushel | 0 71 |
| Twine, 4 lb., at 15c | 0 60 |
| Total cost per acre | $58 61 |

Yield per acre, 12·49 tons
Cost per ton, $4.69
Value per acre, 12·49 tons at $3.83, $47.83
Loss per acre, $10.78

## Cost of Producing Succulent Feed from Different Sources

This experiment was begun in 1922. The object was to compare the cost of production, and the yield per acre of corn, sunflowers, oats, peas and vetches, and turnips when grown under the same conditions. The crops were grown this year on clay land which had been in hay the two previous years. It was ploughed in the fall and again in the spring. Each plot was given the same preparation and fertilizer. The costs are shown in the following tables:—

### Corn-(Longfellow)

Date of Sowing, June 8.

| | |
|---|---|
| Rent of land | $3 00 |
| Use of machinery | 3 00 |
| Manure, 40 per cent of 15 tons, at $1 per ton | 6 00 |
| Nitrate of soda, 187·8 lb., at $3.095 per cwt | 5 81 |
| Sulphate of ammonia, 112·8 lb., at $3.845 per cwt | 4 33 |
| Acid phosphate, 162·4 lb., at $1.095 per cwt | 1 77 |
| Muriate of potash, 135·3 lb., at $1.845 per cwt | 2 55 |
| Ploughing (twice), man and tractor, 8 hours at 63c | 5 04 |
| Ploughing, man and 2 horses, 1 hour at 49c | 0 49 |
| Harrowing, man and tractor, 1·66 hours at 63c | 1 04 |
| Harrowing, man and 2 horses, 1 hour at 49c | 0 49 |
| Sowing fertilizer, 2 men and 2 horses, 1 hour at 74c | 0 74 |
| Seeding corn, man and 2 horses, 3 hours at 49c | 1 47 |
| Harrowing, man and 2 horses, 1 hour at 49c | 0 49 |
| Weeding, man and 1 horse, 1·5 hour at 37c | 0 55 |
| Cultivating, (3 times), man and 2 horses, 6 hours at 49c | 2 94 |
| Cutting, man and 2 horses, 3 hours at 49c | 1 47 |
| Hauling in, man and 2 horses, 8 hours at 49c | 3 92 |
| Loading, unloading and tramping in silo, man, 20 hours at 25c | 5 00 |
| Filling silo, man and tractor, 5 hours at 63c | 3 15 |
| Rent of silage cutter and blower, 5 hours at 40c | 2 00 |
| Seed, 24 lbs. at $2 per bushel | 0 85 |
| Twine, 4 lbs. at 15c. per lb | 0 60 |
| Total cost per acre | $56 70 |

Yield per acre, 11·81 tons
Cost per ton, $4.79
Value per acre, 11·81 tons at $3.83, $45.23
Loss per acre, $11.47

### Sunflowers (Mammoth Russian)

Date of Seeding, June 8.

| | |
|---|---|
| Rent of land | $3 00 |
| Use of machinery | 3 00 |
| Manure, 40 per cent of 15 tons, at $1 per ton | 6 00 |
| Nitrate of soda, 187·8 lb., at $3.095 per cwt | 5 81 |
| Sulphate of ammonia, 112·8 lb., at $3.845 per cwt | 4 33 |
| Acid phosphate, 233·5 lb., at $1.095 per cwt | 2 55 |
| Muriate of potash, 135·3 lb., at $1.845 per cwt | 2 49 |
| Ploughing (twice), man and tractor, 8 hours at 63c | 5 04 |
| Ploughing, man and 2 horses, 1 hour at 49c | 0 49 |
| Harrowing, man and tractor, 1·66 hour at 63c | 1 04 |
| Harrowing, man and 2 horses, 1 hour at 49c | 0 49 |
| Sowing fertilizer, 2 men and 2 horses, 1 hour at 74c | 0 74 |
| Seeding, man and 2 horses, 3 hours at 49c | 1 47 |
| Harrowing, man and 2 horses, 1 hour at 49c | 0 49 |
| Weeding, man and 1 horse, 1·5 hour at 37c | 0 55 |
| Cultivating (3 times), man and 2 horses, 6 hours at 49c | 2 94 |
| Thinning, man, 15 hours at 25c | 3 75 |
| Cutting, man and 2 horses, 3 hours at 49c | 1 47 |
| Hauling in, man and 2 horses, 8 hours at 49c | 3 92 |
| Loading, unloading and tramping in silo, man, 30 hours at 25c | 7 50 |
| Filling silo, man and tractor, 5 hours at 63c | 3 15 |
| Rent of silage, cutter and blower, 5 hours at 40c | 2 00 |
| Seed, 10 lbs. at 10c | 1 00 |
| Twine, 4 lbs. at 15c | 0 60 |
| Total cost per acre | $63 82 |

Yield per acre, 13·35 tons
Cost per ton, $4.78
Value per acre, 13·35 tons at $3.83, $51.13
Loss per acre, $12.44

### Oats, Peas and Vetches

Date of seeding, June 7.

| | |
|---|---|
| Rent of land | $3 00 |
| Use of machinery | 3 00 |
| Manure, 40 per cent of 15 tons, at $1 per ton | 6 00 |
| Nitrate of soda, 187·8 lb., at $3.095 per cwt | 5 81 |
| Sulphate of ammonia, 112·8 lb., at $3.845 per cwt | 4 33 |
| Acid phosphate, 141 lb., at $1.095 per cwt | 1 34 |
| Muriate of potash, 135·3 lb., at $1.845 per cwt | 2 49 |
| Ploughing (twice), man and tractor, 8 hours at 63c | 5 04 |
| Ploughing, man and 2 horses, 1 hour at 49c | 0 49 |
| Harrowing, man and tractor, 1·66 hours at 63c | 1 04 |
| Harrowing, man and 2 horses, 1 hour at 49c | 0 49 |
| Sowing fertilizer, 2 men and 2 horses, 1 hour at 74c | 0 74 |
| Seeding, man and 2 horses, 2 hours at 49c | 0 98 |
| Cutting, man and 2 horses, 2 hours at 49c | 0 98 |
| Hauling in, man and 2 horses, 9 hours at 49c | 4 41 |
| Loading, unloading and tramping in silo, man, 20 hours at 25c | 5 00 |
| Filling silo, man and tractor, 5 hours at 63c | 3 15 |
| Rent of silage, cutter and blower, 5 hours at 40c | 2 00 |
| Seed, 2 bushels oats at $1, 1 bushel peas at $3.50, ½ bushel vetch at $4 | 7 50 |
| Total cost per acre | $57 99 |

Yield per acre, 9·78 tons
Cost per ton, $5.92
Value per acre, 9·78 tons at $3.83, $37.45
Loss per acre, $20.54

SWEDE TURNIPS

Variety: Nappan Monarch.
Date of Seeding, June 13.

| | |
|---|---|
| Rent of land | $3 00 |
| Use of machinery | 3 00 |
| Manure, 40 per cent of 15 tons, at $1 per ton | 6 00 |
| Nitrate of soda, 187·8 lb., at $3.095 per cwt | 5 81 |
| Sulphate of ammonia, 112·8 lb., at $3.845 per cwt | 4 33 |
| Acid phosphate, 179·3 lb., at $1.095 per cwt | 1 96 |
| Muriate of potash, 135·3 lb., at $1.845 per cwt | 2 49 |
| Ploughing (twice), man and tractor, 8 hours at 63c | 5 04 |
| Ploughing, man and 2 horses, 1 hour at 49c | 0 49 |
| Harrowing, man and tractor, 1·66 hours at 63c | 1 04 |
| Harrowing, man and 2 horses, 2 hours at 49c | 0 98 |
| Sowing fertilizer, 2 men and 2 horses, 1 hour at 74c | 0 74 |
| Ridging, man and 2 horses, 3 hours at 49c | 1 47 |
| Seeding, man and 1 horse, 2 hours at 37c | 0 74 |
| Thinning, man, 43 hours at 25c | 10 75 |
| Cultivating (4 times), man and 1 horse, 8 hours at 37c | 2 96 |
| Pulling and loading, man, 40 hours at 25c | 10 00 |
| Hauling, man and 2 horses, 20 hours at 49c | 9 80 |
| Seed, 2 lb. at 50c | 1 00 |
| Total cost per acre | $71 60 |

Yield per acre, 23·40 tons
Cost per ton, $3.05
Value per acre, 23·4 tons, at $1.91, $44.69
Loss per acre, $26.91

COST OF PRODUCTION SUMMARY

| — | | Corn | Sunflowers | O.P.V. | Swedes |
|---|---|---|---|---|---|
| Rent of land, use of machinery, fertilizer and preparation | $ | 34 20 | 34 98 | 33 97 | 36 35 |
| Seeding | $ | 1 47 | 1 47 | 0 98 | 0 74 |
| Cultivation | $ | 3 98 | 7 73 | ..... | 13 71 |
| Harvesting and storing | $ | 15 54 | 18 04 | 15 54 | 19 80 |
| Seed | $ | 0 85 | 1 00 | *7 50 | 1 00 |
| Twine | $ | 0 60 | 0 60 | ..... | ..... |
| Total cost per acre | $ | 56 64 | 63 82 | 57 99 | 71 60 |
| Yield per acre | tons | 11 81 | 13 35 | 9 78 | 23 40 |
| Cost per ton | $ | 4 79 | 4 78 | 5 92 | 3 05 |

* Two dollars of this charge was for one-half bushel of vetch at $4 per bushel. During the two years this experiment has been carried on, the vetches have been a failure.

# HORTICULTURE

## ORCHARDS

The winter of 1922-23 was particularly long and severe. This was followed by a cold, backward spring. The orchard did not come into full bloom until the 9th of June which was ten days later than date of full bloom the previous year. A few trees, mostly in the old orchard, were winter-killed. The young trees came through the winter very well, but owing to the severe winter the set of fruit was small. Eight and a half pounds of a 5-8-6 home-mixed fertilizer were applied around each tree in the variety, cultural and commercial orchard on May 17. Six pounds per tree of the same fertilizer were applied to the McIntosh and Famuse trees in the permanent sod block and to the plum, pear and cherry orchard, on May 18. All the orchard was sprayed three times. The McIntosh and Fameuse trees were either sprayed or dusted four times.

### SPRAYING VERSUS DUSTING

An experiment was carried on in co-operation with the Dominion Entomological Branch to ascertain the comparative value of dusting and spraying for

controlling insect pests and fungous diseases in New Brunswick orchards. Two varieties, McIntosh and Fameuse, were used in this experiment. The dates of application and the material used were as follows:—

*Spray Calendar.*

June 1: 3-10-40 Bordeaux plus 1½ pounds calcium arsenate.
June 22: Soluble sulphur 1 pound, calcium arsenate ¾ pounds, hydrated lime 5 pounds, water 40 gallons.
July 9: 3-10-40 Bordeaux plus 1½ pounds calcium arsenate.
August 2: 3-10-40 Bordeaux plus 1½ pounds calcium arsenate.

*Dust Calendar.*

May 20: 12-8-80 copper arsenic dust.
June 20: 90-10 sulphur lead arsenate dust.
July 9: 12-8-80 copper arsenic dust.
July 30: 12-8-80 copper arsenic dust.

A Perfect duster was used and gave good satisfaction. The dust was applied in the early morning.

*Conclusions.*—The spray method is somewhat superior to the dust method for the control of apple scab.

The dust method is somewhat superior to spray method for the control of insect pests.

The dust method does not cause as much russetting of the fruit as the spray method.

COMMERCIAL ORCHARD

This orchard was planted in 1914. It remained in sod this year and a swath was cut along each side of the trees and the grass left as a mulch. The varieties grown and the yields were as follows:—

| Variety | Number of trees | Number of bearing trees | Total yield | Average yield per bearing tree |
|---|---|---|---|---|
| | | | pecks | pecks |
| New Brunswick | 12 | 9 | 32·16 | 3·57 |
| Wealthy | 26 | 21 | 72·82 | 3·46 |
| Crimson Beauty | 29 | 25 | 70·00 | 2·80 |
| Duchess | 27 | 13 | 31·00 | 2·38 |
| Dudley | 23 | 7 | 11·75 | 1·67 |
| Milwaukee | 29 | 19 | 36·75 | 1·26 |
| Fameuse | 26 | 13 | 13·50 | 1·03 |
| Wolf River | 16 | 10 | 10·00 | 1·00 |
| Red Astrachan | 2 | 2 | 1·33 | 0·66 |
| Alexander | 23 | 12 | 7·14 | 0·58 |
| McIntosh Red | 12 | 9 | 3·50 | 0·38 |
| American Golden Russet | 15 | 11 | 5·75 | 0·38 |
| Canada Baldwin | 5 | 2 | 0·66 | 0·33 |
| Northwestern Greening | 4 | 3 | 0·75 | 0·25 |
| Salome | 3 | 3 | 0·50 | 0·16 |
| Bethel | 18 | 11 | 1·75 | 0·15 |

APPLES—CULTIVATION VERSUS SOD

This experiment was begun in 1922 on a block of McIntosh, Dudley and Wealthy trees set out in 1914. The object of the experiment was to test clean cultivation, partial cultivation (Johnson method) and sod with grass mulch. The block under clean cultivation was ploughed May 28 and cultivated occasion-

ally until July 7 when a cover crop of buckwheat was sown. The block under partial cultivation was ploughed May 28, on the side of the trees in sod the previous year, and cultivated until July 7. A cover crop of buckwheat was then sown and the land was seeded to hay with timothy and clover. The grass on the sod block was kept cut and left on the ground as a mulch. The yields from the different blocks are shown in the following table:—

APPLES—CULTIVATION VERSUS SOD CULTURE

| Variety | Method of treatment | Number of trees in block | Number of bearing trees | Average yield per bearing tree |
|---|---|---|---|---|
| | | | | pecks |
| McIntosh | Clean culture | 5 | 5 | 0·66 |
| " | Partial culture | 5 | 5 | 1·01 |
| " | Sod culture | 6 | 6 | 0·41 |
| Dudley | Clean culture | 6 | 6 | 2·38 |
| " | Partial culture | 10 | 5 | 6·4 |
| " | Sod culture | 9 | 8 | 7·09 |
| Wealthy | Clean culture | 19 | 19 | 8·08 |
| " | Partial culture | 19 | 15 | 4·31 |
| " | Sod culture | 19 | 16 | 3·64 |

The block under clean culture was on lower ground and slightly better sheltered than the other two blocks, and gave a better yield in 1921 (the only year previous to beginning the experiment in which the orchard bore much fruit).

GRASS MULCH VERSUS REMOVING HAY IN SOD ORCHARD

A block of McIntosh and Fameuse was used for this experiment. The trees were planted in 1914 and the orchard was kept in sod. On one part of it the grass was cut and left on the ground as a mulch, while on the remainder the grass was cut and removed as hay. The results are shown in the following table:—

APPLES—GRASS MULCH VERSUS REMOVING HAY IN SOD ORCHARD

| Variety | Treatment | Number of trees | Number of bearing trees | Total yield | Average yield per bearing tree |
|---|---|---|---|---|---|
| | | | | pecks | pecks |
| Fameuse | Grass cut and left as mulch | 17 | 12 | 24·25 | 2·02 |
| McIntosh | Grass cut and left as mulch | 15 | 15 | 11·92 | 0·79 |
| Fameuse | Grass cut and removed | 25 | 16 | 24·16 | 1·51 |
| McIntosh | Grass cut and removed | 18 | 16 | 16·33 | 1·02 |

APPLES—VARIETY EXPERIMENT

This orchard was planted in 1914 and 1917 to try out new varieties of apples. It remained in sod during the year. A six-foot swath was cut on each side of the trees and left on the ground as a mulch. Hay was made on the remainder of the land. The majority of the trees stood the winter very well, but on account of the late cold season the quality and colour of the fruit was below average. The results from five years' fruitage show that the best varieties to-date are: Early varieties—Charlamoff and Melba; autumn varieties—Luke, Kildare, Atlas, Glenton, Lobo and Medford; winter varieties—Northern Spy Seedling Ottawa 430, Northern Spy Seedling Ottawa 360, Rosalie, Homer, Thurso, Tasty, Sonora, Cobalt, Marcus, Rocket, Bruno, Elmer, Kim. One early variety, the Melba, promises to become a good commercial variety and

worthy of distribution, and one autumn variety, the Lobo, is also worthy of distribution. There are several promising winter varieties, but the work has not progressed far enough as yet to recommend any of them.

#### CHERRIES—VARIETY EXPERIMENT

The cherry orchard remained in sod during the year. Each tree was given an application of six pounds of 5-8-6 home-mixed fertilizer. Owing to the severe winter this orchard was in very poor condition in the spring. There was practically no set of fruit, and the few cherries that were produced were destroyed before they could be harvested.

#### PEARS—VARIETY EXPERIMENT

This orchard received the same treatment as the cherry orchard. Pears grown here do not seem hardy enough to stand the severe winters. A number of the trees winter-killed and no fruit was produced this year.

#### PLUMS—VARIETY EXPERIMENT

This orchard received the same treatment as the cherry orchard. Owing to the severe winter this orchard is in poor condition. A few scattered plums were produced by Omaha, Red June, Burbank, Shropshire Damson and John A. varieties.

### SMALL FRUITS

The bush fruits were a good crop this year. The land on which they were grown was well covered with snow, and the cold spring delayed blooming until danger from frost was past. The land devoted to bush fruits is a clay loam with a sandy subsoil, and is under-drained. Barnyard manure at the rate of twenty-five tons per acre was applied in the form of a mulch in the fall. This was turned under in the spring.

#### CURRANTS—VARIETY EXPERIMENT

The currant plantation came through the winter in fair condition and yielded a fair crop. An outbreak of white pine blister rust was apparent during the summer. Seventeen varieties of red currants were grown. Rankins Red, Wilder, Red Dutch, Cumberland, Fay Prolific and Red Grape, in the order named, gave the largest yield. Fourteen varieties of black currants were grown. The following varieties gave the best yields in the order named: Collins Prolific, Victoria, Climax, Clipper, Buddenborg, Boskoop Giant and Black Champion. Three varieties of white currants were grown and yielded in the following order: White Cherry, Large White and White Grape.

#### GOOSEBERRIES—VARIETY EXPERIMENT

Sixteen varieties of gooseberries were grown. The gooseberries have never made good growth. The Whitesmith, May Duke, Victoria, Surprise, Keepsake and Pearl, in the order named, gave the best yields.

#### RASPBERRIES—VARIETY EXPERIMENT

Seventeen varieties of raspberries were grown. They came through the winter in good condition. The yields were very good. The Herbert, Golden Queen, Marlboro, King, Sarah and Newman No. 23, in the order named, gave the largest yields.

### STRAWBERRIES—VARIETY EXPERIMENT

Thirty varieties were grown on garden land. This land received an application of barnyard manure at the rate of twenty-five tons per acre, and ground limestone at the rate of two and a half tons per acre in the spring of 1922. The land was ploughed and put in good tilth with disc and spring-tooth harrow. The plants were set out on May 27 in rows three feet apart with eighteen inches between the plants. The stand was the best ever secured at this station. Ozark gave the highest yield, viz., 6,275 quarts per acre. The next best yields were given by K Premier, Beder Wood, Glen Mary, Senator Dunlap, Parsons Beauty and Cassandra, in the order named. K Premier, Glen Mary, Senator Dunlap and Parsons Beauty can be recommended as good quality berries. Cordelia was the best-flavoured berry, but is a very light producer.

### GRAPES—VARIETY EXPERIMENT

The grapes were laid down in December of the previous year and covered with strawy horse manure. They were uncovered on May 3, but on account of the cold backward spring they were slow in coming into leaf. A fairly good crop of fruit was set, but there was not sufficient warm weather to mature the fruit. Consequently it was not of marketable quality. Beta and Early Daisy varieties were the nearest ripe. Beta yielded an average of 14 pounds of fruit per vine. The next best yields were obtained from Vergennes, Salem, Wilkins, Delaware and Hartford in the order named.

## VEGETABLES

The land devoted to vegetable experiments is a clay loam with a sandy loam subsoil, and is underdrained. It has been in garden crops since 1913. Barnyard manure has been applied annually at the rate of twenty-five to thirty tons per acre, and the land is therefore in a high state of fertility. It is very uniform. This land is badly infested with insect pests such as cutworms, slugs, cucumber beetles and flea beetles. The land was fall and spring ploughed this year, and fertilized at the rate of twenty-tons of barnyard manure and 1,128 pounds of a 4.5-8-6 home-mixed fertilizer.

### BEANS—VARIETY TEST

Twenty-six varieties of beans were planted in 66-foot rows on May 26. The rows were then divided into two plots. Records were taken from one plot for the production of green beans, and from the other plot for the production of ripe beans. The green beans were fairly free from anthracnose early in the season owing to the dry weather, but it developed rapidly toward the end of the season. Masterpiece (Ottawa 2746), Plentiful French (Ottawa 2824), Masterpiece (Vaughan), Wardwell Kidney Wax (Graham), No. 1 White Pole (Ottawa 3209), and Yellow Eye (Ottawa 2821) in the order named, gave the largest yields of green beans. No. 1 White Pole (Ottawa 3209), Masterpiece (Ottawa 2746), Canadian Wonder (Carter), Yellow Eye (Ottawa 2821), Yellow Eye (Ottawa 2822), and Wardwell Kidney Wax (Graham) in the order named, gave the largest yields of ripe beans. Masterpiece (Ottawa 2746) and Masterpiece (Vaughan) were free from anthracnose.

### BEANS—DISTANCE APART OF PLANTING IN ROW

In order to get information on the best distance apart to plant beans, the Round Pod Kidney Wax and Stringless Green Pod varieties were planted two, four and six inches apart in the rows on May 26. The rows were 66 feet long.

The rows were divided into two plots. Records were taken from one plot for the production of green beans, and from the other plot, for the production of ripe beans. The results are as follows:—

BEANS—DISTANCE APART OF PLANTING IN THE ROW. YIELD OF GREEN BEANS

| Variety | Distance apart of planting | Number plants | Yield per 33-foot row |
|---|---|---|---|
| | inches | | lbs. oz. |
| Round Pod Kidney Wax | 2 | 96 | 20 0 |
| " " | 4 | 62 | 16 15 |
| " " | 6 | 40 | 14 6 |
| Stringless Green Pod | 2 | 35 | 12 8 |
| " " | 4 | 28 | 11 10 |
| " " | 6 | 23 | 12 0 |

BEANS—DISTANCE APART OF PLANTING IN THE ROW. YIELD OF RIPE BEANS

| Variety | Distance apart of planting | Number plants | Yield per 33-foot row |
|---|---|---|---|
| | inches | | lbs. oz. |
| Round Pod Kidney Wax | 2 | 84 | 4 1 |
| " " | 4 | 43 | 3 13 |
| " " | 6 | 36 | 2 15 |
| Stringless Green Pod | 2 | 41 | 4 4 |
| " " | 4 | 33 | 3 11 |
| " " | 6 | 20 | 2 8 |

The results indicate that planting two inches apart in the row will give higher yields than planting greater distances apart in the row.

### BEETS—VARIETY TEST

Nine varieties of beets were sown in thirty-foot rows on May 31. One-half of each row was harvested for bunch beets, and the balance of the row was harvested in the fall. On account of the dry weather after planting, germination was very slow and uneven. When harvested for bunches Crosby Egyptian (Dupuy and Ferguson), Detroit Dark Red (MacDonald), Crimson Globe (Graham), Detroit Turnip (MacDonald) and Eclipse (MacDonald) in the order named, gave the largest number of bunches. The Eclipse (MacDonald) and Detroit Dark Red (MacDonald) were earliest. Early Wonder (Dupuy & Ferguson) and Eclipse (MacDonald) gave the largest yield by weight when harvested in the fall. They were not, however, as good quality as Cardinal Globe (Rennie), Detroit Dark Red (MacDonald) and Crosby Egyptian (Dupuy & Ferguson).

### BEETS—DATES OF SEEDING

In order to determine the date of seeding beets that will give the best results, (1) for green table beets put up in bunches, (2) when left in the ground till the end of the season, Detroit Dark Red beets were sown on May 31, June 11, June 20, and July 3. Owing to the dryness of the season the seed germinated very unevenly, and the stand was not very satisfactory. The best yields were obtained from the June 11 planting.

### BRUSSELS SPROUTS—VARIETY TEST

Four varieties of Brussels Sprouts were sown in the hot bed on April 14. They were transplanted in the open on June 5. Imported Dwarf (Vaughan), Paris Market (Ewing), Dalkeith (MacDonald), and Amager Market (Ewing) gave the best yield in the order named.

### CARROTS—VARIETY TEST

Five varieties of carrots were sown on May 30 in thirty-foot rows. One-half of each row was harvested early for green table carrots, and the balance was left in the ground until the end of the season. On account of the very dry weather after seeding, germination was very slow. Oxheart or Guerande (Steele Briggs), Chantenay (Ottawa 2011), and Danvers Half Long (Rennie) in the order named gave the largest yield of bunch carrots. Oxheart or Geurande (Steele Briggs), Danvers Half Long (Lethbridge), and Chantenay (MacDonald) in the order named gave the largest yield when harvested in the fall.

### CARROTS—DIFFERENT DATES OF SOWING

In order to determine the date of seeding carrots which would give the best yield for (1) green table carrots put up in bunches and (2) when left in the ground until the end of the season, seed of the Chantenay variety was sown on May 31, June 11, June 20, and July 3. Owing to dry weather the seed sown on May 31 did not germinate. The best yields, both for bunches, and for harvesting in the fall, were obtained from the June 11 seeding.

### CELERY—VARIETY TEST

The seed of fourteen varieties was sown in the hotbed on April 13, pricked out May 22, and transplanted in trenches on June 19. Bordeaux mixture was applied at intervals of ten days after transplanting until five applications were made. Solid White (Carter), Winter Queen (Graham), French Success (Harris), White Plume (Graham), Paris Golden Yellow (Dupuy & Ferguson), and New Emperor (Vaughan) in the order named gave the best yields.

### CELERY—BLANCHING EXPERIMENT

Golden Self Blanching (MacDonald) was planted (1) in a bed six by six feet with the plants six inches apart each way, (2) in single row planted on the level and blanched with earth, and (3) in trench and blanched with earth. The results are shown in the following table:—

CELERY—BLANCHING EXPERIMENT

| Method of planting and blanching | Weight of twelve heads | Crispness | Blanching and flavour |
|---|---|---|---|
| | lbs. | | |
| Grown in bed 6 by 6 ft. Plants 6 in. apart each way | 22·9 | Third best | Third best |
| Grown in single row. Planted on the level and blanched with earth | 32·1 | Second best | Second best |
| Grown in trench and blanched with earth | 20·7 | Best | Best |

### CABBAGE—VARIETY TEST

Seed of eleven varieties was sown in the hotbed on April 14, pricked out on May 4 and transplanted in the open on June 5. Four applications of corrosive sublimate (10 ounces to 10 gallons of water) were made at intervals of ten days after planting for the control of root maggots. Danish Ball Head

Intermediate (Harris), Marblehead Mammoth (Ewing), Succession (Ewing), Ex. Amager Danish Ball Head (Ottawa 2013), Danish Ball Head Solid Emperor Strain (Harris), and Danish Delicatesse Red (Dupuy & Ferguson) had the heaviest average heads.

### CABBAGE—DIFFERENT DATES OF PLANTING FOR STORAGE PURPOSES

In order to obtain data on the keeping quality of cabbage seeded at different dates, Copenhagen Market and Danish Ball Head varieties were seeded as shown in the following table. The results were as follows:—

CABBAGE—DIFFERENT DATES OF PLANTING FOR STORAGE PURPOSES

| Variety | Date sown | Date harvested | End of keeping period |
|---|---|---|---|
| Copenhagen Market | Sown in hotbed April 16 | Aug. 21 | Dec. 1 |
| " " | Sown outside June 1 | Sept. 14 | Jan. 1 |
| " " | " " 11 | Oct. 22 | " 31 |
| " " | " " 20 | " 22 | Feb. 15 |
| Danish Ball Head | Sown in hotbed April 16 | " 2 | On March 27 they were all showing a little rot on outside and beginning to grow. |
| " " | Sown outside June 1 | " 22 | |
| " " | " " 11* | " 22 | |
| " " | " " 20 | " 22 | |

*The June 11 planting was in the poorest condition.

The Copenhagen Market cabbage when started in the hotbed or when sown in the open as early as June 1, was ready for use before it was desirable to store, and when placed in storage, deteriorated rapidly.

### CAULIFLOWER—VARIETY TEST

Two varieties were planted but they did not develop heads.

### CUCUMBERS—VARIETY TEST

Seven varieties were planted on June 1. Cucumber beetles attacked the young plants very vigorously, but they were kept fairly well under control by dusting. Fordhook Famous, Boston Pickling (Livingston), Improved Long Green (MacDonald), Boston Pickling (Dupuy & Ferguson), and Early Russian, in the order named gave the largest yields.

### CORN—VARIETY TEST

Sixteen varieties were sown on June 29. The season was cold and unfavourable for the corn crop. It was therefore very late in the season before the corn was ready for use. Pickaninny (Ottawa) was the earliest. Early Malcolm (Ottawa 2584-6-12) can be recommended as an early variety of good quality. Golden Bantam Select (MacDonald) was the best flavoured variety.

### LETTUCE—VARIETY TEST

Sixteen varieties of lettuce were sown on May 25. Black Seeded Simpson (Harris) had the largest heads and is a good tender variety. All Heart (Dreer), New York Market (Graham), Grand Rapids (Carter), and Crisp as Ice (Wells) are very good quality lettuce.

### PEPPERS—VARIETY TEST

Two varieties of peppers were sown in the hotbed on April 13, and transplanted in the open on June 16. Harris Earliest (Harris) and Squash or Tomato (Harris) yielded in the order named. The climate here is too cold for good yields of peppers.

PARSNIPS—VARIETY TEST

Three varieties were planted on May 30. The yields were in the order named: Cooper Champion (Dupuy & Ferguson), Cooper Champion (Graham), and Hollow Crown (Ottawa 1919).

PUMPKINS—VARIETY TEST

Five varieties of pumpkins were planted on June 1. The yields were in the order named: Connecticut Field (MacDonald), Small Sugar (Graham), Winter Luxury (Graham), and King of Mammoth (Graham).

PEAS—VARIETY TEST

Twenty-three varieties of peas were planted in sixty-six-foot rows on May 28. Little Marvel (Rennie), Thos. Laxton (MacDonald), Alaska (Carter), Alaska (Dupuy & Ferguson), Eight Weeks (Carter), and Gregory Surprise (Gregory) were ready for use on July 25 and yielded in the order named. The heaviest yields were obtained from Lincoln (Sharpe), English Wonder (Ottawa 2347), English Wonder X Gradus (Ottawa 2338), Lincoln (Invermere), and Gradus (Ottawa 2348) in the order named. These varieties were ready for use between the 5th and 13th of August.

SWISS CHARD—VARIETY TEST

Two varieties were planted on May 30 in duplicate plots. One plot was kept cut throughout the season and the other plot was allowed to grow until September 19. White Silver (Rennie) gave a larger yield than Lucullus (Ewing) when the plots were kept cut throughout the season. The yields, however, were reversed when the plots were not cut until September 19.

SQUASH—VARIETY TEST

Six varieties were planted on June 1. Striped cucumber beetles did a good deal of damage when the young plants first came through the ground, but the beetles were kept fairly well under control by dusting with arsenate of lead and hydrated lime. The yields were in the order named: Delicious (Graham), Green Hubbard (Graham), Golden Hubbard (MacDonald), Mammoth Market Hubbard (Steele Briggs), Golden Hubbard (Ottawa 2910), and Kitchenette (Vaughan).

SALSIFY—VARIETY EXPERIMENT

Two varieties, viz., Long White (Ewing) and Mammoth Sandwich Island (Rennie), were planted, and yielded in the order named.

TOMATOES—VARIETY EXPERIMENT

Twenty varieties were planted in the hotbed on April 13, pricked out on April 30, and transplanted in the open on June 6. The young plants were set in rows four feet wide, four feet apart in the row, and they were not pruned or staked. On account of the coolness of the season very little ripe fruit was obtained until late in the season. The six varieties which gave the largest yield of ripe tomatoes up to September 15 were: Bonny Best Super Standard, Select Earliana, Burbank, Avon Early, Sparks Earliana, and Fifty Day in the order named. The following six varieties in the order named gave the largest total yield of ripe fruit: Fifty Day, Bonny Best Super Standard, Select Earliana, Sparks Earliana, Earliana, and Avon Early. Avon Early, Select Earliana, Alacrity Ottawa 3033, Sparks Earliana, Earliana, and Early Mascot, in the order named, gave the largest total yield.

## TOMATOES—METHOD OF TRAINING

In order to obtain data on the best method of training tomatoes to one stem Bonny Best and Alacrity tomatoes were planted in rows two feet apart, plants one foot apart in the row.

TRAINING TOMATOES

| Method of training | First ripe | Total ripe | Total green | Total crop |
|---|---|---|---|---|
| | | lbs. oz. | lbs. oz. | lbs. oz. |
| *Bonny Best*— | | | | |
| Single stem, not headed back | Sept. 5 | 72 7 | 55 4 | 127 11 |
| " stopped at 3rd truss fruit | Aug. 29 | 69 11 | 30 0 | 99 11 |
| " " 2nd " | Sept. 1 | 44 12 | 9 8 | 54 4 |
| " " 1st " | Aug. 25 | 15 14 | 4 1 | 19 15 |
| *Alacrity*— | | | | |
| Single stem, not headed back | Aug. 29 | 70 8 | 41 0 | 111 8 |
| " stopped at 3rd truss fruit | Sept. 1 | 76 6 | 18 4 | 94 10 |
| " " 2nd " | Aug. 25 | 50 0 | 6 6 | 56 6 |
| " " 1st " | " 21 | 22 10 | 0 0 | 22 10 |

The plants when not headed back gave practically the same total yield of ripe fruit as when stopped at third truss fruit. The plants which were not headed back, however, gave a much larger crop of green tomatoes. This season's work did not show any advantage in pruning back more than to one stem.

## POTATOES—STRAIN TEST

The variety test of potatoes carried on at this Station for the past ten years was discontinued this year. The varieties included in this experiment had become so badly infected with mosaic and leaf roll that very little could be gained by continuing it. Furthermore, the public demand was for good strains of Green Mountain and Irish Cobbler potatoes that were free from disease. In order to obtain data on the seed of these varieties all growers of certified seed in 1922 were asked to send a peck of their seed to this farm for a strain test. Seventeen lots of Irish Cobblers, thirty-eight of Green Mountains, one of Early Rose, and one of Brown's No. 1 were included in this test. They were planted June 16, in a clay loam that was fertilized with fifteen loads of barnyard manure and 1,128 pounds of 4.5-8-6 commercial fertilizer per acre. Each strain was planted in duplicate plots and carefully cultivated and sprayed during the growing season. Inspection was made by potato inspectors, and with a few exceptions they were comparatively free from disease. The results are shown in the accompanying table.

STRAIN TEST—IRISH COBBLERS

| Grower's Number | Grower's Address | Certified seed | Off type | Small | Total yield | Mosaic | Leaf roll | Foreign varieties | Total disease field inspection |
|---|---|---|---|---|---|---|---|---|---|
| | | bbl. | bbl. | bbl. | bbl. | per cent | per cent | per cent | per cent |
| No. 1 | St. Almo, N.B. | 111·10 | 14·93 | 22·89 | 148·92 | 0·5 | ..... | ..... | 0·5 |
| 2 | Florenceville, N.B. | 99·92 | 22·02 | 14·03 | 136·02 | 0·5 | ..... | ..... | 0·5 |
| 3 | Ft. Fairfield, Me. | 96·83 | 13·58 | 24·69 | 135·10 | ..... | ..... | ..... | ..... |
| 4 | Hartland, N.B. | 94·19 | 16·51 | 15·50 | 126·13 | ..... | ..... | ..... | ..... |
| 5 | Hartland, N.B. | 94·00 | 23·97 | 14·92 | 132·89 | ..... | ..... | ..... | ..... |
| 6 | Midgic, N.B. | 93·57 | 27·46 | 12·27 | 133·30 | ..... | ..... | ..... | ..... |
| 7 | Welsford, N.B. | 87·81 | 10·62 | 29·00 | 127·43 | ..... | ..... | ..... | ..... |
| 8 | Midgic, N.B. | 86·80 | 11·86 | 17·86 | 116·52 | 1·0 | ..... | ..... | 1·0 |
| 9 | Petit Rocher, N.B. | 85·10 | 27·25 | 14·69 | 127·13 | 4·5 | ..... | ..... | 4·5 |
| 10 | — N.B. | 84·88 | 19·52 | 22·03 | 126·43 | 2·0 | ..... | ..... | 2·0 |
| 11 | St. John, N.B. | 83·14 | 20·82 | 22·05 | 126·01 | ..... | ..... | ..... | ..... |
| 12 | Elm Tree, N.B. | 76·80 | 33·86 | 18·13 | 128·79 | 5·5 | ..... | 2·5 | 5·5 |
| 13 | Florenceville, N.B. | 76·24 | 23·31 | 18·77 | 118·32 | 6·0 | ..... | ..... | 6·0 |
| 14 | Woodstock, N.B. | 76·02 | 26·20 | 26·24 | 128·46 | ..... | 1·5 | ..... | 1·5 |
| 15 | Ft. Fairfield, Me. | 64·97 | 21·17 | 23·72 | 109·86 | ..... | 1·5 | ..... | 1·5 |
| 16 | Woodstock, N.B. | 58·06 | 18·83 | 23·04 | 99·93 | ..... | ..... | ..... | ..... |
| 17 | Middle Simms, N.B. | 57·03 | 21·90 | 24·75 | 103·68 | ..... | 1·0 | ..... | 1·0 |

STRAIN TEST—GREEN MOUNTAINS

| Grower's Number | Grower's Address | Certified Seed | | | Off type | Small | Total yield | Mosaic | Leaf roll | Foreign varieties | Total disease field inspection |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Good type | Fair type | Total certified | | | | | | | |
| | | bbl. | bbl. | bbl. | bbl. | bbl. | bbl. | per cent | per cent | per cent | per cent |
| No. 18 | River Charlo, N.B.... | 39·50 | 91·92 | 131·42 | 28·62 | 10·97 | 171·01 | ..... | ..... | ..... | ..... |
| 19 | Culligan, N.B..... | 56·20 | 74·60 | 130·80 | 33·38 | 12·38 | 176·56 | 0·5 | ..... | ..... | 0·5 |
| 20 | Oromocto, N.B..... | 56·26 | 73·02 | 129·28 | 40·11 | 11·21 | 180·60 | ..... | ..... | ..... | ..... |
| 21 | Belledune, N.B..... | 51·25 | 76·65 | 127·90 | 34·47 | 10·02 | 172·39 | ..... | ..... | ..... | ..... |
| 22 | River Charlo, N.B.... | 34·40 | 91·86 | 126·26 | 27·60 | 13·06 | 166·92 | ..... | 0·5 | ..... | 0·5 |
| 23 | Oromocto, R.R. No. 1 N.B. | 41·86 | 83·46 | 125·32 | 13·86 | 14·80 | 153·98 | ..... | ..... | ..... | ..... |
| 24 | Swan Creek, N.B..... | 59·05 | 63·48 | 122·53 | 59·86 | 11·36 | 193·75 | 0·5 | ..... | ..... | 0·5 |
| 25 | Belledune, N.B..... | 44·62 | 74·72 | 119·34 | 21·26 | 17·06 | 157·66 | ..... | ..... | ..... | ..... |
| 26 | New Mills, N.B..... | 48·62 | 69·82 | 118·44 | 23·60 | 13·00 | 155·04 | ..... | ..... | ..... | ..... |
| 27 | Arsenault Siding, N.B. | 50·88 | 67·51 | 118·39 | 33·20 | 15·00 | 166·59 | 0·5 | 1·5 | ..... | 2·0 |
| 28 | Charlo Station, N.B.. | 55·20 | 62·61 | 117·81 | 25·45 | 12·51 | 155·77 | 0·5 | ..... | ..... | 0·5 |
| 29 | Blacklands, N.B..... | 71·77 | 45·25 | 117·02 | 33·77 | 16·87 | 167·66 | 3·0 | ..... | ..... | 3·0 |
| 30 | Plaster Rock, N.B... | 57·60 | 58·66 | 116·26 | 37·33 | 10·93 | 164·52 | 10·5 | ..... | ..... | 10·5 |
| 31 | Millville, N.B..... | 57·62 | 57·99 | 115·61 | 30·86 | 12·05 | 158·52 | 5·0 | 0·5 | ..... | 5·5 |
| 32 | River Charlo, N.B.... | 58·65 | 56·93 | 115·58 | 29·39 | 11·10 | 156·07 | ..... | ..... | ..... | ..... |
| 33 | Mountain Brook, N.B. | 60·38 | 54·09 | 114·47 | 34·03 | 8·66 | 157·16 | 1·0 | ..... | ..... | 1·0 |
| 34 | Millville, N.B..... | 56·35 | 57·12 | 113·47 | 24·34 | 17·25 | 155·06 | 6·5 | ..... | ..... | 6·5 |
| 35 | Woodstock, N.B..... | 50·20 | 62·72 | 112·92 | 32·82 | 13·35 | 159·09 | 6·0 | ..... | ..... | 6·0 |
| 36 | Penobsquis, N.B..... | 53·50 | 59·00 | 112·50 | 35·10 | 13·50 | 161·10 | 0·5 | 1·0 | ..... | 1·5 |
| 37 | Penobsquis, N.B..... | 69·01 | 43·41 | 112·42 | 41·25 | 12·17 | 165·84 | 0·5 | ..... | ..... | 0·5 |
| 38 | Oromocto, N.B..... | 38·85 | 72·03 | 110·88 | 34·74 | 12·51 | 158·13 | ..... | 0·5 | ..... | 0·5 |
| 39 | Hartland, N.B..... | 45·97 | 64·76 | 110·73 | 30·79 | 14·78 | 156·30 | 1·0 | 0·5 | ..... | 1·5 |
| 40 | Swan Creek, N.B..... | 53·16 | 55·28 | 108·44 | 28·91 | 15·91 | 153·26 | ..... | ..... | ..... | ..... |
| 41 | Dalhousie, N.B..... | 43·47 | 62·61 | 106·08 | 40·31 | 13·86 | 160·25 | ..... | 0·5 | ..... | 0·5 |
| 42 | Oromocto, N.B..... | 46·41 | 56·57 | 102·98 | 35·72 | 14·30 | 153·00 | 0·5 | ..... | ..... | 0·5 |
| 43 | Durham Centre, N.B. | 46·50 | 55·64 | 102·14 | 29·67 | 18·85 | 150·66 | 16·0 | ..... | ..... | 16·0 |
| 44 | Fredericton, R.R. No. 1, N.B.. | 36·68 | 65·41 | 102·09 | 29·14 | 20·19 | 151·42 | ..... | 0·5 | ..... | 0·5 |
| 45 | Charlo Station, N.B.. | 33·41 | 67·79 | 101·20 | 50·13 | 14·71 | 166·04 | 3·5 | ..... | ..... | 3·5 |
| 46 | Millville, N.B..... | 49·68 | 51·46 | 101·14 | 39·56 | 13·40 | 154·10 | 24·5 | ..... | ..... | 24·5 |
| 47 | Burton, N.B..... | 37·86 | 62·40 | 100·26 | 24·26 | 16·93 | 141·45 | 0·5 | ..... | ..... | 0·5 |
| 48 | Swan Creek, N.B..... | 40·63 | 58·23 | 98·86 | 33·34 | 15·99 | 148·19 | ..... | ..... | ..... | ..... |
| 49 | River Charlo, N.B... | 44·84 | 52·53 | 97·37 | 46·92 | 10·35 | 154·64 | 0·5 | ..... | ..... | 0·5 |
| 50 | River Charlo, N.B... | 24·97 | 67·87 | 92·84 | 28·71 | 9·64 | 131·19 | 1·0 | ..... | ..... | 1·0 |
| 51 | Middle Sackville, N.B..... | 45·40 | 44·43 | 89·83 | 28·59 | 14·44 | 132·86 | 3·0 | ..... | ..... | 3·0 |
| 52 | Ft. Fairfield, Me..... | 39·33 | 45·06 | 84·39 | 40·13 | 12·13 | 136·65 | 1·5 | 0·5 | ..... | 2·0 |
| 53 | Florenceville, N.B.... | 49·27 | 32·22 | 81·49 | 19·61 | 16·58 | 117·68 | 85·0 | 1·0 | ..... | 86·0 |
| 54 | Reynolds, N.B..... | 29·40 | 46·80 | 76·20 | 13·80 | 16·20 | 106·20 | 85·0 | ..... | ..... | 85·0 |
| | *Deleware Variety*— | | | | | | | | | | |
| 55 | Inchby, N.B..... | 55·35 | 69·17 | 124·52 | 36·20 | 13·97 | 174·69 | 16·5 | ..... | ..... | 16·5 |
| | *Brown No. 1 Variety*— | | | | | | | | | | |
| 56 | R.R. No. 1, Lower Hainesville, N.B... | 70·93 | 63·60 | 134·53 | 31·06 | 9·06 | 174·65 | ..... | ..... | ..... | ..... |
| | *Early Rose Variety*— | | | | | | | | | | |
| 57 | Kedgewick, N.B... | 66·12 | 33·37 | 99·49 | 25·20 | 22·67 | 147·36 | 15·0 | 1·5 | ..... | 16·5 |

**Those wishing to know the name of the grower of any particular lot may obtain the same by writing to the Superintendent, Experimental Station, Fredericton, N.B.**

## POTATOES—COST OF PRODUCTION

One acre of Green Mountain potatoes was planted on June 15 to determine the cost of production. The soil was a medium clay loam with considerable small stone in it. It had been ploughed the previous fall, and was ploughed again in the spring. Barnyard manure at the rate of 16 tons per acre, and 4.5-8-6 fertilizer at the rate of 13,536 pounds per acre were applied in the spring for the potato crop.

The cost of production per acre was as follows:—

| | |
|---|---|
| Fall ploughing, 11·8 hours at 49c. per hour | $ 5.78 |
| Manure | 6.40 |
| Spring ploughing, 7·45 hours at 49c. per hour | 3.65 |
| Harrowing, 2·9 hours at 49c. per hour | 1.42 |
| Nitrate of soda, 225·3 lbs. at $3·095 per cwt | 6.97 |
| Sulphate of ammonia, 135·3 lbs. at $3·845 per cwt | 5.20 |
| Share of acid phosphate, 256·2 lbs. at $1·095 per cwt | 2.80 |
| Muriate of potash, 162·4 lbs. at $1·845 per cwt | 2.99 |
| Cost of mixing fertilizer | 1.00 |
| Seed, 7½ barrels at $3 per barrel | 22.50 |
| Cutting and disinfecting seed | 2.25 |
| Planting, 5 hours at 49c.; 5 hours at 25c | 3.70 |
| Cultivating (3), 6 hours at 37c. per hour | 2.22 |
| Horse hoeing (3), 4½ hours at 49c. per hour | 2.20 |
| Spraying, 5 applications | 11.72 |
| Digging, 4 hours at 49c. per hour | 1.96 |
| Picking, 50 hours at 25c. per hour | 12.50 |
| Hauling, 5 hours at 49c. per hour | 2.45 |
| Rent of land | 3 00 |
| Use of machinery | 3 00 |
| Total cost per acre | 103.71 |

Yield per acre, 20,130 lbs. (122 bbl.) marketable potatoes, and 1,485 lbs. (9 bbl.) small potatoes.

Cost per bbl. of 165 lb. small potatoes neglected was $ 0.85

POTATO—DIFFERENT DATES OF PLANTING TO OBTAIN BEST YIELD

In order to obtain information on the date of planting potatoes that will give the best yield, Green Mountain and Irish Cobbler potatoes were planted on the dates shown in the following table. The soil was a sand loam that had been in potatoes the two previous years. Barnyard manure at the rate of fifteen tons per acre, and 4.5-8-6 commercial fertilizer at the rate of 1,128 pounds per acre, were applied for this crop. The results were as follows:—

POTATO—DIFFERENT DATES OF PLANTING TO OBTAIN BEST YIELD

| Variety | Date planted | Yield per acre | | |
|---|---|---|---|---|
| | | Marketable | Small | Total |
| | | lbs. | lbs. | lbs. |
| Irish Cobbler | May 26 | 20,301·5 | 2,197·5 | 22,499·0 |
| " | June 5 | 19,758·5 | 2,597·5 | 22,356·0 |
| " | " 15 | 12,994·5 | 3,012·0 | 16,006·5 |
| " | " 25 | 9,663·0 | 4,623·0 | 14,286·0 |
| Green Mountain | May 26 | 33,797·0 | 1,919·0 | 35,716·0 |
| " | June 25 | 22,038·0 | 2,090·0 | 24,128·0 |

The average yield of marketable potatoes over a period of three years, from potatoes planted the last week in May, was 19,846.1 pounds per acre for early varieties, and 23,241.6 pounds per acre for the later maturing varieties. The average yield from plantings of the same varieties made the last week in June was 11,229.6 pounds per acre for early varieties, and 12,403.6 pounds per acre for late varieties. It would therefore seem that May plantings give best results for both early and late varieties.

POTATOES—DISTANCES OF PLANTING

In order to determine the distance apart of potato rows that will give the best yield of marketable potatoes the experiment begun in 1922 was continued this year. The land used was a clay loam manured with fifteen tons of barnyard manure and 1,128 pounds of 4.5-8-6 commercial fertilizer per acre. The

Green Mountain variety was used, and sets were planted twelve inches apart in the row. They were planted on June 15. The crop was free from mosaic and leaf roll. The results were as follows:—

POTATOES—DISTANCES OF PLANTING

| Distance between rows | Yield per acre, 1923 | | | Number of years grown | Average yield per acre | |
|---|---|---|---|---|---|---|
| | Marketable | Small | Total | | Marketable | Total |
| ft. | lbs. | lbs. | lbs. | | lbs. | lbs. |
| 2 | 27,967·5 | 3,465·0 | 31,432·5 | 2 | 23,634·75 | 25,775·25 |
| 2½ | 25,080·0 | 2,178·0 | 27,258·0 | 3 | 19,119·00 | 20,724·00 |
| 3 | 20,020 | 2,145·0 | 22,165·0 | 3 | 17,286·30 | 18,620·30 |
| 3½ | 19,368·3 | 1,366·6 | 20,734·9 | 2 | 15,369·15 | 16,451·45 |

The results obtained show that the yields per acre of both marketable and small potatoes decrease as the distance between the rows increases.

## POTATOES—FEW OR MANY CULTIVATIONS

In order to determine the amount of cultivation necessary for a growing crop of potatoes, four plots of Green Mountain potatoes were cultivated once, twice, three and four times respectively. The land was similar and received the same treatment as the land in the previous experiment. The potatoes were planted on June 15. The results were as follows:—

POTATOES—FEW OR MANY CULTIVATIONS

| Number of cultivations | Yield per acre | | | Number of years grown | Average yield per acre | |
|---|---|---|---|---|---|---|
| | Merchantable | Small | Total | | Merchantable | Total |
| | lbs. | lbs. | lbs. | | lbs. | lbs. |
| 4 | 20,856 | 2,244 | 23,100 | 2 | 16,320 | 17,943 |
| 3 | 20,724 | 2,442 | 23,166 | 2 | 16,719 | 18,480 |
| 2 | 17,688 | 1,848 | 19,536 | 2 | 15,882 | 17,508 |
| 1 | 19,602 | 2,310 | 21,912 | 2 | 16,335 | 18,114 |

The results obtained indicate that on a wet year like 1922, one cultivation will give as good results. On a dry year like 1923 a larger number of cultivations is necessary. While there was a slightly larger yield for four cultivations than three, the fourth cultivation was not economical.

## POTATOES—SPROUTED VERSUS UNSPROUTED FOR EARLINESS

An experiment was carried on to determine if potatoes sprouted in subdued light at a temperature of between 40 degrees and 50 degreees F. would give better results for seed purposes than potatoes kept as dormant as possible. Green Mountain and Irish Cobbler potatoes were taken out of the cellar on April 9, and spread out on a table in a room where the temperature ran from 40 degrees to 50 degrees. No sunlight was allowed in this room. These potatoes grew short, thick, green sprouts, and were planted on May 26. On the same date a duplicate planting was made of the same strain of potatoes taken direct from the cellar. The soil was a sandy loam, manured with fifteen tons of barnyard manure and 1,128 pounds of 4.5-8-6 commercial fertilizer per acre. The results were as follows:—

POTATOES—SPROUTED VERSUS UNSPROUTED FOR EARLINESS

| Variety | Date dug | With sprouts — Yield per acre | | | Without sprouts — Yield per acre | | |
|---|---|---|---|---|---|---|---|
| | | Marketable | Small | Total | Marketable | Small | Total |
| | | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Irish Cobblers | Aug. 9.. | 14,549 | 2,962 | 17,511 | 10,628 | 2,090 | 12,718 |
| " | " 16.. | 16,931 | 3,373 | 20,304 | 12,134 | 2,740 | 14,874 |
| " | Sept. 17.. | 16,455 | 5,221 | 21,676 | 15,796 | 2,919 | 18,715 |
| Green Mountains | Aug. 31.. | 21,906 | 1,905 | 23,811 | 20,410 | 1,685 | 22,095 |
| " | Oct. 12.. | 33,808 | 1,608 | 35,416 | 26,665 | 1,854 | 28,519 |

The results obtained show that sprouted potatoes will give larger yields. On account of the labour involved, however, it is doubtful if it would be feasible to sprout them on a commercial scale.

POTATOES—SMALL VERSUS LARGE FOR SEED PURPOSES

In order to determine the size of seed potatoes that will give the best results for seed purposes an experiment was carried on as follows: (1) Small potatoes weighing an average of 1.5 ounces were planted whole. (2) Small potatoes called seconds, weighing an average of three ounces, were planted whole or cut in two. (3) Large potatoes weighing an average of eight ounces were planted whole, and cut in sets of the usual size. The soil was a medium clay loam. It was given an application of fifteen tons of barnyard manure and 1,128 pounds of 4.5-8-6 commercial fertilizer. Green Mountain potatoes were planted June 15. The crop was free from mosaic and leaf roll. The results are shown in the following table:—

POTATOES—SMALL VERSUS LARGE FOR SEED PURPOSES

| Size of potatoes | Treatment | Yield per acre, 1923 | | | Average yield per acre for two years | | |
|---|---|---|---|---|---|---|---|
| | | Marketable | Small | Total | Marketable | Small | Total |
| | | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Small | Planted whole | 13,200 | 4,224 | 17,424 | ..... | ..... | ..... |
| Seconds | Cut in two | 15,048 | 2,244 | 17,292 | 18,699 | 2,292 | 20,991 |
| Large | Cut in sets | 11,880 | 1,980 | 13,860 | 16,299 | 1,611 | 17,910 |
| Seconds | Planted whole | 20,328 | 2,640 | 22,968 | 22,686 | 2,256 | 24,942 |
| Large | Planted whole | 19,272 | 4,224 | 23,496 | 21,369 | 3,612 | 24,981 |

It will be noted that the seconds, planted whole, gave the largest yield of marketable potatoes. When cut in two they gave larger yields than larger potatoes cut in sets. As potatoes of this size, viz. 3 ounces, are not marketable in large quantities it would seem advisable to use them for seed. As the potatoes used both years in this experiment were entirely free from disease, the small size of the seconds was not due to disease.

POTATO—STUDY OF TYPES

In any variety of potatoes there is considerable variation from the typical type for that variety. In order to determine if these deviations from the typical type reproduce their own type or rather the general type, the following experiment was begun. Green Mountain seed of the following types was selected and planted June 15—typical oblong type, round type, pointed at

seed end, pointed at stem end, and wasp waisted. These were grown in a clay loam that contained considerable small stone. Barnyard manure at the rate of 15 tons, and 4.5-8-6 commercial fertilizer at the rate of 1,128 pounds per acre, were applied for the crop. At the time of harvesting the potatoes grown from these different types were graded into the above groups, and the percentage of the different types calculated, first, by weight and second, by count. The results were as follows:—

STUDY OF TYPES OF POTATOES—GRADING RESULTS, BY WEIGHT

| Types of potatoes used for seed | Percentage by weight | | | | | | |
|---|---|---|---|---|---|---|---|
| | Typical Green Mountain | Round type | Pointed seed end | Pointed stem end | Wasp waisted | Otherwise off type | Small |
| | % | % | % | % | % | % | % |
| Good Green Mountain type.. | 29·15 | 24·21 | 15·24 | 5·83 | 0 | 13·91 | 11·66 |
| Round Green Mountain type. | 28·43 | 23·77 | 12·40 | 7·49 | 0 | 12·40 | 15·51 |
| Pointed seed end | 25·24 | 17·72 | 23·00 | 4·37 | 0 | 14·68 | 14·99 |
| Pointed stem end | 26·16 | 25·81 | 20·68 | 2·39 | 0 | 12·31 | 12·65 |
| Wasp waisted | 28·67 | 21·03 | 19·92 | 3·91 | 0 | 14·67 | 11·80 |

STUDY OF TYPES OF POTATOES—GRADING RESULTS BY COUNT

| Types of potatoes used for seed | Percentage by count | | | | | | |
|---|---|---|---|---|---|---|---|
| | Typical Green Mountain | Round type | Pointed seed end | Pointed stem end | Wasp waisted | Otherwise off type | Small |
| | % | % | % | % | % | % | % |
| Good Green Mountain type.. | 20·37 | 23·42 | 10·97 | 5·70 | 0 | 11·0 | 28·72 |
| Round Green Mountain type. | 19·30 | 21·40 | 9·77 | 6·28 | 0 | 9·53 | 33·72 |
| Pointed seed end | 17·50 | 16·41 | 15·12 | 4·75 | 0 | 11·01 | 35·21 |
| Pointed stem end | 17·65 | 25·00 | 12·65 | 3·23 | 0 | 8·24 | 33·23 |
| Wasp waisted | 21·96 | 22·20 | 12·89 | 3·34 | 0 | 10·26 | 29·35 |

The yield obtained from the different types was as shown in the following table.

STUDY OF TYPES OF POTATOES—YIELD

| Types of potatoes used for seed | Yield per acre | | |
|---|---|---|---|
| | Merchantable | Small | Total |
| | lbs. | lbs. | lbs. |
| Good Green Mountain type | 17,336·0 | 2,288·0 | 19,624·0 |
| Round Green Mountain type | 15,153·7 | 2,780·0 | 17,933·7 |
| Pointed seed end | 16,059·8 | 2,831·4 | 18,891·2 |
| Pointed stem end | 11,715·3 | 1,696·5 | 13,411·9 |
| Wasp waisted | 16,897·1 | 2,259·9 | 19,157·0 |

This experiment will be continued next year. The seed used will be obtained, when possible, from potatoes produced from each type in order to determine if there are any accumulative effects.

## CEREAL HUSBANDRY

The experimental work for the season included retesting the varieties of spring cereals tested the previous year, testing one new variety of spring wheat, testing ten strains of Banner oats, testing rates of seeding and dates of sowing Banner oats, testing rates of seeding Marquis wheat, and testing various mixtures of wheat, barley and oats. All the grain used was treated with formalin solution (one pint to thirty gallons of water). Plots were one-sixtieth of an acre.

### SPRING WHEAT

Seven varieties of spring wheat were tested this year. There was only one plot of Charlottetown No. 123. All the others were grown in triplicate. Charlottetown No. 123 was obtained from the Charlottetown Station this spring. It is a very promising variety and gave the highest yield. It does not, however, show much uniformity of type. A small amount of Glume Spot was found, but no Wheat Scab or Loose Smut was noted on the plots generally. These were sown on May 28 at the rate of 127 pounds per acre. The following table gives the average yield:—

SPRING WHEAT—VARIETY TEST

| Name of variety | Date of ripening | Number of days maturing | Average length of straw, including head | Strength of straw on scale of 10 points | Yield of grain per acre | Yield of grain per acre | Weight per measured bushel after cleaning |
|---|---|---|---|---|---|---|---|
| | | | inch | | lbs. | bush. lbs. | lbs. |
| Charlottetown No. 122 | Sept. 25 | 120 | 40·0 | 10·0 | 1,620 | 27 0 | 62·0 |
| White Russian | Oct. 2 | 127 | 44·0 | 8·8 | 1,592 | 26 32 | 61·7 |
| Early Russian, Ottawa 40 | Sept. 24 | 119 | 36·6 | 6·6 | 1,522 | 25 22 | 63·1 |
| Early Red Fife, Ottawa 16 | " 25 | 120 | 36·6 | 9·2 | 1,508 | 25 8 | 63·2 |
| Huron, Ottawa 3 | " 24 | 119 | 40·3 | 9·8 | 1,414 | 23 34 | 62·8 |
| Marquis, Ottawa 15 | " 19 | 114 | 38·0 | 9·6 | 1,295 | 21 35 | 62·7 |
| Ruby, Ottawa 623 | " 7 | 102 | 34·6 | 8·2 | 1,126 | 18 46 | 62·7 |

For the varieties grown the past five years, the average yield per acre has been as follows: White Russian, 22 bushels and 52 pounds; Huron, 20 bushels and 28 pounds; Early Red Fife, 18 bushels and 53 pounds; Ruby, 18 bushels and 42 pounds; and Marquis, 18 bushels and 4 pounds.

*Rates of Seeding.*—In order to ascertain which rate of seeding gives the largest yield of grain under New Brunswick conditions, one-sixtieth acre plots were sown in duplicate with Marquis wheat on May 28, at the rate of one and one half to two and a half bushels per acre. The results are shown in the following table:—

MARQUIS WHEAT—RATES OF SEEDING

| Rate of seeding | Date of ripening | Number of days maturing | Average length of straw including head | Strength of straw on scale of 10 points | Yield of grain per acre | Yield of grain per acre | Weight per measured bushel after cleaning |
|---|---|---|---|---|---|---|---|
| bush. | | | inch | | lbs. | bush. lbs. | lbs. |
| 1½ | Sept. 24 | 109 | 37·0 | 9·5 | 1,395 | 23 15 | 62·5 |
| 2 | " 24 | 109 | 37·0 | 9·5 | 1,582 | 26 22 | 62·6 |
| 2½ | " 24 | 109 | 35·5 | 9·5 | 1,515 | 25 15 | 62·6 |

*Deductions.*—The rate of seeding varies inversely with the fertility of the soil. Thus, in the range of plots which were on fertile land, the lightest seeding gave the highest yield; while on the other range which were on rather light land, the heaviest seeding gave the largest yield. The average of both ranges of plots, however, shows that two bushels per acre gave the highest average yield. Therefore judging from this year's test, this rate appears best adapted to average New Brunswick conditions.

## OATS

Five varieties of oats were tested. Victory oats again led all varieties. In 1920 Daubeney, Ligowa and Liberty gave heavier yields than Victory. The other eight years Victory gave heavier yields than any other variety. This is a good plump oat and appears to be well adapted to New Brunswick. Daubeney is an early oat, but is a light yielder and makes a very poor appearance. It is therefore questionable if it has any economic importance in this district. The oats were sown on May 29 at the rate of 107 pounds per acre.

OATS—VARIETY TEST

| Name of variety | Date of ripening | Number of days maturing | Average length of straw including head | Strength of straw on scale of 10 points | Yield of grain per acre | Yield of grain per acre | Weight per measured bushel after cleaning |
|---|---|---|---|---|---|---|---|
| | | | inch | | lbs. | bush. lbs. | lbs. |
| Victory | Sept. 9 | 103 | 43·0 | 8·8 | 2,609 | 76 25 | 40·4 |
| Banner, Ottawa 49 | " 11 | 105 | 42·3 | 8·0 | 2,425 | 71 11 | 39·5 |
| Gold Rain | " 7 | 101 | 41·6 | 8·5 | 2,256 | 66 12 | 41·4 |
| Daubeney, Ottawa 47 | Aug. 27 | 90 | 33·6 | 7·8 | 1,774 | 52 6 | 36·7 |
| *Liberty, Ottawa 480 | Sept. 5 | 99 | 41·3 | 8·6 | 1,313 | 38 21 | 50·7 |

*The Liberty is a hulless variety of oats, but is estimated at thirty-four pounds per bushel.

For the varieties grown the past five years, the average yield per acre has been as follows: Victory, 60 bushels and 23 pounds; Banner, 57 bushels and 5 pounds; Daubeney, 45 bushels and 27 pounds; and Liberty, 38 bushels and 29 pounds.

### BANNER OATS—STRAIN TEST

This Station, in common with the Seed Branch, has been recommending Banner oats for New Brunswick. In the last nine years, however, Victory has surpassed in yield the strain of Banner oats we have been growing at this Station, viz., Banner Ottawa 49. Before changing our policy and recommending Victory, it was decided to test out a number of strains of Banner to ascertain if any of these would give larger yields than Victory under New Brunswick conditions. Nine new strains of Banner were accordingly procured this season and tested under the same conditions as our Banner and Victory oats. None of the strains procured, however, gave as large a yield as Banner Ottawa 49, which was surpassed in yield by Victory. The plots were sown on May 29 at the rate of 107 pounds per acre.

BANNER OATS—STRAIN TEST

| Name of Strain of Banner | Number of plots | Date of ripening | Number of days maturing | Average length of straw including head | Strength of straw on scale of 10 points | Yield of grain per acre | Yield of grain per acre | Weight per measured bush. after cleaning |
|---|---|---|---|---|---|---|---|---|
| | | | | | | lbs. | bush. lbs. | lbs. |
| Ottawa 49 | 2 | Sept. 11 | 105 | 42·3 | 8·00 | 2,425 | 71 11 | 39·5 |
| Cap Rouge | 2 | " 8 | 102 | 43·0 | 9·50 | 2,339 | 68 27 | 40·6 |
| Dixon | 2 | " 15 | 109 | 47·5 | 8·00 | 2,334 | 68 22 | 38·2 |
| McDonald 4407 | 2 | " 11 | 105 | 40·5 | 8·75 | 2,243 | 65 33 | 40·6 |
| Langille | 2 | " 9 | 103 | 45·0 | 7·75 | 2,150 | 63 8 | 40·5 |
| Waugh | 1 | " 10 | 104 | 48·0 | 8·00 | 2,135 | 62 27 | 39·2 |
| Mitchell | 2 | " 10 | 104 | 46·0 | 9·00 | 2,101 | 61 27 | 40·0 |
| McColm | 2 | " 13 | 107 | 42·5 | 8·75 | 1,882 | 55 12 | 41·3 |
| Moore | 1 | " 19 | 113 | 40·0 | 8·50 | 1,775 | 52 7 | 40·2 |
| Dow | 1 | " 19 | 113 | 40·0 | 9·50 | 1,382 | 40 22 | 39·0 |

RATES OF SEEDING

The experiment on rates of seeding oats begun in 1922, was continued in 1923. The object of this experiment is to ascertain the rate of seeding which will give the largest yield of grain and of straw under New Brunswick conditions. One-sixtieth-acre plots were sown in duplicate with Banner oats on May 29, at the rate of two to four bushels per acre. The following table gives the average yield of grain and straw for each rate of seeding:—

OATS—RATES OF SEEDING

| Rates of Seeding | Average yield of grain per acre | Average yield of grain per acre | Weight per measured bushel after cleaning | Average yield of straw per acre |
|---|---|---|---|---|
| | lbs. | bush. lbs. | | tons lb. |
| 2 | 1,935 | 56 31 | 38·7 | 2 1,235 |
| 2·5 | 2,220 | 65 10 | 40·5 | 3 374 |
| 3 | 1,837 | 54 1 | 40·1 | 2 874 |
| 3·5 | 1,710 | 50 10 | 40·3 | 2 110 |
| 4 | 2,137 | 62 29 | 39·4 | 2 1,820 |

DATES OF SEEDING

The experiment on dates of seeding was begun in 1922 and continued in 1923. The object of this experiment was to ascertain which date for seeding oats would give the maximum yield of grain and of straw. One-sixtieth-acre plots were sown with Banner oats at the rate of 107 pounds per acre on three different dates. The following table gives the yield of grain and straw at different dates of seeding for 1922 and 1923:—

OATS—DATES OF SEEDING

| Dates of Seeding | Yield of grain per acre | Yield of grain per acre | Yield of straw per acre |
|---|---|---|---|
| | lbs. | bush. lbs. | tons lbs. |
| May 11, 1922 | 2,430 | 71 16 | 3 360 |
| May 23, 1922 | 1,950 | 57 12 | 2 1,430 |
| June 5, 1922 | 1,580 | 45 30 | 2 1,580 |
| May 30, 1923 | 1,320 | 38 28 | 2 1,190 |
| June 8, 1923 | 1,170 | 34 14 | 2 320 |
| June 17, 1923 | 2,280 | 67 2 | Lodged badly |

## BARLEY

Eight varieties of barley were tested this year. Early Chevalier gave the highest yield. The yield over a term of years, however, indicates that Charlotttetown No. 80 is a slightly heavier yielder. O.A.C. 21 gave a very poor yield this year. This barley also gave a poor yield in 1921. In the other years, however, it has given fair yields. The heads of Himalayan barley have too great a tendency to break off. It is doubtful for this reason if it has any economic importance in this district. The plots were sown on May 28 at the rate of 117 pounds per acre.

BARLEY—VARIETY TEST

| Name of Variety | Date of ripening | Number of days maturing | Average length of straw including head | Strength of straw on scale of 10 points | Yield of grain per acre | Yield of grain per acre | | Weight per measured bush. after cleaning |
|---|---|---|---|---|---|---|---|---|
| | | | inch. | | lbs. | bush. | lbs. | lbs. |
| Early Chevalier Ottawa 51... | Aug. 26 | 90 | 38·6 | 10·0 | 2,041 | 42 | 25 | 52·3 |
| Charlottetown No. 80..... | Sept. 5 | 100 | 30·6 | 10·0 | 2,006 | 41 | 38 | 53·5 |
| Chinese, Ottawa 60..... | Aug. 28 | 92 | 33·3 | 9·8 | 1,968 | 41 | 0 | 49·0 |
| *Gold..... | Sept. 5 | 100 | 29·0 | 10·0 | 1,642 | 34 | 10 | 53·3 |
| Stella, Ottawa 58..... | Aug. 28 | 92 | 35·3 | 10·0 | 1,621 | 33 | 37 | 49·6 |
| Duckbill, Ottawa 57..... | Aug. 31 | 95 | 40·6 | 10·0 | 1,509 | 31 | 21 | 51·4 |
| Himalayan, Ottawa 59..... | Aug. 23 | 87 | 28·3 | 8·0 | 1,404 | 29 | 12 | 60·7 |
| O.A.C. 21..... | Aug. 29 | 93 | 36·0 | 10·0 | 1,363 | 28 | 17 | 50·7 |

*Only two plots of Gold were harvested.

For the varieties grown the past five years, the average yield per acre has been as follows: Early Chevalier, 35 bushels, 37 pounds; O.A.C., 33 bushels, 2 pounds; Stella, 32 bushels, 32 pounds; Gold, 29 bushels, 42 pounds.

## GRAIN MIXTURES

An experiment with various combinations of wheat, oats and barley was begun in 1923. The object of this experiment was to test out the value of grain mixtures under New Brunswick conditions in order to ascertain, (1) if it is possible to grow bigger crops of grain by growing them in combination, (2) which is the most desirable combination of these grains, and (3) which varieties can be combined to the best advantage. In each of the mixtures the grains were combined in equal parts by weight. The plots were sown on May 30 at the rate of three bushels per acre for the mixture of wheat, oats and barley, and the mixture of oats and barley. The mixture of wheat and oats was seeded at the rate of 138 pounds per acre.

GRAIN MIXTURES

| Grain Mixtures | Date of ripening | Number of days maturing | Yield per acre | Average yield per acre of same grains sown separately | Increased yield over grain sown separately |
|---|---|---|---|---|---|
| | | | lbs. | lbs. | lbs. |
| White Russian wheat, Banner oats (Waugh), Charlottetown No. 80 barley..... | Sept. 14 | 107 | 2,100 | 1,911 | 189 |
| Banner oats (Waugh), Charlottetown No. 80 barley..... | " 11 | 104 | 1,830 | 2,070 | 240 |
| Early Russian wheat, Banner oats (Waugh)... | " 14 | 107 | 1,980 | 1,828 | 152 |

In all the mixtures used the grain ripened uniformly.

## WINTER GRAINS

In the fall of 1922 six varieties of winter wheat and two varieties of winter rye were sown in duplicate one-thirtieth-acre plots. The winter was very severe and the plots were all winter killed. They were ploughed up in the spring and the land sown in oats. The land at this Station heaves badly with the frost, and for this reason winter grains do not do well. This condition, however, does not obtain on the average New Brunswick farm and therefore our experience with winter grains is by no means conclusive.

## PEAS

Four varieties of peas were tested. Good stands were secured, but the yields were much below average. Owing to the late spring and cool summer the peas matured slowly. As they were shelling out they were all harvested on October 6. McKay Ottawa 25, gave a low yield this year, but it has given us much better yields for a number of years than any of the other varieties. The seed of this variety was not pure and the yield was decreased this year by removing the off-type plants. They were sown on May 31 at the rate of 120 pounds per acre.

PEAS—VARIETY TEST

| Name of Variety | Length of straw including pod | Length of pod | Yield of grain per acre | Yield of grain per acre | Weight per measured bushel after cleaning | Condition of crop at time of harvesting |
|---|---|---|---|---|---|---|
| | inch. | inch. | lbs. | bush. lbs. | lbs. | |
| Arthur, Ottawa 18 | 43 | 1·80 | 1,000 | 16 40 | 65·2 | Ripe. |
| Canadian Beauty | 68 | 2·25 | 950 | 15 50 | 64·3 | Green in spots. |
| *McKay, Ottawa 25 | 54 | 2·50 | 880 | 14 40 | 64·0 | 95% ripe. |
| Prussian Blue | 52 | 2·00 | 850 | 14 10 | 64·8 | 95% ripe. |

For the varieties grown the past five years, the average yield has been as follows: Arthur, 19 bushels and 27 pounds; Canadian Beauty, 17 bushels and 24 pounds; Prussian Blue, 16 bushels and 44 pounds.

## BEANS

Nine varieties of beans were retested this year. They were sown on June 1 in triplicate in one-hundredth-acre plots. The stand was good, but owing to the cool summer the beans matured slowly. They ripened unevenly and were all badly infected with Anthracnose. Large White and Carleton were badly infected, Carleton being so badly infected that they were worthless. The White Marrowfat and Yellow Eye were infected to a slightly less extent than the other varieties. The last two years the beans at the Station have been badly infected with Anthracnose. Varieties of beans must be early and comparatively immune to Anthracnose in order to have any economic importance in this district. They were all harvested on October 4 and dried on racks in the field. The drills were thirty inches apart and the seeding was at the rate of sixty pounds per acre.

BEANS—VARIETY TEST

| Name of variety | Percentage ripe | Average length of straw including pod | Average length of pod | Yield per acre | Yield per acre | Weight per measured bushel after cleaning |
|---|---|---|---|---|---|---|
| | | inch. | inch. | lbs. | bush. lbs. | |
| Norwegian, Ottawa 710 | 81 | 14 | 5·0 | 1,806 | 30 6 | 62·1 |
| Navy, Ottawa 711 | 60 | 16 | 3·9 | 1,538 | 25 38 | 64·1 |
| White Pea | 53 | 19 | 3·6 | 1,524 | 25 24 | 64·4 |
| White Marrowfat | 71 | 14 | 5·1 | 1,279 | 21 19 | 63·3 |
| Yellow Eye (Kentville) | 66 | 15 | 5·0 | 1,275 | 21 15 | 65·4 |
| Soldier | 70 | 12 | 6·1 | 903 | 15 3 | 64·0 |
| Beauty, Ottawa 712 | 85 | 14 | 3·9 | 861 | 14 21 | 65·5 |
| Large White, Ottawa 713 | 75 | 16 | 3·8 | 746 | 12 26 | 64·8 |
| Carleton, Ottawa 718 | 78 | 14 | 3·7 | 564 | 9 24 | 59·9 |

## FORAGE CROPS

The slow, steady rains of the preceding fall thoroughly saturated the soil and sub-soil. The winter was severe and there was a good depth of snow, but owing to the high winds the ground was very unevenly covered. This caused a large amount of winter killing of clover and alfalfa. The spring was late and cool and the land dried slowly. The summer was cool and dry. Owing to the late spring and cool, dry summer, mangels, sugar beets, corn and carrots were exceptionally poor crops. Turnips and grass were fair crops. The stands of clover and alfalfa were rather poor. All the work carried on the previous year was continued.

### FIELD ROOTS

The land on which the field roots (swede, turnips, mangels, carrots and sugar beets) were grown was a uniform, stony, clay with a clay sub-soil, in a rather low state of fertility. The sod, which was two-year-old timothy, was ploughed, rolled and harrowed in August 1922. It was ploughed again in the late fall and manured in the spring at the rate of fifteen tons per acre of barnyard manure. As the land was rather compact for roots, it was ploughed again in the spring and given a broadcast application of 1,128 pounds of a 4.5-8-6 home-mixed fertilizer per acre. The land was in splendid tilth when the crops were sown, but became rather compact during the summer.

### SWEDE AND TURNIP VARIETY TEST

Twenty-seven varieties of swedes and three varieties of turnips were sown on June 14 in duplicate one-hundredth acre plots. The stands were good. The roots were pulled on October 23. An attempt was made to get the dry matter contents but owing to lack of suitable drying equipment, the turnips fermented while being dried. The yields were as follows:—

SWEDES AND TURNIPS

| Variety | Source of seed | Average yield per acre | Per cent stand | Remarks |
|---|---|---|---|---|
| | | tons lbs. | | |
| Magnum Bonum... | Ewing | 35 1,019 | 64·8 | Long globe to short oval. Purple top to dark bronze. Lacks uniformity. Rough but free from roots. Twenty-five per cent off type. |
| Bangholm Lyngby B.L. 318. | Danske Landboforeningers Fro forsyning, Roskilde. | 31 1,385 | 70·5 | Oval purple top, tapers to top. Clean roots and easy to pull. Fourteen per cent off type. |

SWEDES AND TURNIPS—*Concluded*

| Variety | Source of seed | Average yield per acre | Per cent stand | Remarks |
|---|---|---|---|---|
| | | tons lbs. | | |
| New Century | Rennie | 31 552 | 74·1 | Short oval, purple top. Fairly clean roots. Nine per cent off type. |
| *Yellow Tankard B. L. 351. | Danske Landboforeningers Fro forsyning, Roskilde. | 30 1,925 | 86·8 | Long green turnip, flesh soft and pulpy, most of the roots very smooth. Easy to pull. Seven per cent off type. |
| Bangholm Pajbjerg V No. 7022. | Trifolium 16 Denmark | 29 194 | 78·7 | Purple top, long globe or short oval. Fairly uniform. Seven per cent off type. |
| Best of All | Rennie | 29 50 | 75 | Long globe. Purple top. Fifteen per cent off type. |
| Best of All | Ewing | 26 674 | 68·9 | Globe to oval. Purple top. Clean roots, not uniform. Twenty-five per cent off type. |
| *Fynsk Bortfelder Parti 2660. | Danske Lanboforeningers Fro forsyning, Roskilde. | 26 93 | 95·7 | White, round turnip, large size. Flesh white and pulpy. Twelve per cent off type. |
| Selected Magnum Bonum. | Rennie | 26 28 | 82·7 | Short oval to globe. Purple top. Twelve per cent off type. |
| Swede Shepherd No. 2056. | Trifolium 16 Denmark | 25 1,902 | 79·2 | Globe. Green top. Large, mostly clean and easy to pull. Eighteen per cent off type. |
| Bangholm | Ewing | 25 984 | 68·3 | Globe to oval. Purple top. Fairly clean. Fourteen per cent off type. |
| Carter's Imperial Purple Top. | Ewing | 25 195 | 67·5 | Long oval to intermediate. Purple top. Lacks uniformity. Thirty-six per cent off type. |
| Monarch | Nappan | 24 1,948 | 79·5 | Oval to intermediate type. Purple top. Sixteen per cent intermediates. |
| *Dallis B. L. 773 | Danske Landboforeningers Fro forsyning Roskilde. | 24 854 | 90·6 | Large smooth green turnip. Globe type. Pulpy. Thirteen per cent off type. |
| Kangaroo | Ewing | 24 429 | 69·6 | Oval. Greenish bronze top. Eleven per cent off type. |
| Garton's Superlative. | Ewing | 24 385 | 67·5 | Oval with a few globes, purple top. Seventeen per cent off type. |
| Invicta Bronze Top | Rennie | 24 263 | 73·7 | Long globe. Greenish bronze top. Smooth roots, very uniform. Four pe cent off type. |
| Ditmar's Swede turnips. | H. H. McNutt | 23 1,909 | 90·5 | Globe. Bronze top. Smooth and uniform. Six per cent off type. |
| Kaslrabri froBangholm No. 7021. | Trifolium 16 Denmark | 23 1,611 | 83·3 | Globe. Purple top. Fairly clean. Six per cent off type. |
| Irish King | Rennie | 23 512 | 95·3 | Globe, dark bronze. Eleven per cent oval. |
| Universal | Ewing | 23 475 | 77·9 | Long globe to short oval. Dark purple top. Fairly uniform. Eight per cent off type. |
| Mammoth Clyde Purple Top. | Ewing | 23 233 | 79·2 | Globe. Purple top. Seven per cent off type. |
| Harley's Bronze Top. | Rennie | 22 1,122 | 84 | Globe. Bronze top. Ten per cent off type. |
| Canadian Gem | Rennie | 22 1,001 | 85 | Short oval to long globe. Purple top. Twenty-one per cent off type. |
| Bangholm Studegeard B.L. 768. | Danske Landboforeningers Fro forsyning Roskilde. | 22 916 | 83·6 | Short oval. Purple top. Eleven per cent off type. |
| Bangholm Purple Top. | Rennie | 22 340 | 92·1 | Globe. Purple top. Fifteen per cent off type. |
| Ka Iroc Wilhelmisburger B.L. 770. | Danske Landboforeningers Fro forsyning Roskilde | 21 1,731 | 90·6 | Globe. Bronze or green top. Smooth and clean. Uniform except for a few short ovals. |
| Halewoods Green Top. | Ewing | 21 1,328 | 93·4 | Oval. Green top. Lacks uniformity. Nineteen per cent off type. |
| Kangaroo Bronze Top. | Rennie | 21 1,321 | 82·3 | Oval. Greenish bronze top. Fair roots. Fairly uniform. Eight per cent off type. |
| Bangholm | E.F. Charlottetown | 19 453 | 81·3 | Oval. Purple top. No definite type. Large percentage of small roots. |

*Turnips.

NOTE.—The stony character of the soil may be responsible for the large number of roots off type.

### MANGEL VARIETY TEST

Twenty-three varieties of mangels were sown on June 8 in duplicate one-hundredth-acre plots. Owing to the late date on which they were sown and the cold summer, they made poor growth. They were pulled on October 14. The Devon Yellow Globe (Sutton) gave a yield of 6 tons, 400 pounds per acre. This was the largest yield. The next highest yields were given by Barres 7034 (Denmark), Giant White Half Sugar (Ewing), Barres 3084 (Denmark), and Improved Giant (Rennie) in the order named. Owing to the shortness of the season, and the rather heavy nature of the soil, it has been difficult to get a satisfactory crop of mangels at this station.

### CARROT VARIETY TEST

Thirteen varieties of carrots were sown on June 8 in duplicate one-hundredth acre plots. The stand was good but owing to the late date of sowing, the coldness of the season and the heavy character of the land, an unsatisfactory crop was secured. Improved Intermediate White (Ewing) gave the highest yield, viz., 4 tons 435 pounds per acre. White Belgian (French), Long Orange (Rennie), and Large White Belgian (Rennie) gave the next highest yields in the order named. The carrots were pulled on October 15.

### SUGAR BEET VARIETY TEST

Five varieties of sugar beets were sown on June 8 in duplicate one-hundredth-acre plots. Owing to the late date of sowing and the cold season the crop was very poor. Kitchener (Dominion Sugar Co.) gave a yield of 3 tons 1,940 pounds per acre, which was the largest yield. Chatham (Dominion Sugar Co.), Vilmarin's Improved (France), Heming and Harvings (Denmark), and Sluice Bros. (Holland) yielded in the order named. Kitchener tested 16.30 per cent sugar, which was the highest sugar content.

### CORN VARIETY TEST

The soil on which the corn was grown was a clay loam with a sandy clay sub-soil. In the autumn of 1922 one year old clover sod with considerable couch was ploughed under and thoroughly cultviated with a stiff tooth cultivator. The soil became so compact it was necessary to plough it again in the spring. It was manured at the rate of fifteen tons of barnyard manure per acre. The corn was sown on June 10 in one-fortieth-acre plots. The seed was planted in hills three feet apart each way and three plants to each hill. Owing to an unfavourable season the corn was very short and immature when cut. The plots were all cut on September 27. The results are shown in the following table:—

CORN—TEST OF VARIETIES

| Name of variety | Source of seed | Degree of maturity | Per cent stand | Yield per acre | |
|---|---|---|---|---|---|
| | | | | Green Wt. | Dry matter |
| | | | | tons lbs. | tons lbs. |
| Compton Early | Duke | Ears beginning to form | 95 | 17 947 | 2 403 |
| Longfellow | Duke | " | 97 | 16 1,814 | 1 1,706 |
| Quebec 28 | McDonald College | " | 99 | 14 888 | 1 1,587 |
| Leaming | John Park | " | 78 | 14 1,487 | 1 978 |
| Wisconsin No. 7 | Duke | Beginning to silk | 99 | 11 424 | 1 827 |
| Golden Glow | Duke | Partly formed ears | 92 | 9 1,565 | 1 705 |
| Disco Pride Yellow Dent Lot 1015. | Ottawa | Ears well formed | 100 | 8 1,800 | 1 458 |
| Northwestern Red Dent Disco Lot A.B. | Dakota Improved Seed Co. | Ears beginning to form | 99 | 8 565 | 1 256 |
| Twitchell Pride | Fredericton | Coming in milk stage | 97 | 8 701 | 1 129 |
| Disco White Dent 90 day Lot 1318. | Ottawa | No ears present | 93 | 8 344 | - 1,900 |
| Disco Longfellow—Lot 1099. | Ottawa | Coming into silk | 97 | 8 1,731 | - 1,863 |
| Northwestern Dent 15-172 | A. E. McKenzie | Ears all present | 97 | 7 20 | - 1,816 |
| North Dakota | Steele-Briggs | Coming into silk | 93 | 5 1,182 | - 1,386 |
| White Cap Yellow Dent | Steel-Briggs | Beginning to tassel | 92 | 5 217 | - 1,279 |
| Leaming | Duke | 20% tasseled | 92 | 4 913 | - 1,130 |
| Wisconsin No. 7 | John Park | No ears present | 97 | 5 103 | - 1,061 |

VARIETY TEST OF CORN—MAIN CROP

Five varieties of corn were grown on the six acres of rotation land. The area sown to each, and the yield per acre is shown in the following table:—

| Name of variety | Area sown | Yield per acre |
|---|---|---|
| | acres | tons lbs. |
| Golden Glow | 0·93 | 13 1,047 |
| Longfellow | 1·24 | 13 690 |
| Bailey | 0·96 | 13 200 |
| White Cap Yellow Dent | 2·16 | 12 588 |
| Northwestern Dent | 0·69 | 9 744 |

SUNFLOWERS—VARIETY TEST

Seven varieties of sunflowers were sown on the 14th of June in one-fortieth-acre plots. The seed was planted in hills three feet apart each way, and three plants to each hill. The land received the same treatment as the land used in the corn variety tests. The sunflowers were cut when fifty per cent of them were in bloom. The yields were smaller than those obtained under field conditions when the sunflowers were sown in rows 3½ feet apart.

SUNFLOWERS—VARIETY TEST

| Name of variety | Source of seed | Date cut | Per cent stand | Yield per acre | |
|---|---|---|---|---|---|
| | | | | Green weight | Dry matter |
| | | | | tons lb. | tons lb. |
| *Disco Russian Giant | Dakota Improved Seed Co. | Sept. 25 | 98 | 15 408 | - - |
| Manchurian 87-352 | A. E. MacKenzie | " 6 | 87 | 11 758 | 1 876 |
| C.P.R. Mixed | C.P.R. | " 11 | 82 | 10 487 | 1 769 |
| C.P.R. Manteca | C.P.R. | " 6 | 92 | 10 652 | 1 639 |
| C.P.R. Giant Russian | C.P.R. | " 6 | 93 | 10 860 | 1 582 |
| C.P.R. Black | C.P.R. | " 6 | 75 | 9 1,200 | 1 501 |
| Ottawa 76 | Ottawa | " 11 | 96 | 9 1,375 | 1 483 |

*Dry matter sample was spoiled.

## EXPERIMENT WITH GRASSES AND CLOVER

This experiment was carried on to study the suitability of different mixtures of grasses and clover for New Brunswick. Twenty-four one fortieth-acre plots were sown on June 10, 1921. They were sown without a nurse crop. Notwithstanding the drought good stands were secured and the plots came through the winter in good condition. They were cut twice in 1922. The winter of 1922-23 was very severe and a number of the plots winter-killed. As these plots were all in one section of the field it is evident that the winter-killing was due to the condition in that portion of the field rather than to any lack of hardness in the mixtures used. The remaining plots had good stands of red clover, timothy, meadow fescue and orchard grass. Practically no alsike, however, was present in 1923. The orchard grass came into bloom on June 26, the red clover and meadow fescue on July 5, and the timothy was just coming into bloom when the plots were cut on July 11. The plots were again cut on October 16. The plan of seeding these plots was as follows:—

Plots 1-6, inclusive.—The grasses were sown in combination with ten pounds red clover.

Plots 7-12, inclusive.—The grasses were sown in combination with six pounds alsike clover.

Plots 13-18, inclusive.—The grasses were sown in combination with eight pounds red clover and two pounds alsike clover.

Plots 19-24, inclusive.—The grass mixture was sown alone.

The yield and grass mixtures used are shown in the following table:—

GRASSES AND CLOVERS—TEST OF MIXTURES

| Plot No. | Timothy | Meadow Fescue | Orchard Grass | Green weight, first cutting | Green weight, second cutting | Hay first cutting | Hay second cutting | Total green weight | Total Hay |
|---|---|---|---|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | tons lbs. | tons lbs. | tons lbs. | tons lbs. | tons lbs. | tons lbs. |
| 3 | ..... | ..... | 15 | 8 89 | .. 1,374 | 2 1,497 | .. 748 | 8 1,463 | 3 245 |
| 13 | 8 | ..... | ..... | 6 432 | .. 202 | 2 472 | .. 101 | 6 634 | 2 573 |
| 7 | 8 | ..... | ..... | 6 435 | ..... | 2 441 | .. * | 6 457 | 2 441 |
| 1 | 8 | ..... | ..... | 6 94 | .. 22 | 2 264 | .. 94 | 6 347 | 2 358 |
| 16 | 6 | 10 | ..... | 5 549 | 1 272 | 1 1,247 | .. 972 | 6 821 | 2 219 |
| 14 | ..... | 15 | ..... | 5 889 | .. 1,867 | 1 1,030 | .. 776 | 6 756 | 1 1,806 |
| 20 | ..... | 30 | ..... | 4 1,392 | .. 877 | 1 1,297 | .. 401 | 5 269 | 1 1,707 |
| 15 | ..... | ..... | 15 | 4 413 | .. 1,957 | 1 757 | .. 937 | 5 370 | 1 1,694 |
| 4 | 6 | 10 | ..... | 4 910 | .. 775 | 1 1,048 | .. 447 | 4 1,685 | 1 1,495 |
| 18 | ..... | 10 | 10 | 3 1,872 | 1 216 | 1 493 | .. 983 | 5 88 | 1 1,476 |
| 22 | 8 | 15 | ..... | 4 122 | .. 630 | 1 1,004 | .. 296 | 4 752 | 1 1,300 |
| 17 | 6 | ..... | 10 | 3 964 | .. 1,833 | 1 285 | .. 847 | 4 797 | 1 1,132 |
| 2 | ..... | 15 | ..... | 4 644 | .. 1,182 | 1 405 | .. 618 | 4 1,826 | 1 1,023 |
| 5 | 6 | ..... | 10 | 3 1,528 | .. 1,106 | 1 281 | .. 584 | 4 634 | 1 865 |
| 6 | ..... | 10 | 10 | 3 1,116 | .. 1,014 | 1 265 | .. 493 | 4 1 0 | 1 758 |
| 19 | 12 | ..... | ..... | 3 897 | .. 675 | 1 421 | .. 307 | 3 1,572 | 1 728 |
| 10 | 6 | 10 | ..... | 3 783 | .. 18 | 1 327 | .. * | 3 801 | 1 327 |
| 21 | ..... | ..... | 30 | 2 492 | .. 945 | .. 1,539 | .. 402 | 2 1,437 | 1 1 |
| 23 | 8 | ..... | 15 | 2 582 | .. 675 | .. 1,645 | .. 296 | 2 1,257 | .. 1,941 |
| 12 | ..... | 10 | 10 | 2 198 | .. 124 | .. 1,523 | .. 70 | 2 322 | .. 1,593 |
| 9 | ..... | ..... | 15 | 2 390 | .. 48 | .. 1,539 | .. 39 | 2 438 | .. 1,578 |
| 24 | ..... | 15 | 15 | 1 1,471 | .. 450 | .. 1,206 | .. 209 | 1 1,921 | .. 1,415 |
| 11 | 6 | ..... | 10 | 1 1,560 | .. 130 | .. 1,312 | .. 79 | 1 1,690 | .. 1,319 |
| 8 | ..... | 15 | ..... | 1 350 | .. 337 | .. 856 | .. 201 | 1 687 | .. 1,057 |

*Yield of plot too small for dry sample. Hay weights were obtained by adding 15% to the absolute dry weight obtained from shrinkage samples taken at harvest.

| Plot No. | Rate of Seeding per Acre | | | | | Yield of Hay | | |
|---|---|---|---|---|---|---|---|---|
| | Alsike Clover | Red Clover | Timothy | Meadow Fescue | Orchard Grass | 1922 | 1923 | Total for two years |
| | lbs. | lbs. | lbs. | lbs. | lbs. | tons lbs. | tons lbs. | tons lbs. |
| 13 | 2 | 8 | 8 | ..... | ..... | 4 1,720 | 2 573 | 7 293 |
| 7 | 6 | ..... | 8 | ..... | ..... | 4 1,440 | 2 441 | 6 1,881 |
| 16 | 2 | 8 | 6 | 10 | ..... | 4 880 | 2 219 | 6 1,099 |
| 1 | ..... | 10 | 8 | ..... | ..... | 3 940 | 2 358 | 5 1,298 |
| 3 | ..... | 10 | ..... | ..... | 15 | 2 980 | 3 245 | 5 1,225 |
| 17 | 2 | 8 | 6 | ..... | 10 | 4 30 | 1 1,132 | 5 1,162 |
| 15 | 2 | 8 | ..... | ..... | 15 | 3 1,460 | 1 1,694 | 5 1,154 |
| 18 | 2 | 8 | ..... | 10 | 10 | 3 1,540 | 1 1,476 | 5 1,016 |
| 14 | 2 | 8 | ..... | 15 | ..... | 3 1,150 | 1 1,806 | 5 956 |
| 4 | ..... | 10 | 6 | 10 | ..... | 3 260 | 1 1,495 | 4 1,755 |
| 19 | ..... | ..... | 12 | ..... | ..... | 3 210 | 1 728 | 4 938 |
| 5 | ..... | 10 | 6 | ..... | 10 | 3 30 | 1 865 | 4 895 |
| 6 | ..... | 10 | ..... | 10 | 10 | 2 1,890 | 1 758 | 4 648 |
| 2 | ..... | 10 | ..... | 15 | ..... | 2 1,400 | 1 1,023 | 4 423 |
| 10 | 6 | ..... | 6 | 10 | ..... | 2 1,790 | 1 327 | 4 117 |
| 22 | ..... | ..... | 8 | 15 | ..... | 2 500 | 1 1,300 | 3 1,800 |
| 20 | ..... | ..... | ..... | 30 | ..... | 1 1,640 | 1 1,707 | 3 1,347 |
| 9 | 6 | ..... | ..... | ..... | 15 | 2 1,760 | .. 1,578 | 3 1,338 |
| 12 | ..... | ..... | ..... | 10 | 10 | 2 1,600 | .. 1,593 | 3 1,193 |
| 11 | 6 | ..... | 6 | ..... | 10 | 2 1,180 | .. 1,391 | 3 571 |
| 8 | 6 | ..... | ..... | 15 | ..... | 2 710 | .. 1,057 | 2 1,767 |
| 24 | ..... | ..... | ..... | 15 | 15 | 2 200 | .. 1,415 | 2 1,615 |
| 21 | ..... | ..... | ..... | ..... | 30 | 1 1,480 | 1 1 | 2 1,481 |
| 23 | ..... | ..... | 8 | ..... | 15 | 1 1,410 | .. 1,941 | 2 1,351 |

*Deductions*

1. Generally speaking, timothy in combination with clover gives the best yield.

2. Both alsike and red clover should be added to grass mixtures.

3. If red clover is cut when in blossom and again in the autumn it will persist the second year. The same treatment, however, will cause alsike to die out the second year.

## EXPERIMENTS IN GROWING ALFALFA

These experiments were conducted in order to obtain accurate data on the effect of lime, nurse crops, rate, and method of seeding on alfalfa. On July 15, 1921, twelve duplicate one-fortieth-acre plots were sown with Grimms' alfalfa. Duplicate limed and unlimed plots without nurse crops were sown broadcast at the rate of twenty pounds per acre, in twelve-inch rows at the rate of ten pounds per acre, and in twenty-four-inch rows at the rate of five pounds per acre. The plots came through the winter in good condition and were cut in 1922 on June 26, August 10, and September 18. The limed and unlimed plots gave approximately the same yield, but the plots without a nurse crop made a larger yield. (For fuller details see 1922 report of Fredericton Experimental Station, page 63.) The alfalfa plots all winter-killed during the winter of 1922-23. The alfalfa made very little growth after the third cutting. It is possible that this late cutting weakened the plants so that they could not withstand the extremely severe winter.

On July 20, 1923, the experiment was again repeated with duplicate one-acre plots, and three plots which were given an application of wood ashes at the rate of 4,000 pounds per acre, were sown in addition. These plots came through the winter in splendid condition and were cut on July 6 and again on August 30. The plots were not cut a third time as it was thought a good growth would prevent winter-killing. This year one foot was cut off the borders of

each plot in order to approximate field conditions and the dry weight was based on the per cent dry matter as determined by the Chemistry Division.

On July 30, 1923, the experiment was again repeated with duplicate one-fortieth-acre plots. Splendid catches were secured in the plots without nurse crops, but owing to the very heavy straw in 1923 the plots with nurse crops had very poor stands on them. The nurse crop used in all cases was barley, sown at the rate of one bushel per acre.

The yield of the alfalfa plots sown in 1922 is shown in the following table:—

ALFALFA EXPERIMENT

| Plot No. | Method of seeding | With or without nurse crop | Green Weight | | Dry Weight | | Total | |
|---|---|---|---|---|---|---|---|---|
| | | | First cutting | Second cutting | First cutting | Second cutting | Green weight | Dry weight |
| | | | tons lbs. | tons lbs. | tons lbs. | tons lbs. | tons lbs. | tons lbs. |
| 1 | Broadcast | Without | 8 1,968 | 4 921 | 2 110 | 1 76 | 13 889 | 3 186 |
| *14 | 12-inch rows | " | 7 445 | 5 819 | 1 1,128 | 1 539 | 12 1,264 | 2 1,667 |
| *13 | Broadcast | " | 7 1,423 | 3 790 | 1 1,616 | .. 1,953 | 11 213 | 2 1,569 |
| *15 | 24-inch rows | " | 7 217 | 5 137 | 1 1,028 | 1 297 | 12 354 | 2 1,325 |
| 2 | 12-inch rows | " | 6 1,392 | 4 287 | 1 1,203 | 1 105 | 10 1,679 | 2 1,308 |
| 7 | Broadcast | " | 8 739 | 3 1,650 | 1 1,266 | .. 1,942 | 12 389 | 2 1,208 |
| 8 | 12-inch rows | " | 6 430 | 3 992 | 1 775 | .. 1,874 | 9 1,422 | 2 649 |
| 3 | 24-inch rows | " | 3 1,757 | 4 406 | .. 1,619 | 1 96 | 8 163 | 1 1,715 |
| 6 | 24-inch rows | " | 3 1,313 | 2 1,992 | .. 1,700 | .. 1,522 | 6 1,305 | 1 1,222 |
| 4 | Broadcast | With | 3 1,323 | 2 1,138 | .. 1,757 | .. 1,396 | 6 461 | 1 1,153 |
| 5 | 12-inch rows | " | 3 761 | 2 1,495 | .. 1,404 | .. 1,496 | 6 256 | 1 900 |
| 9 | 24-inch rows | Without | 2 1,285 | 2 1,192 | .. 1,369 | .. 1,520 | 5 477 | 1 889 |
| 11 | 12-inch rows | With | 3 301 | 2 1,179 | .. 1,347 | .. 1,422 | 5 1,480 | 1 769 |
| 12 | 24-inch rows | " | 2 1,624 | 2 944 | .. 1,488 | .. 1,126 | 5 568 | 1 614 |
| 10 | Broadcast | " | 3 627 | 1 1,695 | .. 1,441 | .. 1,004 | 5 322 | 1 445 |

*These plots were not in duplicate.

ALFALFA EXPERIMENT—YIELD 1922 AND 1923

| Method of Seeding | With or without nurse crop | Limed or unlimed | Rate of seeding | Yield per Acre—Dry Weight | | |
|---|---|---|---|---|---|---|
| | | | | 1922 | 1923 | Average |
| | | | lbs. | tons lbs. | tons lbs. | tons lbs. |
| Broadcast | Without | Limed | 20 | 5 1,960 | 3 186 | 4 1,073 |
| 12-inch rows | " | " | 10 | 5 840 | 2 1,308 | 4 74 |
| 24-inch rows | " | " | 5 | 4 960 | 1 1,715 | 3 337 |
| Broadcast | With | " | 20 | 5 140 | 1 1,153 | 3 646 |
| 12-inch rows | " | " | 10 | 4 460 | 1 900 | 2 1,680 |
| 24-inch rows | " | " | 5 | 3 680 | 1 1,222 | 2 951 |
| Broadcast | Without | Unlimed | 20 | 5 1,000 | 2 1,208 | 4 104 |
| 12-inch rows | " | " | 10 | 5 140 | 2 649 | 3 1,394 |
| 24-inch rows | " | " | 5 | 4 1,520 | 1 889 | 3 204 |
| Broadcast | With | " | 20 | 5 700 | 1 445 | 3 572 |
| 12-inch rows | " | " | 10 | 4 1,200 | 1 769 | 2 1,984 |
| 24-inch rows | " | " | 15 | 3 1,000 | 1 614 | 2 807 |

1. Broadcast seeding will give larger yields than twelve and twenty-four-inch rows, and twelve-inch rows will give larger yields than twenty-four-inch rows.

2. Seeding without nurse crop will give larger yields than seeding with nurse crop. The difference will be much more noticeable when the straw is heavy.

3. Speaking generally, lime will increase the yield of alfalfa, and the alfalfa on the limed plots will make the best spring growth.

## TEST OF CLOVER SEED FROM DIFFERENT SOURCES

In order to test the general suitability of clover seed from different sources fifteen one-fiftieth-acre plots were sown on June 26, 1922. The land on which this seed was sown was part of the same field, and received the same cultivation as the land sown with alfalfa. Before the plots were sown the land was given a broadcast application of wood ashes at the rate of two tons per acre. Splendid catches of seed were secured on all plots. The winter was unusually severe and the snow blew off one portion of the field. Of the varieties planted on this section, viz., Alta Swede, Casimir Quebec, France 500, France 533, Italy 536, Ottawa C.E.F. 16-20, St. Clet Quebec and Ottawa District, all winter-killed except Ottawa District. Italy 501 was partly destroyed by ice and later had to be disregarded owing to weeds.

The following table shows the yields of the other varieties:—

TEST OF CLOVER SEED FROM DIFFERENT SOURCES

| Source of Seed | Yield per acre | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Green weight | | | | Dry weight | | | | Total | |
| | First cutting | | Second cutting | | First cutting | | Second cutting | | Green weight | Dry weight |
| | tons | lbs. | tons | lbs. | tons | lbs. | tons | lbs. | tons lbs. | tons lbs. |
| Late Swedish | 14 | 938 | .. | .. | 3 | 1,104 | .. | .. | 14 938 | 3 1,104 |
| Early Swedish | 9 | 1,116 | 5 | 532 | 1 | 1,792 | 1 | 969 | 14 1,648 | 3 761 |
| Ottawa C.E.F., O.S. 21 | 10 | 134 | 3 | 388 | 2 | 405 | 1 | 276 | 13 522 | 3 681 |
| Ottawa 17-20 | 10 | 1,811 | 2 | 258 | 2 | 785 | .. | 1,422 | 13 69 | 3 207 |
| Medium Late Swedish | 11 | 396 | .. | .. | 2 | 1,437 | .. | .. | 11 396 | 2 1,437 |
| Ottawa District | 5 | 1,133 | 1 | 1,989 | 1 | 1,056 | .. | 1,557 | 7 1,122 | 2 613 |
| Kenora District Seed Growers Association* | 10 | 71 | .. | .. | 2 | 917 | .. | .. | 10 71 | 2 917 |

* The yield of this variety is from half the plot only as the other half of the plot winter-killed.

## EXPERIMENTS WITH FERTILIZERS

The work carried on during the year in co-operation with the Division of Chemistry includes, experimental work with complete fertilizers in a three-year rotation of potatoes, grain and hay; experimental work on the effect of lime on that rotation; experiments to determine the value of different types of basic slag, rock phosphate and superphosphate as sources of phosphoric acid, and pasture fertilizer experiments to determine the value of nitrate of soda, slag, acid phosphate and lime on the average New Brunswick pasture.

The season was very favourable for grain. Timely rains in the fall insured well-filled kernels, and good crops of grain were harvested off all the grain plots. The harvest conditions, however, were very unfavourable, and the grain suffered considerably from shattering.

### FERTILIZER FORMULAE EXPERIMENT WITH THREE-YEAR ROTATION

An experiment was begun in 1922 with a view to finding out which fertilizer formula and rate of application would give the best yields in a three-year rotation of potatoes, grain and hay under New Brunswick conditions. Thirty duplicate plots and eight check plots were used in the experiment. The land was a clay loam with a clay sub-soil, and had been in two previous fertilizer experiments. Each of these experiments was a three-year rotation of potatoes, grain and clover, with fertilizer applied to the potato crop. In May, 1916, one-

half of each plot was given an application of waste lime at the rate of 5,000 pounds per acre. In the fall of 1920 a clover sod was turned under and the land was manured next spring at the rate of ten tons of barnyard manure per acre and planted with potatoes. In the spring of 1922 the land was spring ploughed, harrowed, and fertilizer was applied according to the formulæ, and at the rates shown in the following table. Nitrogen was supplied equally by nitrate of soda, and sulphate of ammonia; phosphoric acid by superphosphate; and potash by muriate of potash. The land was then planted with potatoes. In the spring of 1923 the land was spring ploughed and put in good tilth with a disk and smoothing harrow, and sown on May 28 with the Waugh strain of Banner oats at the rate of three bushels per acre and seeded to hay with ten pounds timothy, eight pounds red clover and two pounds alsike clover per acre. The season was favourable and excellent stands of grain were secured. All the plots made splendid growth. The grain was cut on September 18, but owing to continued wet weather lay on the field until September 26. For this reason considerable grain was lost through shattering. As the hay seed did not catch it was necessary to plough this land up again in the fall. The results obtained from the potato crop—first year of the rotation—are given in the report of this Station for the year 1922, and show that the value of the increased yields on twenty-seven of the thirty fertilized plots gave a profit over the cost of the fertilizer employed, and that the profit varied to a considerable extent with the formula and rate of application of the fertilizer. The results of the grain crop are shown in the following table:—

FERTILIZER FORMULAE EXPERIMENT

Three-year Rotation: 1st year, Potatoes; 2nd year, Grain; 3rd year, Hay. Record of Returns for the Grain Crop—(Oats), 1923

| Formulae of fertilizer | Rate of application per acre | Cost of fertilizer (applied to the potato crop in 1922) | Yield per acre | | Increased grain yield |
|---|---|---|---|---|---|
| | | | Straw | Grain | |
| | lbs. | $ cts. | tons lbs. | bush. lbs. | bush. lbs. |
| 6-6-6 | 2,000 | 42 84 | 1 1,700 | 67 22 | 9 33 |
| 5-6-6 | 2,000 | 38 36 | 2 110 | 65 30 | 8 7 |
| 4-6-6 | 2,000 | 33 89 | 1 900 | 66 6 | 8 17 |
| 3-6-6 | 2,000 | 29 41 | 1 965 | 59 29 | 2 6 |
| 6-6-6 | 1,500 | 31 99 | 1 1,980 | 72 22 | 14 33 |
| 5-6-6 | 1,500 | 28 88 | 1 1,855 | 74 29 | 17 6 |
| 4-6-6 | 1,500 | 25 38 | 2 400 | 73 18 | 15 29 |
| 3-6-6 | 1,500 | 22 07 | 2 115 | 78 33 | 21 10 |
| 6-6-6 | 1,000 | 21 42 | 2 310 | 82 2 | 24 13 |
| 5-6-6 | 1,000 | 19 18 | 1 1,940 | 78 8 | 20 19 |
| 4-6-6 | 1,000 | 16 94 | 1 1,940 | 75 10 | 17 21 |
| 3-6-6 | 1,000 | 14 70 | 1 1,075 | 67 13 | 10 24 |
| 5-8-6 | 2,000 | 41 61 | 1 1,980 | 69 24 | 12 1 |
| 4-8-6 | 2,000 | 37 14 | 1 1,565 | 65 25 | 8 2 |
| 3-8-6 | 2,000 | 32 66 | 1 1,565 | 67 7 | 9 18 |
| 5-8-6 | 1,500 | 31 35 | 1 820 | 59 24 | 2 1 |
| 4-8-6 | 1,500 | 27 85 | 1 850 | 57 12 | − 0 11 |
| 3-8-6 | 1,500 | 24 54 | 1 770 | 55 10 | − 2 13 |
| 5-8-6 | 1,000 | 20 80 | 1 835 | 62 7 | 4 18 |
| 4-8-6 | 1,000 | 18 57 | 1 740 | 67 32 | 10 9 |
| 3-8-6 | 1,000 | 16 33 | 1 460 | 61 16 | 3 27 |
| 4-8-10 | 2,000 | 41 30 | 1 480 | 62 12 | 4 23 |
| 4-8-8 | 2,000 | 39 22 | 1 1,555 | 61 21 | 3 32 |
| 4-8-4 | 2,000 | 35 06 | 1 470 | 59 24 | 2 1 |
| 4-8-10 | 1,500 | 30 97 | 1 1,265 | 59 29 | 2 6 |
| 4-8-8 | 1,500 | 29 41 | 1 865 | 55 15 | − 2 8 |
| 4-8-4 | 1,500 | 26 29 | 1 960 | 62 32 | 5 9 |
| 4-8-10 | 1,000 | 20 65 | 1 495 | 47 7 | −10 16 |
| 4-8-8 | 1,000 | 19 61 | .. 1,895 | 47 7 | −10 16 |
| 4-8-4 | 1,000 | 17 53 | 1 900 | 54 14 | − 3 9 |
| Average 8 checks | ..... | ..... | 1 826 | 57 23 | |

From the yields of grain (second year of the rotation) tabulated in the foregoing table, we find that while in the greater number of instances, there is an increase in yield of the fertilized plots over the average of the check plots, these increased yields are apparently not consistent with the amounts of plant food supplied the previous year.

Increasing the percentage of nitrogen in the fertilizer applied to the potato crop has not given consistent and corresponding increased yields of grain the next year.

It would appear that for the clay loam soil in which this experiment was conducted the heavier applications of potash in the fertilizer applied the previous year do not give a corresponding increased yield in the grain crop.

It may be said, however, that on the majority of the plots there is evidence of a benficial influence to the grain crop from the residual plant food of the fertilizer applied the previous year.

While the land on which this experiment was conducted, was level and fairly uniform, a study of the checks on the part of the field on which the first four plots in the table were located, indicates that this portion of the field was somewhat poorer than the remainder. This accounts for the smaller yields obtained by using 2,000 pounds than from using 1,500 and 1,000 pounds of the same fertilizer.

## EFFECT OF LIME ON GRAIN CROP

In 1916 half of each plot in the three-year rotation of potatoes, grain and hay was given an application of waste lime at the rate of 5,000 pounds per acre. In order to ascertain if any benefit accrued to the 1923 grain crop from this 1916 application, the limed and the unlimed half of one range of plots were harvested and threshed separately.

On fifteen out of a total of thirty-four plots, the limed areas gave an average increased yield of 861.3 pounds of straw. On nineteen of the thirty-four plots the unlimed areas gave an average increased yield of 535.7 pounds of straw per acre. For the thirty-four plots the limed areas gave an average increase of 80.5 pounds of straw per acre.

On twenty-six plots the limed areas gave an average increase of 9 bushels and 9 pounds of grain per acre. On eight plots the unlimed areas gave an average increase of 7 bushels and 19.5 pounds of grain per care. For the thirty-four plots the limed areas gave an average increase of grain of 5 bushels, 4.1 pounds per acre.

There is evidence in the yields obtained of a beneficial effect on the grain crop from lime applied seven years previously, and these results serve to some extent to illustrate the lasting effects of lime compounds applied to the soil.

Heavy application of lime where a three-year rotation of potatoes, grain and hay is used may, however, result in loss to the farmer. The previous year the potatoes on the limed half of the plot were so scabby that they brought only fifty cents per barrel, while the potatoes on the unlimed half of the plots were free from scab and brought one dollar per barrel. Where a rotation of turnips, grain and hay is used, however, lime can be strongly recommended for the average New Brunswick land.

## EXPERIMENT TO COMPARE DIFFERENT TYPES OF BASIC SLAG AS SOURCE OF PHOSPHORIC ACID IN A COMPLETE FERTILIZER

The object of the experiment was to ascertain the relative values of various types of basic slag—fortified, open hearth, Bessemer-ground rock phosphate and superphosphate (with and without ground limestone) as sources of phos-

phoric acid when used in conjunction with nitrate of soda and muriate of potash.

The land used for this experiment was a light clay loam, level and apparently fairly uniform, but of rather low natural fertility. In 1919 this land was manured with barnyard manure at the rate of fifteen tons per acre. In the spring of 1922 it was given an application of 1,350 pounds per acre of a 4-8-6 home-mixed fertilizer and was put in hoed crops. The land was prepared for this year's crop by fall ploughing and spring cultivation. The plots were sown on June 7 with Banner oats at the rate of three bushels per acre, seeded to hay with ten pounds timothy, eight pounds red clover and two pounds of alsike. The first lot of fertilizer which had been assembled for this experiment, was destroyed by fire. Therefore the fertilizer (as a top-dressing) could not be applied before June 15—one week after the grain was seeded. For this reason it is doubtful if the plot received much benefit from the phosphates. Twenty duplicate, one-thirtieth-acre plots and six check plots were used in the experiment. All the plots, including the checks, received an application of 100 pounds of nitrate of soda, and fifty pounds of muriate of potash per acre. The plots were cut October 8, and threshed from the field on October 12. The results are shown in the following table.

EXPERIMENT TO COMPARE THE DIFFERENT TYPES OF SLAG AS A SOURCE OF PHOSPHORIC ACID IN A COMPLETE FERTILIZER

Rotation: 1st year, Grain; 2nd year, Clover; 3rd year, Mixed Hay.

| Name of Fertilizer | Per cent phosphoric acid | Rate of application per acre | Average yield per acre | | Increase | |
|---|---|---|---|---|---|---|
| | | | Straw | Grain | Straw | Grain |
| | | | tons lbs. | bush. lbs. | lbs. | bush. lbs. |
| XX Fortified Slag | 14 | 1,000 | 1 1,380 | 55 30 | 332 | .. − 4 |
| XX Fortified Slag | 14 | 500 | 1 1,347 | 60 25 | 299 | 4 25 |
| XXX Fortified Slag | 17 | 825 | 1 1,664 | 47 12 | 616 | − 8 22 |
| XXX Fortified Slag | 17 | 412 | 1 910 | 53 13 | −138 | − 2 21 |
| Best of All Slag | 20 | 700 | 1 296 | 59 3 | −752 | 3 3 |
| Best of All Slag | 20 | 350 | 1 700 | 63 33 | −348 | 7 33 |
| Anglo Canadian Slag | 16 | 875 | . 1,974 | 55 25 | −1,074 | .. 9 |
| Anglo Canadian Slag | 16 | 437 | 1 1,180 | 65 10 | 132 | 9 10 |
| English Slag | 16 | 875 | 1 1,782 | 63 23 | 734 | 7 23 |
| English Slag | 16 | 437 | 1 580 | 67 17 | −468 | 11 17 |
| Open Hearth Slag | 10-11 | 1,270 | 1 1,732 | 59 16 | 684 | 3 16 |
| Open Hearth Slag | 10-11 | 635 | 1 925 | 68 13 | −123 | 12 13 |
| Belgian Slag | 16-45 | 851 | 1 1,093 | 53 8 | 45 | − 2 26 |
| Belgian Slag | 16-45 | 425 | 1 1,428 | 61 12 | 380 | 5 12 |
| Natural Rock Phosphate | 28-30 | 1,000 | 1 1,255 | 65 10 | 207 | 9 10 |
| Natural Rock Phosphate | 28-30 | 500 | 1 1,192 | 56 20 | 144 | 0 20 |
| Natural Rock Phosphate | 28-30 | 250 | 1 1,885 | 71 1 | 837 | 15 1 |
| Superphosphate | 16 | 875 | 1 1,230 | 61 14 | 182 | 5 14 |
| Superphosphate | 16 | 437 | 1 1,380 | 60 19 | 332 | 4 19 |
| Superphosphate and Ground Limestone | 16 | 437 / 4,000 | 1 1,150 | 55 5 | 102 | − 0 29 |
| Average 6 checks | | | 1 1,048 | 56 | | |

## EXPERIMENT TO COMPARE THE VALUE OF DIFFERENT SOURCES OF PHOSPHORIC ACID WHEN USED WITHOUT NITROGEN OR POTASH

The object of the experiment was to ascertain the relative values of various types of slag—fortified, open hearth, and Bessemer-ground rock phosphate and superphosphate (with and without ground limestone) when used alone in a rotation of grain hay.

Sixteen plots and seven check plots were used in this experiment. Three checks were given an application of 100 pounds of nitrate of soda and 50 pounds of muriate of potash per acre. The other four check plots were given no fertilizer. The sixteen plots received neither nitrogenous nor potassic fertilizer. The land used in this experiment was part of the same field and received the same treatment as the land used in previous experiment (basic slag as a source of phosphoric acid in a complete fertilizer). The plots were sown on June 7 with Banner oats at the rate of three bushels per acre, and seeded to hay with 10 pounds of timothy, 8 pounds of red clover and 2 pounds of alsike clover. The first lot of fertilizer which had been assembled for this experiment was destroyed by fire. Therefore the fertilizer could not be applied until June 15. For this reason the effect of the different fertilizers was not apparent this year. The plots were cut on September 8 and threshed from the field on October 11 and 12.

As the results of this experiment showed no difference in yield that could be attributed to the fertilizer, the yields will not be reported until a later date when there is more data available.

### PASTURE IMPROVEMENT EXPERIMENTS

An experiment was begun in 1923 to ascertain the most feasible means of improving New Brunswick pasture by means of fertilizer. Basic slag, acid phosphate, nitrate of soda and ground limestone were applied to plots at different rates per acre. As this experiment has been conducted for only one year the results will be reported at a later date.

An experiment was also begun in 1923 to determine the relative gains made by sheep on slagged versus unslagged pasture. Two plots, each one and one-half acres, were used in the experiment. One plot was given an application of Bessemer slag (16 per cent) at the rate of 750 pounds per acre. The other plot was unfertilized. The results show that the sheep made larger gains on the slagged pasture, but as the fertilizer was not applied until May 14 the plot did not receive the full benefit.

### ORCHARD FERTILIZER EXPERIMENT

An experiment was begun in 1923 to determine which fertilizer formula and rate of application would best promote the growth of a young orchard. Corn was grown between the rows, and the yields for the different plots were recorded. When more data is available the results will be reported.

## POULTRY

The winter of 1922-23 was particularly long and severe and the spring, cold and backward, but the egg production was higher than any previous year. Good progress was made in breeding for egg production. Of the three pens (thirty birds) entered by the Station in the New Brunswick Egg Laying Contest, twenty-two birds qualified for registration. They had an average production of 243.3 eggs. One Barred Rock hen, Fredericton 18, laid 306 eggs in the contest year, and 309 eggs in 365 days.

Only one breed, viz., Barred Plymouth Rocks, is being kept at the Station. The White Wyandottes were disposed of owing to lack of accommodation. The stock on December 31, 1923, consisted of:—

Barred Rocks: 17 males, 124 hens, 189 pullets.
Toulouse Geese: 1 gander, 2 geese.
Pekin Ducks: 2 drakes, 7 ducks.

## HATCHING RESULTS

The hatching results were a disappointment, and the mortality in the young chicks was very heavy. Eggs to the number of 3,403, all Barred Rocks, were set in a 1,200-egg Candee incubator. Of these 82.3 per cent proved fertile, 1,194 chicks were hatched. The percentage fertility was 6.2 per cent lower than for the previous year. The percentage of total eggs hatched was 14 per cent lower than for the previous year, and the percentage of fertile eggs hatched 12.9 per cent lower.

The results from hatchings of different dates are shown in the following table:—

HATCHING RESULTS FROM SETTINGS OF DIFFERENT DATES

| —— | Setting Mar. 20 | Setting April 3 | Setting April 17 | Setting May 2 | Setting May 16 |
|---|---|---|---|---|---|
| Total eggs set | 588 | 791 | 589 | 803 | 632 |
| Number fertile | 478 | 691 | 493 | 662 | 480 |
| Per cent fertile | 81·2 | 87·3 | 83·7 | 82·4 | 75·9 |
| Number of chicks | 180 | 232 | 189 | 351 | 242 |
| Per cent total eggs hatched | 30·6 | 29·3 | 32 | 43·7 | 38·2 |
| Per cent fertile eggs hatched | 37·6 | 33·5 | 38·3 | 53·0 | 50·4 |
| Numberchicks alive when wing banded | 39 | 48 | 32 | 74 | 108 |
| Per cent chicks hatched, alive when wing banded | 21·6 | 20·6 | 16·9 | 21 | 44·6 |
| Total eggs required for one chick hatched | 3·2 | 3·4 | 3·1 | 2·2 | 2·3 |
| Total fertile eggs for one chick hatched | 2·6 | 2·9 | 2·6 | 1·8 | 1·9 |
| Total eggs required for one chick when wing banded | 15 | 16·4 | 18·4 | 10·8 | 5·8 |

*Deductions.*—The best hatching results apparently can be obtained from eggs set the latter part of April. For the years 1921, 1922 and 1923 the best results were obtained from eggs set on April 17, April 26 and April 17, respectively.

## HATCHING RESULTS—HENS VERSUS PULLETS

Records were kept of the results obtained from the Barred Rock hens and pullets eggs used for hatching during the year. The results are shown in the following table:—

| —— | Hens | Pullets |
|---|---|---|
| Total eggs set | 1,574 | 1,829 |
| Number fertile | 1,328 | 1,476 |
| Per cent fertile | 84·3 | 80·7 |
| Number of chicks | 670 | 524 |
| Per cent total eggs hatched | 42·5 | 28·6 |
| Per cent fertile eggs hatched | 50·5 | 35·5 |
| Number chicks alive when wing banded | 33·1 | 15·0 |
| Total eggs required for one chick hatched | 2·3 | 3·4 |
| Total fertile eggs for one chick hatched | 1·9 | 2·8 |
| Total eggs required for one chick when wing banded | 7·0 | 23·1 |

## COST OF REARING YOUNG CHICKS

Records were kept of the eggs, coal and feed required to produce a chick to the end of the brooder period, or approximately two months of age. On account of the high mortality the costs were excessive. The figures below cover chicks hatched and purchased as follows:—

COST OF REARING CHICKS TO END OF BROODER PERIOD

| | |
|---|---|
| Number of eggs set | 3,403 |
| Number of chicks hatched | 1,194 |
| Number of chicks purchased, May 20 | 195 |
| Number of chicks alive, July 6 | 480 |

STATEMENT OF COST

| | |
|---|---|
| 3,403 eggs at 50c. per doz | $ 141 79 |
| 195 one-month-old chicks at 45c. each | 87 75 |
| 4,400 lb. hard coal at $20 per ton | 44 00 |
| 1,169 lb. hard coal at $17 per ton | 9 93 |
| 200 lb. rolled oats at $3.50 per cwt | 7 00 |
| 500 lb. chick feed (grains) at $3.30 per cwt | 16 50 |
| 250 lb. chick feed (grains) at $2.66 per cwt | 6 65 |
| 435 lb. chick feed (grains) at $2.23 per cwt | 9 70 |
| 100 lb. crimped oats at $2.30 per cwt | 2 30 |
| 100 lb. wheat at $2.50 per cwt | 2 50 |
| 425 lb. buttermilk at 15c. per cwt | 0 63 |
| Total cost of 480 chicks, labour neglected | 328 75 |
| Cost per chick, labour neglected | 0 683 |

The brooding period ended on July 6. The chicks were run on range until October 5, or approximately to five months of age. The cost of feed and the number of chicks alive on that date are shown in the following table:—

COST OF REARING CHICKS TO FIVE MONTHS

| | |
|---|---|
| Number of chicks alive July 6 | 480 |
| Number of chicks alive October 5 | 364 |

STATEMENT OF COST

| | |
|---|---|
| Cost of 480 chicks to July 6 | $ 328 75 |
| 2,415 lb. mash at $2.23 per cwt | 53 85 |
| 500 lb. crimped oats at $2.30 per cwt | 11 50 |
| 2,650 lb. grain mixture at $2.23 per cwt | 59 09 |
| 700 lb. wheat at $2.50 per cwt | 17 50 |
| 3,650 lb. buttermilk at 15c. per cwt | 5 47 |
| 200 lb. ground oats at $2 per cwt | 4 00 |
| 100 lb. corn meal at $2.20 per cwt | 2 20 |
| Total cost of 364 chicks, labour neglected | 482 36 |
| Average cost per chick, labour neglected | 1 32 |

The high cost of raising these chicks was largely due to the high mortality. Of the total cost of $482.36, $229.54 was spent for eggs and chicks.

## CAPONS VERSUS COCKERELS

The object of this experiment was to compare the cost of producing capons and cockerels.

Nineteen birds were caponized on July 28. One of these birds died. The remaining eighteen birds were put on close range on August 1. They were fed a grain mixture consisting of equal parts of cracked corn, wheat, crimped oats, and a dry mash consisting of equal parts wheat bran, corn meal, middlings and crushed oats. Both these feeds were fed in hoppers. Twelve cockerels were also put on close range on the same date and fed in the same manner. The results are shown in the following table:—

CAPONS VERSUS COCKERELS

| — | Cockerels | Capons |
|---|---|---|
| Number of birds in experiment | *11 | 18 |
| Gross weight of birds July 28 lb. | 34·00 | 48·00 |
| Average weight of birds July 28 lb. | 3·08 | 2·66 |
| Gross weight of birds Nov. 18 lb. | 82·00 | 129·00 |
| Average weight of birds Nov. 18 lb. | 7·45 | 7·16 |
| Total gain per group in period lb. | 48·00 | 81·00 |
| Average gain per bird in period lb. | 4·37 | 4·50 |
| Total gain mixture eaten by group in period lb. | 264·00 | 430·00 |
| Average grain mixture eaten per bird in period lb. | 24·00 | 23·88 |
| Total mash eaten per group in period lb. | 94·00 | 142·00 |
| Average mash eaten per bird in period lb. | 8·54 | 7·88 |
| *Statement of Cost* | | |
| Value of grain mixture at $2.33 per cwt $ | 6·15 | 10·01 |
| Value of mash at $1.85 per cwt $ | 1·73 | 2·62 |
| Total value of feed $ | 7·88 | 12·63 |
| Cost of feed per cwt. gain $ | 16·41 | 15·59 |

*There were originally twelve birds in this pen. One bird died on October 15. One-twelfth of the feed consumed up to that date has been deducted.

On November 18 when birds were examined it was found that nine of the capons were apparently slips. These nine slips and two of the cockerels were taken out. The remaining nine cockerels and nine capons were kept on a grain ration until December 10. They were then weighed and put in fattening crates and fed a mash consisting of equal parts corn meal and rolled oats with buttermilk until December 22, when they were slaughtered. Neither lot made any gains while on this fattening ration. No difference could be distinguished in the flesh.

The capons made slightly larger and cheaper gains than the cockerels, but one bird was lost in caponizing. Therefore caponizing does not show a profit. Caponizing is only profitable where the market is discriminating and a higher price can be obtained for the capons than for cockerels. The birds were three months old when caponized and it is possible that if caponized at an earlier date they would have shown cheaper gains.

### COST OF EGG PRODUCTION

The average cost of egg production for the 200 hens in the New Brunswick Egg Laying Contest for the different periods in the year was as follows:—

| Period | Number eggs laid | Per cent production | Food cost per doz. | Price per doz. | Profit per doz. |
|---|---|---|---|---|---|
| | | | $ | $ | $ |
| Nov. 1 to Nov. 28 | 919 | 16·4 | 0·465 | 0·55 | 0·085 |
| Nov. 29 to Dec. 26 | 1,805 | 32·2 | 0·265 | 0·65 | 0·385 |
| Dec. 27 to Jan. 23 | 1,828 | 32·6 | 0·270 | 0·65 | 0·380 |
| Jan. 23 to Feb. 20 | 1,952 | 34·8 | 0·268 | 0·55 | 0·282 |
| Feb. 21 to Mar. 20 | 2,450 | 43·7 | 0·216 | 0·40 | 0·184 |
| Mar. 21 to Apr. 17 | 3,238 | 57·8 | 0·165 | 0·40 | 0·235 |
| April 17 to May 15 | 3,380 | 60·3 | 0·177 | 0·30 | 0·123 |
| May 16 to June 12 | 3,394 | 60·6 | 0·182 | 0·30 | 0·118 |
| June 13 to July 11 | 3,531 | 63·0 | 0·133 | 0·25 | 0·117 |
| July 12 to Aug. 7 | 3,252 | 58·0 | 0·144 | 0·30 | 0·156 |
| Aug. 8 to Sept. 4 | 2,901 | 51·8 | 0·165 | 0·35 | 0·185 |
| Sept. 5 to Oct. 2 | 2,332 | 41·6 | 0·190 | 0·45 | 0·260 |
| Oct. 3 to Oct. 30 | 1,478 | 26·3 | 0·281 | 0·475 | 0·194 |
| Year | 32,450 | 44·5 | 0·200 | ..... | ..... |

The records show that the cost of production per dozen was lowest from February to September, which were the months of highest production. The profit per dozen was greater from December to February, which were the months of highest prices.

### HOME-MIXED GRAIN AND MASH VERSUS COMMERCIAL GRAIN AND MASH

In order to determine the relative value of home-mixed and commercial poultry feeds, an experiment was conducted with two pens of White Wyandotte pullets. The experiment was begun November 7. Pen 4 was fed a commercial mash and scratch feed. Pen 3 was fed a home-mixed mash consisting of one part bran, one part middlings, one part crushed oats, one part corn meal, one part beef scrap and five per cent charcoal; and scratch grain consisting of two parts cracked corn, one part wheat and one part oats. The scratch mixtures were fed in the litter, and the mash was fed dry in hoppers. Green feed, shell. grit and buttermilk were supplied to each pen. The birds fed on commercial feed did not eat as much mash as those receiving the home-mixed mash. The home-mixed mash had more coarse material in it, and in picking this out the birds wasted some of the mash by throwing it out of the hopper. The results are shown in the following table:—

| — | | Pen 3 Home-mixed | Pen 4 Commercial |
|---|---|---|---|
| Number of days in experiment | | 206 | 206 |
| Number of birds in experiment | | 25 | 25 |
| Home-mixed scratch feed eaten in period | lb. | 720 | ..... |
| Commercial scratch feed eaten in period | lb. | ..... | 740 |
| Home-mixed mash eaten in period | lb. | 834 | ..... |
| Commercial mash eaten in period | lb. | ..... | 432 |
| Buttermilk eaten in period | lb. | 355 | 353 |
| Green feed eaten in period | lb. | 426 | 246 |
| Grit feed eaten in period | lb. | 25 | 18 |
| Shell feed eaten in period | lb. | 47 | 38 |
| Total number of eggs laid in period | | 2,011 | 1,929 |
| *Statement of Cost* | | | |
| Home-mixed scratch feed at $2.30 per cwt. | $ | 4·37 | ..... |
| Home-mixed scratch feed at $2.08 per cwt. | $ | 11·02 | ..... |
| Commercial scratch feed at $2.90 per cwt. | $ | ..... | 21·46 |
| Home-mixed mash at $3.12 per cwt. | $ | 6·61 | ..... |
| Home-mixed mash at $2.70 | $ | 16·79 | ..... |
| Commercial mash at $3.30 per cwt. | $ | ..... | 14·25 |
| Buttermilk at 15c. per cwt. | $ | 0·53 | 0·53 |
| Green feed at 25c. per cwt. | $ | 1·06 | 0·61 |
| Grit at $1.50 per cwt. | $ | 0·37 | 0·27 |
| Shell at $1 per cwt. | $ | 0·47 | 0·38 |
| Total cost of feed | $ | 41·22 | 37·50 |
| Cost of eggs per dozen | | 0·24 | 0·23 |
| Total value of eggs | $ | 80·93 | 75·86 |
| Profit on pen | $ | 39·71 | 38·36 |

The number of eggs laid by each pen and the price obtained each month were as follows:—

| — | Home-mixed | Commercial | Value of eggs per dozen |
|---|---|---|---|
| | No. of eggs | No. of eggs | $ |
| November | 122 | 80 | 0·55 |
| December | 306 | 210 | 0·65 |
| January | 321 | 286 | 0·65 |
| February | 210 | 281 | 0·55 |
| March | 288 | 305 | 0·40 |
| April | 369 | 365 | 0·40 |
| May | 395 | 397 | 0·30 |

*Deductions.*—1. The pen fed commercial feed produced eggs at a cheaper cost per dozen than the pen fed home-mixed feed. 2. The pen fed home-mixed feed showed a larger profit as the birds laid more eggs during the winter months when prices were high.

A similar experiment was conducted the previous year in which the home-mixed feed proved cheaper and more efficient than the commercial feed. (See page 74 Fredericton Report, 1922.)

### BUTTERMILK VERSUS BEEF SCRAP

In order to determine the relative value of buttermilk and beef scrap as protein feeds for laying hens an experiment was carried on with two pens of thirty Barred Rock pullets. The experiment began November 7, and ended May 31. Each pen was fed scratch feed in the litter consisting of two parts cracked corn, one part wheat, and one part oats, and dry mash in hopper con-

sisting of one part wheat bran, one part middlings, one part corn meal, one part crushed oats and five per cent charcoal. Grit and shell were fed in hoppers in each pen. Pen 1 received buttermilk as their protein feed and Pen 2 was fed beef scrap in hoppers. The results are shown in the following table:—

BUTTERMILK VERSUS BEEF SCRAP FOR EGG PRODUCTION

| — | | Buttermilk Pen 1 | Beef scrap Pen 2 |
|---|---|---|---|
| Number of days in experiment | | 206 | 206 |
| Number of birds in experiment | | 30 | 30 |
| Scratch feed eaten during period | lb. | 864 | 864 |
| Mash eaten during period | lb. | 808 | 592 |
| Green feed eaten during period | lb. | 502 | 502 |
| Grit eaten during period | lb. | 25·5 | 25 |
| Shell eaten during period | lb. | 52·5 | 51 |
| Buttermilk consumed during period | lb. | 1,291 | ..... |
| Beef scrap eaten during period | lb. | ..... | 166 |
| Total eggs laid during period | | 1,880 | 2,112 |
| Average number eggs laid per bird during period | | 62·66 | 70·4 |
| *Statement of Cost* | | | |
| Scratch feed at $2.30 per cwt. | $ | 5·29 | 5·29 |
| Scratch feed at $2.08 per cwt. | $ | 13·18 | 13·18 |
| Mash at $1.89 per cwt. | $ | 3·70 | 3·11 |
| Mash at $1.75 per cwt. | $ | 10·71 | 7·47 |
| Green feed at 25c. per cwt. | $ | 1·25 | 1·25 |
| Grit at $1.50 per cwt. | $ | 0·38 | 0·37 |
| Shell at $1 per cwt. | $ | 0·52 | 0·51 |
| Buttermilk at 15c. per cwt. | $ | 1·93 | ..... |
| Beef scrap at $6.50 per cwt. | $ | ..... | 10·79 |
| Total cost of feed | $ | 36·96 | 41·97 |
| Cost of eggs per dozen | $ | 0·235 | 0·238 |
| Total value of eggs | $ | 73·60 | 83·05 |
| Profit on pen | $ | 36·64 | 41·08 |

The number of eggs laid by each pen, and the price obtained each month were as follows:—

| — | Buttermilk | Beef scrap | Value of eggs per doz. |
|---|---|---|---|
| | No. of eggs | No. of eggs | $ |
| November | 100 | 159 | 0·55 |
| December | 230 | 236 | 0·65 |
| January | 250 | 339 | 0·65 |
| February | 232 | 199 | 0·55 |
| March | 295 | 350 | 0·40 |
| April | 390 | 375 | 0·40 |
| May | 383 | 454 | 0·30 |

The hens fed beef crap ate less mash, grit and shell than those fed buttermilk. Although the beef scrap cost more than the buttermilk the hens fed beef scrap showed a larger profit owing to the greater egg production during the winter months when prices were high. The previous year skim milk proved superior to beef scrap in a similar experiment. (See P. 73 Fredericton Report for 1922.)

### ALFALFA VERSUS SPROUTED OATS

In order to determine the relative value of sprouted oats and alfalfa for green feed when fed to poultry, an experiment was carried on from December 1 to March 15 with two pens of thirty Barred Rock pullets. Scratch grain, con-

sisting of two parts cracked corn, one part wheat and one part oats, was fed in equal quantities in the litter to each pen. Dry mash, consisting of one part bran, one part middlings, one part corn meal, one part ground oats, one part beef scrap and five per cent charcoal, was fed in hoppers to each pen. Grit and oyster shell were kept before the birds at all times and milk was fed during January, February and March in equal quantities. Pen 5 was fed sprouted oats and Pen 6 was fed alfalfa leaves as green feed. The sprouted oats were fed each day, and the alfalfa leaves were before the birds at all times.

ALFALFA VERSUS SPROUTED OATS FOR EGG PRODUCTION

| — | | Pen 5 Sprouted oats | Pen 6 Alfalfa |
|---|---|---|---|
| Number of days in experiment | | 105 | 105 |
| Number of birds in experiment | | 30 | 30 |
| Scratch feed eaten in period | lb. | 454 | 454 |
| Mash eaten in period | lb. | 277 | 345 |
| Buttermilk eaten in period | lb. | 155 | 155 |
| Grit eaten in period | lb. | 13 | 11·5 |
| Shell eaten in period | lb. | 26 | 26 |
| Sprouted oats eaten in period | lb. | 76 | ..... |
| Alfalfa eaten in period | lb. | ..... | 38 |
| Total number of eggs laid in period | lb. | 957 | 1,047 |
| *Statement of Cost* | | | |
| Scratch feed at $2.30 per cwt | $ | 2·87 | 2·87 |
| Scratch feed at $2.08 per cwt | $ | 6·84 | 6·84 |
| Mash at $3.12 per cwt | $ | 3·02 | 2·65 |
| Mash at $2.70 per cwt | $ | 4·86 | 7·02 |
| Buttermilk at 15c. per cwt | $ | 0·23 | 0·23 |
| Grit at $1.50 per cwt | $ | 0·195 | 0·172 |
| Shell at $1 per cwt | $ | 0·26 | 0·26 |
| Sprouted oats at $1.50 per cwt | $ | 1·14 | ..... |
| Alfalfa leaves at $1 per cwt | $ | ..... | 0·38 |
| Total cost of feed | $ | 19·41 | 20·42 |
| Cost of eggs per dozen | $ | 0·243 | 0·234 |
| Total value of eggs | $ | 46·14 | 50·61 |
| Profit on pen | $ | 26·73 | 30·19 |

The number of eggs laid by each pen and the price obtained each month were as follows:—

| — | Sprouted oats | Alfalfa | Value of eggs per doz. |
|---|---|---|---|
| | No. of eggs | No. of eggs | $ |
| December | 226 | 240 | 0·65 |
| January | 300 | 318 | 0·65 |
| February | 263 | 328 | 0·55 |
| March | 168 | 161 | 0·40 |

The birds which were fed alfalfa leaves consumed more mash and slightly less grit than the birds fed sprouted oats. The hens fed alfalfa consumed more feed, but they produced more eggs during the months when eggs were high in price, and thus showed a greater profit.

### BUTTERMILK VERSUS WATER

In order to determine the relative value of buttermilk and water as a drink for laying hens, an experiment was carried on from December 1 to March 15, with two pens of fifteen Barred Plymouth Rock pullets. Scratch grain, consisting of two parts cracked corn, one part wheat, and one part oats, was fed in

equal quantities in the litter to each pen. Dry mash consisting of one part middlings, one part corn meal, one part ground oats, one part wheat bran, one part beef scrap and five per cent charcoal was fed in hoppers to each pen. Grit and shell were kept in hoppers before the birds at all times. Pen 7 was fed buttermilk as a drink and Pen 8 was given water. The results are shown in the following table:—

BUTTERMILK VERSUS WATER FOR EGG PRODUCTION

| —— | | Pen 7 Buttermilk | Pen 8 Water |
|---|---|---|---|
| Number of days in experiment | | 105 | 105 |
| Number of birds in experiment | | 15 | 15 |
| Scratch feed eaten in period | lbs. | 227 | 227 |
| Mash feed eaten in period | lbs. | 185 | 160 |
| Buttermilk eaten in period | lbs. | 288 | ..... |
| Green feed eaten in period | lbs. | 183 | 183 |
| Grit eaten in period | lbs. | 5·0 | 5·5 |
| Shell eaten in period | lbs. | 12·5 | 11·0 |
| Total eggs laid in period | | 452 | 351 |
| Average number of eggs laid per bird in period | | 30 | 23·4 |
| *Statement of Cost* | | | |
| Scratch feed at $2.30 per cwt | $ | 1·43 | 1·43 |
| Scratch feed at $2.08 per cwt | $ | 3·42 | 3·42 |
| Mash at $3.12 per cwt | $ | 1·40 | 1·63 |
| Mash at $2.70 per cwt | $ | 3·78 | 2·90 |
| Buttermilk at 15c per cwt | $ | 0·43 | ..... |
| Green feed at 25c. per cwt | $ | 0·45 | 0·45 |
| Grit at $1.50 per cwt | $ | 0·07 | 0·08 |
| Shell at $1 per cwt | $ | 0·12 | 0·11 |
| Total cost of feed | $ | 11·10 | 10·02 |
| Cost of eggs per dozen | $ | 0·294 | 0·342 |
| Total value of eggs | $ | 21·38 | 16·51 |
| Profit on pen | $ | 10·28 | 6·49 |
| Profit per cwt. buttermilk fed | $ | 1·31 | ..... |

BUTTERMILK VERSUS WATER FOR EGG PRODUCTION

| —— | Buttermilk fed Pen 7 | Eggs laid Pen 7 | Eggs laid Pen 8 | Value of eggs per dozen |
|---|---|---|---|---|
| | lb. | | | cts. |
| December | 93 | 93 | 62 | 65 |
| January | 90 | 130 | 109 | 65 |
| February | 75 | 135 | 101 | 55 |
| March | 30 | 94 | 79 | 40 |

## NEW BRUNSWICK EGG LAYING CONTEST

The third New Brunswick Egg Laying Contest was completed on October 30, 1923. Seventeen pens owned by poultry breeders throughout the province, and three pens owned by the Experimental Station, Fredericton were entered in this contest. The pullets entered were a very good lot. They took quite readily to their changed conditions at the beginning of the contest, and the percentage production for the first month was 11.9 per cent greater than for the same period of the second contest, and three per cent greater than for the first contest.

All contest birds were housed in portable houses, shed-roofed, with glass and cotton fronts. These houses were twelve by twelve feet in dimension, and each house was divided into two pens, each pen accommodating ten hens. The birds were confined throughout the year.

Details regarding this contest including full particulars of individual pen yields will be published in an early bulletin dealing with all egg laying contests conducted by the Dominion Experimental Farms.

## BEES

Thirty-three colonies were placed in the cellar on November 22 and December 2, 1922. The average weight of these colonies was 56·3 pounds. On account of the cold, backward spring the bees were not taken out of the cellar until the 1st of May. Eight colonies were dead when taken from the cellar and the balance were in a weak condition. The willows were in bloom May 14, dandelions on May 25 and apple trees on June 5.

On May 9, five three-pound packages with queens were received. They were half dead when they arrived, and were replaced by a shipment that came through in good condition on May 25. On May 28, six two-pound packages (three with queens and three without) were received. All these bees came from Alabama. These were used for strengthening weak colonies. The five three-pound packages received on May 25 (two on combs and three on foundation) were started as new colonies.

A number of experiments were outlined early in the season, but on account of the weak condition of the colonies and the small honey flow no results were obtained. The colonies built up very well and forty colonies went into winter quarters in good condition. The average production per colony, spring count, was 5⅞ pounds of honey. The highest producing colony yielded 29½ pounds of honey. In order to provide sufficient stores for winter the bees had to be fed sugar syrup. Feeding began October 4. The bees were placed in storage on December 11. The average weight of the colonies after feeding was 63 pounds. Twenty-eight colonies were stored in a cellar under a house and twelve were stored in packing cases outside.

## ECONOMIC FIBRE PLANTS

The work carried on in co-operation with the Fibre Division included variety tests of fibre flax and hemp, and a test of different dates of seeding flax. The land on which the flax and hemp were grown was a stony, clay loam with a clay subsoil. It had been in hay the two previous years, and was in rather a low state of fertility. The field was ploughed, rolled and harrowed with a tractor early in August, and ploughed again late in the fall. In the spring the land was manured at the rate of fifteen tons of barnyard manure per acre. The manure was ploughed under and the land was given a broadcast application of 4.5-8-6 home-mixed fertilizer at the rate of 1,128 pounds per acre. Owing to the late spring, seeding was not begun until June 6. Excellent stands were secured and the plots were free from weeds. The flax was very uniform but the hemp varied greatly in height. Owing to the late season and poor drying weather it was so late before the flax was dry enough to ship to Ottawa that it could not be retted that fall. Hence no report can be given here of the quality or quantity of flax fibre.

### VARIETY TEST OF FIBRE FLAX

Five varieties of fibre flax were sown broadcast on June 7 at the rate of one and a half bushels per acre, in one-fortieth-acre plots. Four varieties were sown in duplicate, and one variety, viz., Riga Blue, which was used as a check, was sown in quadruplicate. The flax was pulled and stooked in the field until dry, when it was shipped to Ottawa. The yields are shown in the following table:—

FIBRE FLAX—TEST OF VARIETIES

| Variety | Height of plants | Yield of dry strw per acre | |
|---|---|---|---|
| | Inch. | tons | lbs. |
| Saginaw | 29·5 | 4 | 1,400 |
| Longstem | 31·0 | 4 | 320 |
| Pure Line No. 3 | 24·5 | 3 | 1,240 |
| Pure Line No. 5 | 28·0 | 3 | 1,040 |
| Riga Blue (check) | 28·75 | 3 | 970 |

SOWING FLAX AT DIFFERENT DATES

In order to determine the best date for sowing fibre flax in this district, Riga Blue was sown broadcast in duplicate one-fortieth-acre plots at the rate of one and a half bushels per acre. Beginning June 6, four sowings were made on dates one week apart. The flax was pulled and stooked in the field until dry, when it was shipped to Ottawa. The yields are shown in the following table:—

FIBRE FLAX—SOWING AF DIFFERENT DATES

| Date sown | Height when pulled | Yield of dry straw per acre | |
|---|---|---|---|
| | inch. | tons | lbs. |
| June 6 | 29 | 3 | 1,440 |
| June 13 | 28 | 3 | 200 |
| June 20 | 26·5 | 4 | – |
| June 27 | 29·5 | 4 | 300 |
| June 7 (Checks) | 27·5 | 3 | 940 |

VARIETY TEST OF HEMP

Two one-fortieth-acre plots were sown with Minnesota No. 8 hemp on June 7. Good stands were secured, but the height of the plants varied from 6 to 93 inches, the average height being 54 inches. The hemp was cut on October 3, dried in the field and shipped to Ottawa. The yield was as follows:—

| | | |
|---|---|---|
| Weight of dry straw per acre | ..... | 9,980 lb. |
| " long fibre " | ..... | 530 " |
| " tow fibre " | ..... | 560 " |

## GENERAL FARM NOTES

FARM IMPROVEMENT.—The small barn which was used as a storehouse and potting house was destroyed by fire on June 2. A new one-story building, 30 by 40 feet, was erected on the old foundation. The old barn which was taken from the orchard and attached to the sheep barn the previous year was remodelled. A 30 by 12-foot root cellar, 8 feet deep, was put under the barn to keep roots for the pigs and sheep. The lower story will be used for lambing and farrowing pens. The upper story will be used as a storage barn for hay for the sheep. The upper story of the implement building was finished. It will be utilized as a boarding house for men employed on the farm. A small portable hen house, 12 by 20 feet, was built to house the pen of Barred Rocks belonging to the Station, which made such an excellent record in the third egg laying contest here. A verandah was built on the small cottage in the poultry plant. The electric line was extended to the station during the year. Motors were installed to pump water, turn the separator and run the milking machine. Electric lights were installed in the dairy barn, steer barn, horse barn, poultry plant, implement building, dairy, pump-house, superintendent's and assistant superintendent's houses. Work was continued on a permanent road through the lawn. Bushes were cut on twenty acres of land. The stones were picked off the thirty acres of land which were broken the previous summer. This land was again ploughed with a Manitoba brush breaking plough drawn by oxen and is now ready for crops.

EXTENSION AND PUBLICITY.—The advantage of small excursions was again clearly demonstrated this year. During the months of June, July and August seventeen field days were held at this Station, the attendance varying from fifteen to four hundred, with a total attendance of over two thousand people.

Agricultural societies were grouped similar to the previous year, and each group was invited through the various secretaries to visit the Station. In this way the station officials were prepared to receive them and every effort was made to familiarize the visitors with the work of the Station. There were also a number of field days at which special branches of farming were featured, i.e., poultry, bees, potatoes, etc. The special meetings also included a Neighbours' Field Day, to which all farmers living within a radius of five miles were invited. The laying of the corner stone of the Agricultural School recently established at this Station was a special feature of the day; but the importance of getting acquainted with our neighbours and showing them what was being done at the Station was not lost sight of. Another day that proved very successful was Citizens' Day. Eighty business and professional men of the city of Fredericton were invited to the Station for lunch. Following the luncheon the work of the Station was fully explained, and over thirty remained for the afternoon to inspect the work in the fields and stables, etc.

The second annual visit of the Provincial Normal School students was a decided success. Some four hundred were here, and coming as they do from all sections of the province, should be the means of bringing the work of the Station to the attention of many farmers of the province. The balance of the meetings included a Conference of the New Brunswick Branch of the Canadian Society of Technical Agriculturists, a Conference of the Illustration Station Operators, a Field Crop Judges' Conference and a Potato Dusting demonstration.

Educational exhibits emphasizing the more important branches of farming practised in New Brunswick were displayed at Fredericton, St. John and Woodstock exhibitions. A poultry exhibit was displayed at the smaller fairs. Members of the staff accompanied these exhibits and were on hand at all times to give information, and receive applications for literature.

During the year the staff prepared a number of press articles on subjects of special interest to New Brunswick farmers. They also acted as judges at fall fairs and exhibitions and delivered addresses at a number of farmers' meetings.

# EXPERIMENTAL PROJECTS UNDER WAY AT THE EXPERIMENTAL STATION, FREDERICTON, N.B.

## ANIMAL HUSBANDRY

### SWINE

| Project No. | Title. |
|---|---|
| A. 135. | Corn vs. barley for bacon production. |
| A. 168. | Skim-milk vs. tankage for hog feeding. |

### BEEF CATTLE

| | |
|---|---|
| A. 180. | Feeding steers loose vs. tied. |
| A. 185. | Feeding choice vs. inferior steers. |
| A. 194. | Cost of beef production. |
| A. 271. | Light vs. heavy feeding of concentrates to steers. |
| A. 405. | Ensilage vs. ensilage and roots for steers. |

### HORSES

| | |
|---|---|
| A. 293. | Cost of horse labour. |
| A. 294. | Cost of rearing colts. |
| A. 296. | Cost of wintering idle work horses. |

### SHEEP

| | |
|---|---|
| A. 338. | Cost of rearing market lambs. |
| A. 401. | Shropshire vs. Cheviot rams for grading. |
| A. 403. | Early vs. late weaning of lambs. |
| A. 439. | Comparison of rations for breeding ewes. |

### DAIRY CATTLE

| | |
|---|---|
| A. 13. | Corn vs. sunflower ensilage for milch cows. |
| A. 59. | Cost of rearing dairy breed calves and heifers. |
| A. 204. | Dairy cattle grading experiment. |
| A. 220. | Blatchfords vs. home-mixed meal for dairy-breed calves. |
| A. 268. | Mineral feeds for dairy cattle. |
| A. 396. | Corn vs. sunflower silage for calves and heifers. |
| A. 395. | Ensilage vs. turnips for milch cows. |
| A. 397. | Dehorning milch cows. |
| A. 398. | Straw vs. hay for young stock. |
| A. 399. | Ensilage vs. roots for young stock. |
| A. 400. | Oat straw vs. mixed hay for young stock. |
| A. 438. | Comparison of methods of rearing dairy cattle. |

## FIELD HUSBANDRY

### ROTATION EXPERIMENTS

| | |
|---|---|
| F. 4. | Three-year roation—Potatoes; oats; clover. |
| F. 8. | Three-year rotation—Potatoes and sunflowers; oats; clover. |
| F. 13. | Four-year rotation—Potatoes; oats; clover; timothy. |
| F. 18. | Four-year rotation—Oats; clover; timothy; timothy. |
| F. 28. | Five-year rotation—Potatoes; barley; clover; timothy; oats. |
| F. 40. | Six-year rotation—Sunflowers; barley; clover; timothy; timothy; oats. |

### CULTURAL EXPERIMENTS

| | |
|---|---|
| F. 69. | Methods and cost of clearing land. |
| F. 74. | Types of under-drains. (Stone, pole, etc.) |

### FARM MANAGEMENT EXPERIMENTS

| Project No. | Title. |
|---|---|
| F. 88. | Yield and profit from root and silage crops. |
| F. 90. | Cost of operating tractor. |
| F. 91. | Cost of producing farm crops. |

## HORTICULTURE

### POMOLOGY

| | |
|---|---|
| H. 4. | Currant, variety experiment. |
| H 6. | Gooseberry, variety experiment. |
| H. 11. | Raspberry, variety experiment. |
| H. 21. | Strawberry, variety experiment. |
| H. 33. | Apple, variety experiment. |
| H. 35. | Cherry, variety experiment. |
| H. 40. | Grape, variety experiment. |
| H. 44. | Pear, variety experiment. |
| H. 48. | Plum, variety experiment. |

### VEGETABLE GARDENING

| | |
|---|---|
| H. 58. | Bean, distances of planting. |
| H. 61. | Bean, variety experiment. |
| H. 65. | Beet, different dates of sowing. |
| H. 67. | Beet, thinning experiment. |
| H. 68. | Beet, variety experiment. |
| H. 72. | Cabbage, different dates of sowing for storage purposes. |
| H. 77. | Cabbage, variety experiment. |
| H. 79. | Carrot, different dates of sowing. |
| H. 82. | Carrot, thinning experiment. |
| H. 83. | Carrot, variety experiment. |
| H. 88. | Cauliflower, variety experiment. |
| H. 90. | Celery, blanching experiment. |
| H. 94. | Celery, variety experiment. |
| H. 101. | Corn, suckering experiment. |
| H. 102. | Corn, variety experiment. |
| H. 106. | Cucumber, variety experiment. |
| H. 116. | Lettuce, variety experiment. |
| H. 134. | Onion, seed vs. sets. |
| H. 136. | Onion, thinning experiment. |
| H. 137. | Onion, transplanted vs. sown in the open. |
| H. 138. | Onion, variety experiment. |
| H. 142. | Parsnip, different dates of sowing. |
| H. 145. | Parsnip, variety experiment. |
| H. 148. | Pea, distances of planting. |
| H. 153. | Pea, variety experiment. |
| H. 157. | Pepper, variety experiment. |
| H. 160. | Potato, cost of producing. |
| H. 162. | Potato, different dates of planting to obtain best yield. |
| H. 163. | Potato, different depths of planting. |
| H. 164. | Potato, different sizes of sets. |
| H. 165. | Potato, distances of planting. |
| H. 166. | Potato, few vs. many cultivations. |
| H. 170. | Potato, harvesting at different dates for seed. |
| H. 179. | Potato, seed treated chemically vs. not treated. |
| H. 182. | Potato, spraying experiment. |
| H. 183. | Potato, sprouted vs. unsprouted for earliness. |
| H. 186. | Potato, variety experiment. |
| H. 188. | Pumpkin, variety experiment. |
| H. 192. | Radish, variety experiment. |
| H. 201. | Squash, variety experiment. |
| H. 207. | Tomato, methods of training. |
| H. 211. | Tomato, variety experiment. |

### ORNAMENTAL GARDENING

| | |
|---|---|
| H. 307. | Trees and shrubs, ornamental and shelter variety experiment. |

## CEREALS

| Project No. | Title. |
|---|---|
| Ce. 1. | Spring wheat—Test of varieties or strains. |
| Ce. 4. | Winter wheat—Test of varieties or strains. |
| Ce. 5. | Oats—Test of varieties or strains. |
| Ce. 6. | Barley—Test of varieties or strains. |
| Ce. 7. | Peas—Test of varieties or strains. |
| Ce. 8. | Beans—Test of varieties or strains. |
| Ce. 50. | Multiplication of cereals. |
| Ce. 59. | Test of peas and oats in combination for grain. |
| Ce. 61. | Test of barley, oats and wheat in combination for grain. |

## FORAGE PLANTS

| | |
|---|---|
| Ag. 1. | Indian corn, variety tests for ensilage purposes. |
| Ag. 2. | Indian corn, variety tests for the production of grain. |
| Ag. 7. | Indian corn, breeding. |
| Ag. 16. | Mangels, variety tests for yield and purity. |
| Ag. 36. | Carrots, variety tests for yield and purity. |
| Ag. 51. | Swedes, variety tests for yield and purity. |
| Ag. 53. | Swedes, early vs. late seeding. |
| Ag. 58. | Swedes, seed production as a commercial venture. |
| Ag. 59. | Swedes, methods of planting stecklings for seed production. |
| Ag. 64. | Rape, variety tests. |
| Ag. 66. | Sugar beets, variety tests for yield and purity. |
| Ag. 76. | Sunflowers, variety tests for yield and purity. |
| Ag. 127. | Alfalfa, inoculation. |
| Ag. 128. | Alfalfa, liming. |
| Ag. 129. | Alfalfa, broadcast vs. rows for hay production. |
| Ag. 133. | Alfalfa, seeding with vs. without a nurse crop for seed production. |
| Ag. 146. | Red clover, variety tests for yield and general suitability. |
| Ag. 148. | Red clover, rows vs. broadcast for seed production. |
| Ag. 150. | Red clover, cutting at different dates for seed. |
| Ag. 151. | Red clover, seed growing vs. hay for profit (Combination AG and F.H.) |
| Ag. 161. | Sweet clover, variety tests. |
| Ag. 255. | Miscellaneous grasses, variety tests. |
| Ag. 256. | Miscellaneous legumes, variety tests. |
| Ag. 257. | Forage crops other than legumes and grasses. Variety tests. |
| Ag. 258D. | Hay and pasture mixture experiment, red clover as a base. |
| Ag. 258E. | Hay and pasture mixtures experiment, mixed clovers as a base. |
| Ag. 258H. | Hay and pasture mixtures experiment, alsike clover as a base. |
| Ag. 258I. | Hay and pasture mixtures experiment, seeding hay mixtures with different nurse crops. |

## CHEMISTRY

| | |
|---|---|
| C. 8. | Fertilizer formulae for potatoes, experiment, 1922. |
| C. 26. | Basic slag experiment, 1923. |
| C. 10. | Sugar beet investigation. |
| C. 11. | Agricultural meteorology. |
| C. 96. | Basic slag on pastures experiment, 1923. |
| C. 98. | Fertilizers on pastures experiment, 1923. |
| C. 99. | Apple orchard fertilizer experiment, 1923. |

## POULTRY

| | |
|---|---|
| P. 1. | Best make of incubator. (Candee-Buckeye-Tamlin.) |
| P. 3. | Best date for incubation. |
| P. 12. | Hatching results by breeds (B.R. and W.W.) |
| P. 31. | Rearing costs. |
| P. 32. | Feeding methods in rearing. |
| P. 38. | Methods and rations for fattening and feeding capons. |
| P. 39. | Costs of feeding and producing capons. |
| P. 50. | Best marketing date for capons. |
| P. 56. | Pedigree breeding for egg production (W.W.) |
| P. 58. | Best hatching date for egg production. |
| P. 60. | Pullets vs. hens for egg production. |

## POULTRY—*Concluded.*

| Project No. | Title. |
|---|---|
| P. 62. | Costs of egg production Exp. (a) per dozen. |
| P. 66. | Best type of laying house. |
| P. 70. | Best type of floor for laying house. |
| P. 76. | Standard (home-mixed) vs. commercial grain. |
| P. 79. | Standard (home-mixed) vs. commercial mashes. |
| P. 82. | Skim-milk vs. beef scrap. |
| P. 92. | Clover vs. sprouted oats. |
| P. 105. | Buttermilk vs. water. |
| P. 111. | Breeding for fertility, hatchability and livability Exp. (a) Hens vs. pullets. |

## APIARY

| | |
|---|---|
| Ap. 1. | Control of swarming by dequeening and requeening. |
| Ap. 2. | Control of swarming by separation of brood and queen. |
| Ap. 5. | Methods of detecting preparations for swarming. |
| Ap. 8. | Wintering in 4-colony cases. |
| Ap. 20. | Returns from apiaries. |
| Ap. 21. | Comparison of different sizes of hives. |
| Ap. 22. | Package bees as a means of starting colonies. |
| Ap. 30. | Outdoor versus cellar wintering. |
| Ap. 37. | Comparison of methods for building up colonies in the spring. |
| Ap. 45. | Methods of increase without natural swarming. |

## FIBRE PLANTS

| | |
|---|---|
| E. 3. | Testing varieties of flax. |
| E. 4. | Testing varieties of hemp. |
| E. 7. | Seeding tests, sowing flax at different dates. |

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