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 1930

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

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### NOTES ON THE SEASON

The winter was free from extremes and the orchards, pastures, and hay lands came through with practically no winter-killing.

The fields were covered with 20 inches of snow at the beginning of the year. Rains on January 3, 8 and 9 removed the snow, but the fields were again covered with snow on the 10th of the month. The snow was 2 feet deep on February 10, but was reduced to 16 inches by 1·47 inches of rain on February 13 and 14. The remaining snow was gradually removed by the sun and an occasional rain, so that the fields were bare on the 13th of March. Five inches of snow fell on March 18 and was removed by rain on the 25th and 26th of the month. The last snow fell on April 25. It disappeared at once.

The spring opened early and as there were splendid stands of grass and clover on both meadows and pastures the growth was rapid.

The total precipitation from April 8 to May 14 inclusive was 0·44 of an inch. This light precipitation, together with the warm weather the first two weeks of May, dried up the fields and enabled farmers to finish seeding two weeks earlier than usual.

Ploughing was begun April 30 and was general May 5. The previous year ploughing was begun on May 9. The first dates of seeding under field conditions were: wheat, May 6; oats, May 1; barley, May 14; potatoes, May 14; corn, May 23; swedes, May 26; and sunflowers, June 5.

The precipitation for the growing period May 1 to September 30 inclusive was 14·08 inches as compared with a seventeen-year average of 15·77 inches. The rainfall in June was 1·79 inches, which was 1·37 inches less than the seventeen-year average.

The dry weather did not check growth to any appreciable extent. Crops were well established earlier than usual and were able to withstand the dry weather in June; also the rainfall, although light, was timely.

Field crops made splendid growth throughout the entire season and for the most part were of excellent quality. Hay had an unusually high percentage of clover. Grain was well filled and there was practically no lodging. Corn matured well; potatoes were a heavy crop and free from rot. Apples and small fruit, with the exception of strawberries, were good. Swedes and turnips were a heavy crop but the quality was poor. Vegetables were good.

Weather conditions during the entire harvest season favoured the storing of hay, grain, corn fodder, potatoes, vegetables and roots in good condition.

Five degrees of frost were recorded on October 20—this was the first killing frost. It was possible to plough every day until November 27. One-half inch snow fell on November 27. With the exception of slight flurries, this was the first snow of the season. Sheep were not housed until November 28.

The Saint John river froze over on the night of December 2. December was not a cold month, but there were no definite thaws after the 2nd of the month. The ice on the Saint John river was 10 inches thick on December 31.

TABLE 1.—1930 METEOROLOGICAL RECORDS

| Month | Temperature (F.) | | | | | | Precipitation | | | | Sunshine | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Maximum | | Minimum | | Rain | Snow | Total precipitation | | 1930 | Average, 17 years |
| | 1930 | Average, 17 years | Highest | Mean Maximum | Lowest | Mean Minimum | | | 1930 | Average, 17 years | | |
| | ° | ° | ° | ° | ° | ° | in. | in. | in. | in. | hours | hours |
| January | 14·24 | 12·75 | 51·0 | 25·00 | −20·0 | 3·48 | 1·14 | 21·5 | 3·29 | 3·53 | 105·8 | 105·33 |
| February | 16·43 | 14·39 | 45·0 | 27·96 | −24·0 | 4·91 | 1·76 | 11·0 | 2·86 | 2·72 | 128·3 | 122·01 |
| March | 27·75 | 26·74 | 49·0 | 35·93 | − 8·0 | 19·56 | 4·30 | 8·0 | 5·10 | 2·96 | 147·2 | 147·56 |
| April | 38·38 | 39·94 | 66·0 | 48·93 | 11·0 | 27·83 | 2·04 | 3·0 | 2·34 | 3·19 | 194·5 | 160·83 |
| May | 51·78 | 51·03 | 77·0 | 64·29 | 31·0 | 39·27 | 2·34 | ..... | 2·34 | 2·53 | 219·8 | 200·78 |
| June | 67·64 | 60·66 | 92·0 | 79·86 | 38·0 | 55·41 | 1·79 | ..... | 1·79 | 3·16 | 231·4 | 208·50 |
| July | 66·54 | 65·52 | 88·0 | 77·38 | 45·0 | 55·7 | 4·26 | ..... | 4·26 | 3·19 | 220·8 | 222·98 |
| August | 63·2 | 63·87 | 85·0 | 74·03 | 43·0 | 52·38 | 3·72 | ..... | 3·72 | 2·75 | 222·9 | 205·68 |
| September | 57·51 | 56·20 | 82·0 | 67·43 | 37·0 | 47·6 | 1·97 | ..... | 1·97 | 3·14 | 164·2 | 166·61 |
| October | 47·62 | 46·10 | 84·0 | 57·54 | 20·0 | 37·7 | 1·82 | ..... | 1·82 | 3·54 | 138·9 | 144·43 |
| November | 35·2 | 32·87 | 59·0 | 45·3 | 8·0 | 25·1 | 1·52 | 1·5 | 1·67 | 2·81 | 113·5 | 92·47 |
| December | 20·62 | 19·29 | 51·0 | 28·64 | −7·0 | 12·61 | 0·55 | 22·0 | 2·75 | 3·11 | 74·2 | 88·61 |
| 1930 | 42·24 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 33·91 | 37·63 | 1,970·5 | 1,865·79 |

## ANIMAL HUSBANDRY

The work carried on under this division consisted of breeding and feeding experiments, cost of production, and demonstrational work.

### CATTLE

There were thirty Ayrshires and sixteen Holsteins at the Station on January 1, 1931.

The herd was blood tested for contagious abortion three times during the year. These tests were commenced in 1928 in co-operation with the Health of Animals Branch. There were no positive reactions from the last two tests.

#### SUMMER FEEDING

The experiment testing the merits of close grazing, rotational grazing, and heavy fertilization of pasture was continued.

The fertilizer applied during the past three years has greatly increased the carrying capacity of the field and it has also changed the character of the herbage. Last summer there was a large percentage of White Dutch clover on the fertilized area, while the growth on the unfertilized area was largely brown-top. The high quality of the herbage on the fertilized area has made it possible to dispense almost entirely with millfeed during June, July, and August. The cows have not been fed any green feed while at pasture since the experiment started. In previous years it was necessary to start feeding green feed about the 1st of August in order to maintain the milk flow. There was an abundance of aftergrass on some of the hay fields this year, so, beginning August 11, the heavier milking cows were taken off the plots to utilize this feed. A full report of this experiment is given in the fertilizer section of this report.

#### WINTER FEEDING

The roughage ration for the winter consisted chiefly of mixed clover and timothy hay, swedes, and silage. The silage was corn, sunflowers, oats, and peas. A small quantity of other feeds, such as mangels, were fed, but they were not considered the main feed.

The meal ration varied at times, owing to the nature of the feeds on hand, but consisted for the most part of bran, one part; crushed oats, one part; brewers' grains, two parts; and oilcake, two parts. One per cent salt and one per cent bone char were added at mixing.

## DAIRY HERD RECORDS

Table 2 shows the milk records of all the milch cows that finished a lactation period during the year 1930. For heifers with their first calf, feed is charged from date of freshening. For cows with previous lactation periods, feed is charged for the period during which they were dry before beginning the lactation period here recorded. The following prices were charged for feed:—

| | |
|---|---|
| Hay | $ 7 86 per ton |
| Roots | 4 03 " |
| Ensilage | 4 05 " |
| Meal mixture | 42 00 " |
| Pasture | 2 00 per month |

These values represent the cost of production of hay (after allowing for 10 per cent shrinkage in the mow), the cost of production of roots and ensilage for 1929, and the prices paid for carload lots of feed plus small charge for hauling from car to barn and mixing of the grains which made up the meal mixture.

TABLE 2.—INDIVIDUAL MILK RECORDS DURING YEAR 1930

| Name of cow | Age at beginning of lactation period | Date of dropping calf | Number of days in lactation period | Total pounds of milk for period | Daily average yield of milk | Average per cent fat in milk | Pounds of butter produced in period | Value of butter at 30c. per pound | Value of skim-milk at 20c. per cwt. | Total value of product | Amount of meal eaten at $42 per cwt. | Amount of roots at $4.03 per ton and ensilage at $4.05 per ton | Amount of hay eaten at $7.86 per ton | Months on pasture at $2.00 per mont | Total cost of feed for period | Cost to produce 100 pounds of milk | Cost to produce 1 pound butter skim-milk neglected | Profit on 1 pound butter skim-milk neglected | Profit on cow during period labour and calf neglected |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | years | | | lb. | lb. | p.c. | lb. | $ | $ | $ | lb. | lb. | lb. | mos. | $ | $ | cts. | cts. | $ |
| *Ayrshire* | | | | | | | | | | | | | | | | | | | |
| Fredericton Pansy | 6 | Jan. 9, 1930 | 280·5 | 6,298·2 | 22·45 | 4·18 | 309·49 | 92·85 | 12 07 | 104 92 | 1,715 | R- 6,390 E- 1,370 | 2,370 | 4·74 | 70 46 | 1·119 | 22·8 | 7·2 | 34 46 |
| Fredericton Starlight | 5 | Oct. 30, 1929 | 259·5 | 6,231·6 | 24·87 | 4·36 | 319·38 | 95 81 | 11 92 | 107 73 | 2,109 | R- 9,256 E- 1,270 | 3,375 | 3·39 | 85 55 | 1·373 | 26·8 | 3·2 | 22 18 |
| Fredericton Briery | 4 | Sept. 1, 1929 | 366·5 | 9,138·7 | 24·93 | 4·08 | 438·87 | 131 66 | 17 53 | 149 19 | 2,364 | R- 9,531 E- 1,270 | 3,382 | 5·93 | 96 56 | 1·057 | 22·0 | 8·0 | 52·63 |
| Fredericton Spottie | 5 | Oct. 12, 1929 | 325·5 | 8·742·8 | 26·85 | 4·23 | 434·83 | 130 45 | 16 74 | 147 19 | 2,995 | R-12,141 E- 1,370 | 3,375 | 4·75 | 112 89 | 1·291 | 26·0 | 4·0 | 34 30 |
| Lennoxville Dairymaid 9th | 4 | Sept. 2, 1929 | 266·0 | 6,224·6 | 23·40 | 4·27 | 312·69 | 93 81 | 11 91 | 105 72 | 1,774 | R- 9,531 E- 1,285 | 3,335 | 3·30 | 78 76 | 1·265 | 25·2 | 4·8 | 26 96 |
| Lennoxville Dairymaid 8th | 4 | Oct. 2, 1929 | 335·0 | 4,775·0 | 14·25 | 3·58 | 201·16 | 60 35 | 9 20 | 69 55 | 1,764 | R- 9,531 E- 1,270 | 3,350 | 6·59 | 85 16 | 1·783 | 42·3 | −12·3 | −15 61 |
| Lennoxville Marjorie 4th | 6 | Mar. 15, 1930 | 252·0 | 4,745·0 | 18·82 | 4·39 | 245·15 | 73 55 | 9 07 | 82 62 | 1,135 | R- 8,488 E- 1,370 | 2,990 | 4·86 | 65 18 | 1·374 | 26·6 | 3·4 | 17 44 |
| Fredericton Spottie 3rd | 2 | Feb. 18, 1930 | 300·0 | 6,857·0 | 22·85 | 4·29 | 346·28 | 103 88 | 13 12 | 117 00 | 1,870 | R- 6·212 E- 1,370 | 2,303 | 4·86 | 73 33 | 1·069 | 21·2 | 8·8 | 43 67 |
| Lennoxville Bettina 6th | 2 | Feb. 28, 1930 | 288·0 | 5,291·9 | 18·37 | 4·11 | 256·01 | 76 80 | 10 14 | 86 94 | 1,360 | R- 5,662 E- 1,370 | 2,149 | 4·86 | 60 91 | 1·151 | 23·8 | 6·2 | 26 03 |
| Average for breed | ..... | ..... | 296·0 | 6,478·3 | 21·88 | 4·18 | 318·20 | 95 46 | 12 41 | 107 87 | 1,898 | R- 8,526 E- 1,327 | 2,958 | 4·80 | 80 95 | 1·250 | 25·4 | 4·6 | 26 92 |
| *Holstein* | | | | | | | | | | | | | | | | | | | |
| Francy DeKol Posch | 7 | Mar. 1, 1930 | 297·5 | 10,340·0 | 34·75 | 3·02 | 367·42 | 110 23 | 20 05 | 130 28 | 2,655 | R- 9,649 E- 1,370 | 3,455 | 4·86 | 101 27 | ·979 | 27·6 | 2·4 | 29 01 |
| Fredericton Johanna Alcartra | 5 | Dec. 6, 1929 | 316·0 | 10,587·9 | 33·50 | 3·48 | 433·87 | 130 16 | 20 43 | 150 59 | 3,255 | R-11,134 E- 1,370 | 3,683 | 5·80 | 119 64 | 1·130 | 27·6 | 2·4 | 30 95 |
| Fredericton Frances | 5 | Feb. 25, 1930 | 278·5 | 8·941·6 | 32·10 | 3·18 | 334·67 | 100 40 | 17 31 | 117 71 | 1,969 | R- 8,929 E- 1,370 | 3,323 | 4·86 | 84 89 | ·949 | 25·4 | 4·6 | 32 82 |
| Average for breed | ..... | ..... | 297·3 | 9,956·5 | 23·48 | 3·23 | 378·65 | 113 60 | 19 26 | 132 86 | 2,626 | R- 9,904 E- 1,370 | 3,487 | 5·17 | 101 92 | 1·024 | 26·9 | 3·1 | 30 94 |

R—Roots. E—Ensilage.

COST OF REARING DAIRY HEIFERS

Calves were fed whole milk until three to four weeks of age, and then they were gradually changed to skim-milk. A fat substitute composed of one part flax seed and four parts crushed oats was added to the skim-milk. Each calf was fed from one-quarter to one pound of this fat substitute per day, the amount depending upon the age and condition of the calf. The calves were also fed hay, roots, and dry grain as soon as they would eat them. The composition of this dry meal mixture varied slightly at times, owing to the nature of the feed on hand, but was mainly made up of three parts bran, two parts crushed oats, one part oilcake, and one part brewers' grains. The aim in feeding was to keep the calves growing and to avoid a setback.

Yearlings and two-year-old heifers were turned to pasture on May 23. They were wintered on hay, roots, and silage. Two pounds of grain each per day were fed to some of the heifers to keep them in thrifty condition. The feed costs are shown in table 3.

TABLE 3.—COST OF RAISING DAIRY HEIFERS

Average cost of feed—birth to one year for four heifers
(3 Ayrshires, 1 Holstein)

| Item | Amount of feed consumed | Cost of feed |
|---|---|---|
| | lb. | $ |
| New milk at $40 per ton | 354 | 7 08 |
| Skim-milk at $4 per ton | 3,258 | 6 52 |
| Fat substitute at $50 per ton | 175 | 4 38 |
| Dry meal at $37.50 per ton | 772 | 14 48 |
| Turnips at $4.03 per ton | 1,524 | 3 07 |
| Ensilage at $4.05 per ton | 707 | 1 43 |
| Hay at $7.86 per ton | 966 | 3 80 |
| Pasture at 1·5 cents per day | 84 days | 1 26 |
| Average cost of feed per head | ..... | 42 02 |
| Average weight at 1 year | 604 lb. | |

Average cost of feed—one to two years for four heifers
(3 Ayrshires, 1 Holstein)

| | lb. | $ |
|---|---|---|
| Dry meal at $37.50 per ton | 275 | 5 16 |
| Turnips at $4.03 per ton | 3,303 | 6 66 |
| Ensilage at $4.05 per ton | 1,497 | 3 03 |
| Hay at $7.86 per ton | 2,448 | 9 62 |
| Pasture at $1.50 per month | 4.45 mos. | 6 68 |
| Average cost of feed per head | ..... | 31 15 |
| Average cost of feed per head, birth to two years | ..... | 73 17 |
| Average weight at two years | 877 lb. | |

Average cost of feed—two years to calving, at an average of 2 years, 243 days for four heifers
(3 Ayrshires, 1 Holstein)

| Item | Amount of feed consumed | Cost of feed |
|---|---|---|
| | lb. | $ |
| Dry meal at $37.50 per ton | 76 | 1 43 |
| Turnips at $4.03 per ton | 4,040 | 8 14 |
| Ensilage at $4.05 per ton | 770 | 1 56 |
| Hay at $7.86 per ton | 2,180 | 8 57 |
| Pasture at $2 per month | $2.69 mos. | 5 38 |
| Average cost of feed per head | ..... | 25 08 |
| Average cost of feed per head, birth to freshening | ..... | 98 25 |
| Average weight 10 days after freshening | 999 lb. | |

## SHEEP

The flock on December 31, 1930, consisted of one aged ram, one ram lamb, 24 ewes and 16 ewe lambs. Pure-bred Shropshire is the breed kept at this Station.

### CONTROL OF PARASITES

EXTERNAL.—The flock was dipped in Cooper's dip in the spring and again in the fall. This treatment gave excellent results.

INTERNAL.—The flock was again given the copper sulphate-mustard drench for tapeworms and stomach worms. This is an excellent drench and has the added merit of being inexpensive. Directions for preparing and administering it may be obtained by writing to this Station.

### TREATMENT OF PREGNANT EWES WITH IODIZED SALT

This experiment has been carried on during the last four winters in order to determine if ewes would have stronger lambs if fed iodized salt during pregnancy. One-half of the breeding ewes at this Station had access to iodized salt during the time they were pregnant, while the remaining ewes had access to common salt. This iodized salt was prepared by drying the moisture out of 50 pounds of common salt and then sprinkling it with two ounces of potassium iodide dissolved in water. Allowing pregnant ewes access to iodized salt had little, if any, effect upon the strength of lambs in 1930. Similar results were obtained in 1927, while in 1928 and 1929 the ewes fed iodized salt during pregnancy had, generally speaking, stronger lambs than the ewes which had access to common salt. This experiment will be continued, but from results obtained to date, it would seem advisable to feed iodized salt where weak goitrous or flabby lambs are common.

### MAINTENANCE OF FLOCK

The sheep were housed on November 19, 1929, and went to pasture May 16, 1930. The ewes received one-half pound of meal each from October 21 to January 10. From March 11 to May 16 they again received meal. The amount was increased slightly after the ewes had lambed. This meal consisted of bran, 3 parts, crushed oats, 2 parts, and oil meal, one part. Pulped roots were fed at the rate of three pounds each per day from October 21 to May 16. Clover or mixed hay, largely clover, was fed from November 11 to May 16. The lambs were fed one-half pound grain each per day from the time they were housed in the fall until turned to pasture in the spring.

Twenty-six ewes had thirty-two lambs twenty-nine of which were successfully raised. The ewes were bred first to Minton 99-62072. This ram was imported in 1928 and the first year he was used, only eight ewes proved in lamb. In 1929 only one ewe proved in lamb after the first mating so the remainder of the ewes were bred to a ram secured from the Nappan Experimental Station. The lambs averaged 9·4 pounds at birth and on October 1, 86·7 pounds. Nine ram lambs were sold as breeders.

The breeding ewes sheared an average of 8·19 pounds of wool, the shearling ewes an average of 7·86 pounds and the ram sheared 10·8 pounds.

## HORSES

On January 1, 1930, there were seventeen horses in stock including eight pure-bred Clydesdales, one pure-bred Percheron, two pure-bred French Canadians, four grade Clydesdales and two general purpose horses.

The grain ration for the work horses consisted of a mixture of oats and bran. The percentage of the bran varied according to the character of the work. The horses worked a total of 23,475 hours. Eight heavy horses worked a total of 17,313 hours.

The cost of feed and horse-shoeing for these eight horses was as follows:—

| | |
|---|---|
| 26 tons 1,598 pounds of hay at $7.86 per ton | $ 210 64 |
| 962 bushels 12 pounds oats at 70½ cents per bushel | 678 45 |
| 3 tons 640 pounds bran at $29 per ton | 96 28 |
| 2 tons 339 pounds roots at $4.03 per ton | 8 74 |
| Horseshoeing at $3 for new shoes and $1.75 for changing shoes | 138 50 |
| Total cost (labour, interest, depreciation and drugs neglected) | $ 1,132 61 |
| Number of hours worked | 17,313 |
| Cost of horse labour per hour | 6·54 cents |

FEED COST OF RAISING YOUNG HORSES

The last three foals reared at this Station were not weaned until approximately six months of age. Until weaned each foal had access to the feed fed their dams, therefore records could not be kept of the feed consumed by these foals the first six months. Table 4 gives the average cost of feed for three horses from six months to two years and the average cost for two horses from six months to three years.

TABLE 4—FEED COST OF RAISING YOUNG HORSES

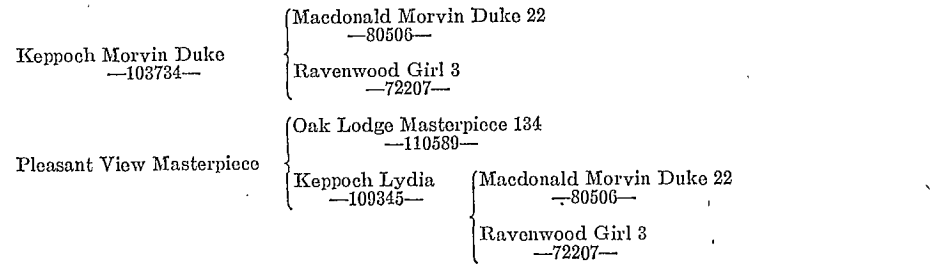
| — | | Average for 3 horses— 6 months to 2 years | Average for 2 horses— 6 months to 3 years |
|---|---|---|---|
| Oats | lb. | 2,156 | 3,696 |
| Bran | lb. | 1,039 | 1,631 |
| Roots | lb. | 437 | 524 |
| Hay | lb. | 4,812 | 8,076 |
| Pasture | months | 5·3 | 10·4 |
| Weight at beginning of period | lb. | 621 | 618 |
| Weight at end of period | lb. | 1,111 | 1,316 |
| Gain in period | lb. | 490 | 698 |
| *Statement of Costs* | | | |
| Oats at $40 per ton | $ | 43 12 | 73 92 |
| Bran at $29 per ton | $ | 15 07 | 23 65 |
| Roots at $4.03 per ton | $ | 0 88 | 1 06 |
| Hay at $7.86 per ton | $ | 18 91 | 31 74 |
| Pasture at $2 per month | $ | 10 60 | 20 80 |
| Total cost of feed | $ | 88 58 | 151 17 |

## SWINE

The breeding herd of swine at this Station on December 31, 1930, numbered eighteen head, consisting of two pure-bred Yorkshire boars and sixteen pure-bred sows. The females in the herd were all bred at the Station and were sired by present or former sires in service including Ottawa Alexander 239 —120064—, Brandon A.F. 336 —130240—, and Keppoch Morvin Duke —103734—.

Keppoch Morvin Duke —103734— the sire in service last year and in part service this year has contributed more to herd advancement than has any other boar in recent years. Nine of the sixteen females making up the present herd were sired by him. He also sired all litters entered in advanced registry test by this Station in 1930.

For 1930 fall service, it was necessary to secure a new boar and Pleasant View Masterpiece —134120— was selected. This boar is two and a half years of age and was first prize aged boar at all of the Maritime fairs this year. There is always danger in introducing an outcross of new blood in a herd. The relationship of our present herd sires is portrayed in the following diagram:—




Local patronage for boar service continues to increase. This makes it necessary to maintain two boars in service during the fall months. The use of Sation boars is making itself felt locally in a better class of swine. Farmers are also feeding better, due to coming in contact with Station practice. Mangels are being grown to a greater extent than formerly.

The demand for breeding stock of all ages is keen. A normal number of weanlings were disposed of in the spring months as breeders. Only the best were shipped out, the more common kind being disposed of as feeders or held and fed at the Station. During the past summer and fall there was a very heavy inquiry for stock of both sexes of serviceable age. All superfluous breeding stock was consequently disposed of.

For the first time in many years, this Station made an exhibit of swine at Fredericton Exhibition. Eight head were entered, and while competition was very keen this year with entries from all three Maritime Provinces, the Station swine made a good impression, winning first prize aged herd, grand champion female, first and second prize aged sows, first prize year-old boar, first prize single bacon hog, first prize pair of bacon hogs, third prize aged boar, and third prize year-old sow.

TABLE 5—FARROWING RECORDS

| Sow number | Advanced registry designation | Sire of litter | Farrowing date | Number of pigs in litter | Number reared |
|---|---|---|---|---|---|
| 674 | XT 19-2 | Keppoch Morvin Duke | April 3, 1930 | 15 | 12 |
| 678 | XT | Keppoch Morvin Duke | April 7, 1930 | 11 | 9 |
| 331 | XP | Keppoch Morvin Duke | April 13, 1930 | 9 | 8 |
| 682 | XN | Keppoch Morvin Duke | April 14, 1930 | 12 | 11 |
| 679 | XR | Keppoch Morvin Duke | April 16, 1930 | 13 | 12 |
| 675 | XX 19-1 | Keppoch Morvin Duke | April 17, 1930 | 14 | 10 |
| 673 | XN 19-2 | Keppoch Morvin Duke | April 30, 1930 | 13 | 13 |
| 680 | XS | Keppoch Morvin Duke | May 8, 1930 | 9 | 6 |
| | | Total | | 96 | 81 |

Average number of pigs farrowed per spring litter ..... 12
Average number of pigs reared per spring litter ..... 10·13
Percentage of pigs reared per spring litter ..... 84·38

In quality, uniformity, and freedom from physical defects, this year's litters were outstanding. This, as in size of litter and other desirable features, is due to selection. The extent to which milking ability has developed in certain strains may be gauged from the performance of sow 682. Her litter of eleven pigs

weighed 345 pounds when weaned at six weeks of age. Rupture has been practically eliminated from the herd; of ninety-six pigs farrowed in the spring, only two were ruptured.

The following table gives the weight of all litters at six weeks of age—i.e., at weaning time; also the average weight per pig at weaning:—

TABLE 6.—PERFORMANCE OF LITTERS

| Sow number | Advanced registry designation | Number of pigs weaned | Weight of litter at six weeks | Average weight per pig at six weeks |
|---|---|---|---|---|
| | | | lb. | lb. |
| 381 | XP | 8 | 226 | 28·2 |
| 682 | XN | 11 | 345 | 31·2 |
| 675 | XX 19–1 | 10 | 292 | 29·2 |
| 678 | XT | 9 | 205 | 22·7 |
| 679 | XR | 12 | 259 | 21·5 |
| 674 | XT 19–2 | 12 | 245 | 20·4 |
| 673 | XN 19–2 | 13 | 262 | 20·1 |

It is significant to note that the first three sows are closely related. Thus sow 682 is a daughter of 381 and sow 675 is a granddaughter of sow 381. The other sows in the table belong to another branch of the Augustine family.

### COST OF REARING LITTERS

*Statement of feed fed to sows from breeding date to date of farrowing—*

| | |
|---|---|
| Roots (mangels) 766 pounds at $3.18 per ton | $ 1 22 |
| Crushed oats 259 pounds at $44 per ton | 5 70 |
| Shorts 211 pounds at $28 per ton | 2 95 |
| Bran 130 pounds at $29 per ton | 1 89 |
| Middlings 130 pounds at $35 per ton | 2 28 |
| Corn 16 pounds at $40 per ton | 0 32 |
| Oil meal 8 pounds at $50 per ton | 0 20 |
| Skim-milk 1,010 pounds at $4 per ton | 2 02 |
| Total | $16 58 |

*Statement of feed from birth to weaning—*

| | |
|---|---|
| Roots (mangels) 375 pounds at $3.18 per ton | $ 0 60 |
| Crushed oats 168 pounds at $44 per ton | 3 70 |
| Shorts 42 pounds at $28 per ton | 0 59 |
| Bran 84 pounds at $29 per ton | 1 22 |
| Middlings 84 pounds at $35 per ton | 1 47 |
| Corn 42 pounds at $40 per ton | 0 84 |
| Oil meal 25 pounds at $50 per ton | 0 63 |
| Skim-milk 1,260 pounds at $4 per ton | 2 52 |
| Total | $11 57 |

*Statement of Costs*

| | |
|---|---|
| Boar service | $ 1 00 |
| Feed to birth | 16 58 |
| Feed, birth to weaning | 11 57 |
| Total cost of weaning | $29 15 |
| Average cost per pig (10·12 pigs per litter) | $ 2 92 |

### ADVANCED REGISTRATION OF SWINE

Co-operating with the Dominion Live Stock Branch, this Station entered six sows in the advanced registry test. These sows all made creditable records and all qualified for the advanced registry notwithstanding the fact that material deductions were made in the score due to overweight carcasses. In live grading, the progeny of all six sows qualified as selects.

The minimum score required for a sow to qualify is as follows:—

Production—40 (5 points for each pig weaned at six weeks).
Maturity—100.
Slaughter test—75.

The following is the record of the various Station sows entered in 1930:—

TABLE 7.—RECORDS OF SOWS

| Sow | Score for production | Score for maturity | Score for slaughter test | Score for slaughter test after deductions for overweight carcasses |
|---|---|---|---|---|
| XR | 60 | 117 | 82 | 74 |
| XT 19-2 | 60 | 111 | 76 | 76 |
| XT | 45 | 114 | 79 | 73 |
| XP | 40 | 109 | 85 | 83 |
| XN | 55 | 108 | 76 | 76 |
| XN 19-2 | 65 | 112 | 74 | 72 |
| Average | 54·1 | 111·8 | 78·66 | 74·66 |

NOTE.—A score of 70 in the slaughter test qualified a sow this year, due to the fact that they were tested under previously issued regulations.

Canadian "belly" bacon is reputed to be too thin. It is worthy of note that the Station hogs were particularly high in this regard, all scoring 23 or over out of a possible score of 25; i.e. from 92 to 100 per cent.

TABLE 8.—THE RELATIVE PERFORMANCE OF PIGS FROM DIFFERENT LITTERS

| Sow | Total weight of four pigs slaughtered (carcass) | Average weight of four pigs slaughtered (carcass) | Average age (birth to slaughter) | Live grading |
|---|---|---|---|---|
| | lb. | lb. | days | |
| XR 19 | 678·5 | 169·6 | 181 | All selects |
| XT 19-2 | 613·5 | 153·4 | 183 | All selects |
| XT 19 | 636·75 | 159·19 | 180·7 | All selects |
| XP 19 | 642·25 | 160·6 | 190·7 | All selects |
| XN 19 | 648·25 | 162·06 | 190·7 | All selects |
| XN 19-2 | 620·25 | 155·06 | 179·7 | All selects |

TABLE 9.—DAILY GAINS, FEED COST AND NET RETURNS OF FEEDER HOGS IN RECORD OF PERFORMANCE TEST

| — | | Group XR 19 | Group XT 19-2 | Group XT 19 | Group XP 19 | Group XN 19 | Group XN 19-2 |
|---|---|---|---|---|---|---|---|
| Average daily gain | lb. | 1·54 | 1·42 | 1·44 | 1·35 | 1·39 | 1·51 |
| Meal per pound gain | lb. | 2·99 | 2·91 | 2·91 | 3·19 | 3·01 | 2·94 |
| Feed cost per 100 pounds gain | $ | 6 65 | 6 55 | 6 54 | 7 11 | 6 74 | 6 61 |
| Cash returns (5 pigs) | $ | 127 17 | 119 30 | 122 90 | 122 08 | 122 22 | 120 65 |
| Net returns (birth to finish) | $ | 52 12 | 49 38 | 49 94 | 43 94 | 50 46 | 50 15 |
| Average net return per pig | $ | 10 42 | 9 87 | 9 98 | 8 78 | 10 09 | 10 03 |

NOTE.—All hogs sold at $11.25 per hundred with a premium of $1.00 per head for selects.

This concludes three years' experience in advanced registry work. The variations in the performance of various individuals and strains in production, early maturity and quality of carcass justified advanced registration as an economic necessity, because it enables the breeder to determine his most productive strains, families or individuals, and at the same time due recognition is given to quality and early maturity.

## FIELD HUSBANDRY

Field husbandry work during the year included production costs with hay, grain, root and ensilage crops, rotation experiments with three, four, five, and six-year rotations, experiments with manure and fertilizer in the rotation, cultural experiments with corn—hills versus rows, and rates of seeding oats and wheat.

The fields were covered with snow during December, but snow was removed by rain the first week in January; however, the fields were again covered with snow on the 10th of the month. Ground was well covered with snow during the remainder of January and February and this snow was removed by the sun and occasional rains so that the fields were bare by the middle of March. The spring opened early and as there were splendid stands of grass and clover on both meadows and pastures, the growth was rapid.

The total precipitation from April 8 to May 14 inclusive was 0·44 of an inch. This light precipitation allowed the fields to dry out and enabled farmers to finish seeding two weeks earlier than usual. Ploughing was begun on April 30 and was general May 5. The first dates of seeding under field conditions were: wheat, May 6; oats, May 1; barley, May 14; potatoes, May 14; corn, May 23; swedes, May 26; sunflowers, June 5.

The rainfall for the growing period, May 1 to September 30, was 1·69 inches lower than the seventeen-year average. This light rainfall was mostly accounted for by the small precipitation in June, when the rainfall was 1·37 inches less than the seventeen-year average. Crops were well established earlier than usual and they were very little affected by the dry weather in June; also the rainfall, though light, was timely.

Field crops made splendid growth throughout the entire season. Hay had an unusually high percentage of clover; the grain was well filled and there was less lodging than usual. Corn matured well and potatoes were a heavy crop and free from rot. Swedes were a heavy crop but the quality was poor, as at least 50 per cent of the roots were affected with brown core or watery heart.

Weather conditions were favourable during the harvest season and crops were stored in good condition. Pastures were good in the early season, but the growth was slow during the latter part of the summer. The first killing frost came on October 20, when five degrees of frost were recorded. It was possible to plough every day until November 27.

The six-year rotation of hoe crop, grain, hay, hay, hay, and grain, begun in 1927, has been continued in our general farm rotation. In this rotation, barnyard manure supplemented with commercial fertilizer is applied for the hoed crop and barnyard manure at the rate of eight tons per acre is applied as a top dressing after the second-year hay crop is removed. While this rotation is fairly satisfactory, it is becoming more apparent each year that it provides too much ensilage and roots as compared with hay, straw and grain to make it satisfactory for a live stock farm. There is always a surplus of ensilage and it is necessary each year to buy a considerable quantity of grain and straw.

## CROP PRODUCTION COSTS

All materials and operations in the cost of production tables are charged at the 1930 prices, which are:—

| | |
|---|---|
| Rent and taxes | $ 3 00 per acre |
| Machinery | 2 85 per acre |
| Manure | 1 50 per ton |
| Nitrate of soda | 51 50 per ton |
| Sulphate of ammonia | 47 00 per ton |
| Superphosphate | 17 00 per ton |
| Muriate of potash | 40 75 per ton |
| Mixing fertilizer | 2 00 per ton |
| Timothy | 10 00 per cwt. |
| Red clover | 22 00 per cwt. |
| Alsike clover | 16 00 per cwt. |
| Alfalfa | 37 00 per cwt. |
| Oats | 1 00 per bushel |
| Barley | 1 25 per bushel |
| Wheat | 1 75 per bushel |
| Peas | 3 50 per bushel |
| Vetch | 3 30 per bushel |
| Swedes | 0 75 per pound |
| Corn | 4 00 per cwt. |
| Sunflowers | 0 10 per pound |
| Twine | 15 50 per cwt. |
| Manual labour, teamster and tractor operator | 0 25 per hour |
| Horse labour | 0 10 per hour |
| Threshing oats | 0 08 per bushel |
| Threshing wheat and barley | 0 10 per bushel |

The cost of manure and fertilizer is distributed to the various crops in the rotation on the following basis:—

TABLE 10.—MANURE AND FERTILIZER

| | Three-year rotation | | Four-year rotation | | Six-year rotation | |
|---|---|---|---|---|---|---|
| | Manure | Fertilizer | Manure | Fertilizer | Manure | Fertilizer |
| | % | % | % | % | % | % |
| First crop | 50 | 60 | 40 | 55 | 40 | 55 |
| Second crop | 30 | 30 | 30 | 30 | 25 | 30 |
| Third crop | 20 | 10 | 20 | 10 | 20 | 10 |
| Fourth crop | ..... | ..... | 10 | 5 | 10 | 5 |
| Fifth crop | ..... | ..... | ..... | ..... | 5 | ..... |
| Sixth crop | ..... | ..... | ..... | ..... | ..... | ..... |

### HAY—COST OF PRODUCTION IN A SIX-YEAR ROTATION

Haymaking was begun July 3 for odd lots and July 19 for main crop and finished August 2, the total crop being 182·70 tons. A good aftermath developed on some of the fields and 7·46 tons of second cutting clover were harvested.

Records of the cost of producing hay were kept from the first, second, and third crops in a six-year rotation of hoed crop, grain, hay, hay, hay, and grain. A share of the manure and fertilizer applied for the rotation was charged to the crop as previously noted. All of the red clover used in the seeding down was charged to the first-year hay crop. Timothy, alsike, and alfalfa were proportionately charged to the three hay crops in the rotation. The results are shown in table 11.

TABLE 11.—COST PER ACRE OF PRODUCING HAY IN A SIX-YEAR ROTATION

| — | | First-year hay | Second-year hay | Third-year hay | Average 1930 |
|---|---|---|---|---|---|
| Rent and taxes | $ | 3 00 | 3 00 | 3 00 | 3 00 |
| Manure | $ | 4 50 | 2 25 | 6 30 | 4 35 |
| Fertilizer | $ | 0 74 | 0 28 | ..... | 0 34 |
| Seed | $ | 2 11 | 0 79 | 0 79 | 1 23 |
| Machinery | $ | 2 85 | 2 85 | 2 85 | 2 85 |
| Manual labour | $ | 3 97 | 3 35 | 4 18 | 3 83 |
| Horse labour | $ | 1 18 | 0 89 | 1 04 | 1 04 |
| *Statement of Yield and Cost* | | | | | |
| Total cost per acre | $ | 18 35 | 13 41 | 18 16 | 16 64 |
| Yield per acre hay | tons | 1·72 | 1·96 | 2·91 | 2·20 |
| *Yield per acre dry matter | tons | 1·38 | 1·57 | 2·33 | 1·76 |
| †Average digestibility | % | 55 00 | 55 00 | 55 00 | 55 00 |
| Total yield per acre dry matter | tons | 0·76 | 0·86 | 1·28 | 0·97 |
| Cost per ton hay | $ | 10 67 | 6 84 | 6 24 | 7 56 |
| Cost per ton dry matter | $ | 13 30 | 8 54 | 7 79 | 9 45 |
| Cost per ton digestible nutrient | $ | 24 14 | 15 59 | 14 19 | 17 15 |

*Assuming that hay contains 80 per cent dry matter.
†Clover and timothy, Table 2 "Feeds and Feeding," Henry and Morrison 1923 edition.

## BARLEY—COST OF PRODUCTION IN A SIX-YEAR ROTATION

One acre of O.A.C. No. 21 barley was sown on May 14 on the New Land Field following third year hay. The field received a top dressing of eight tons of barnyard manure in 1929. Straw was rather short, but a fairly good crop was harvested under favourable weather conditions on August 18.

The results are shown in table 12.

TABLE 12.—BARLEY—COST OF PRODUCTION IN A SIX-YEAR ROTATION

| | | |
|---|---|---|
| Rent and taxes | $ | 3 00 |
| Manure | $ | 3 00 |
| Seed | $ | 2 50 |
| Machinery | $ | 2 85 |
| Twine | $ | 0 31 |
| Manual labour | $ | 4 45 |
| Horse labour | $ | 1 20 |
| Tractor labour | $ | 2 16 |
| Threshing | $ | 3 30 |
| *Statement of Yield and Cost* | | |
| Total cost per acre | $ | 22 77 |
| Yield per acre grain | bush. | 32·96 |
| Yield per acre grain | tons | 0·79 |
| Yield per acre straw | tons | 1·31 |
| Value of straw at $4 per ton | $ | 5 24 |
| Cost of grain per acre, considering value of straw | $ | 17 53 |
| *Dry matter | % | 90·7 |
| Yield grain per acre, dry matter | tons | 0·72 |
| †Average digestibility of grain | % | 88·0 |
| Yield grain per acre digestible nutrient | tons | 0·63 |
| Cost per bushel grain | $ | 0 53 |
| Cost per ton grain | $ | 22 19 |
| Cost per ton dry matter in grain | $ | 24 35 |
| Cost per ton digestible nutrient in grain | $ | 27 83 |

*Barley, table 1, "Feeds and Feeding", Henry and Morrison, 1923 edition.
†Barley, table 2, "Feeds and Feeding", Henry and Morrison, 1923 edition.

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PEAS—COST OF PRODUCTION IN A SIX-YEAR ROTATION

One acre of Chancellor peas was sown in the C.P.R. field on May 19. This land grew a crop of oats the previous year. The land received an application of eight tons of barnyard manure in 1928. In 1930, fifteen tons of barnyard manure and 1,000 pounds of a 2-12-5 fertilizer were applied to the land. The peas grew well at the beginning of the season, but were later attacked by aphides. They were harvested by hand with scythes on August 29 and 30. The results are shown in table 13.

TABLE 13.—PEAS—COST OF PRODUCTION IN A SIX-YEAR ROTATION

| | | |
|---|---|---|
| Rent and taxes | $ | 3 00 |
| Manure | $ | 11 40 |
| Fertilizer | $ | 6 81 |
| Seed | $ | 10 50 |
| Machinery | $ | 2 85 |
| Manual labour | $ | 8 69 |
| Horse labour | $ | 0 95 |
| Tractor labour | $ | 2 72 |
| Threshing | $ | 3 00 |
| Gasoline | $ | 0 80 |

*Statement of Yield and Cost*

| | | |
|---|---|---|
| Total cost per acre | $ | 50 72 |
| Yield per acre grain | bush. | 18·17 |
| Yield per acre grain | tons | 0·55 |
| Yield per acre straw | toss | 1 17 |
| Value of straw at $4 per ton | $ | 4 68 |
| Cost of grain per acre, considering value of straw | $ | 46 04 |
| *Dry matter | % | 90·8 |
| Yield grain per acre, dry matter | tons | 0 50 |
| †Average digestibility of grain | % | 87·0 |
| Yield grain per acre, digestible nutrient | tons | 0·44 |
| Cost per bushel grain | $ | 2 53 |
| Cost per ton grain | $ | 83 71 |
| Cost per ton dry matter in grain | $ | 92 08 |
| Cost per ton digestible nutrient in grain | $ | 104 04 |

*Peas, table 1 "Feeds and Feeding" Henry and Morrison, 1923 edition.
†Peameal, table 2 "Feeds and Feeding", Henry and Morrison, 1923 edition.

NOTE.—The crop was heavily infested with aphides which undoubtedly reduced the yield of peas considerably.

COST PER ACRE OF PRODUCING SUCCULENT FEED IN A SIX-YEAR ROTATION

Corn, sunflowers, turnips and oats and peas were grown in one acre blocks on a clay loam soil. In the fall of 1929, 15 tons of barnyard manure per acre were applied. This spring, the land was ploughed and cultivated with a spring tooth cultivator and smoothing harrow, and given an application of 1,000 pounds per acre of a 2-12-5 fertilizer.

Longfellow corn was sown on May 23. The crop was kept clean by cultivating and hand hoeing and a good crop was harvested on September 16.

Mammoth Russian sunflower seed was sown on June 5 at the rate of twelve pounds per acre. A good crop was harvested on August 22 when about fifty per cent of the plants were in blossom.

The oats, peas and vetch mixture, which was sown on May 19, consisted of Victory oats 2 bushels, Chancellor peas—1 bushel and Vetch—½ bushel. The crop was cut August 6. The crop was badly lodged and probably twenty per cent could not be cut.

Ditmar swedes were sown on May 26. They were harvested on October 17 and about eighty per cent of them were affected with "watery heart."

The results are shown in the following table 14.

TABLE 14.—COST PER ACRE OF PRODUCING SUCCULENT FEED IN A SIX-YEAR ROTATION

| Items | | Corn | Sunflowers | O.P.V. | Swedes |
|---|---|---|---|---|---|
| Rent and taxes | $ | 3 00 | 3 00 | 3 00 | 3 00 |
| Manure | $ | 11 40 | 11 40 | 11 40 | 11 40 |
| Fertilizer | $ | 6 81 | 6 81 | 6 81 | 6 81 |
| Seed | $ | 1 80 | 1 20 | 7 15 | 1 50 |
| Machinery | $ | 2 85 | 2 85 | 2 85 | 2 85 |
| Twine | $ | 0 62 | 0 62 | ..... | ..... |
| Manual labour | $ | 17 73 | 14 86 | 9 90 | 37 57 |
| Horse labour | $ | 4 98 | 4 18 | 2 63 | 5 34 |
| Tractor labour | $ | 2 72 | 2 72 | 2 72 | 2 72 |
| Rent of silage cutter and blower | $ | 1 60 | 1 40 | 0 57 | ..... |
| *Statement of Yield and Cost* | | | | | |
| Total cost per acre | $ | 53 51 | 49 04 | 47 03 | 71 19 |
| Total yield per acre | ton | 18·20 | 15·33 | 6·38 | 24·16 |
| Dry matter | % | 15·20 | 16·09 | 16·14 | 10·77 |
| Total yield per acre dry matter | ton | 2·77 | 2·47 | 1·03 | 2·60 |
| *Average digestibility | % | 64·00 | 58·00 | 65·00 | 87·00 |
| Total yield per acre digestible nutrient | ton | 1·77 | 1·43 | 0·67 | 2·26 |
| Cost per ton green weight | $ | 2 94 | 3 20 | 7 37 | 2 95 |
| Cost per ton dry matter | $ | 19 32 | 19 85 | 45 66 | 27 38 |
| Cost per ton digestible nutrient | $ | 30 23 | 34 29 | 70 19 | 31 50 |

*Table 2 "Feeds and Feeding", Henry and Morrison, 1923 edition.

## CULTURAL EXPERIMENTS

### VICTORY OATS—RATES OF SEEDING

Rates of seeding experiments were carried on with Victory oats, sown May 13 at the rates of 2, 2·5, 3, 3·5 and 4 bushels per acre. The soil is a medium clay loam and a grain crop had been grown on it the previous year. The land was ploughed in the fall and 100 pounds Chilean nitrate of soda, 750 pounds superphosphate and 160 pounds muriate of potash were applied in the spring. Plots were $\frac{1}{220}$ of an acre each when border effect had been eliminated by discarding the two outside rows on each side and a foot off each end. These were cut August 21. The results are shown in table 15.

TABLE 15—VICTORY OATS—RESULTS FROM DIFFERENT RATES OF SEEDING

| Rate of seeding | Yield per acre 1930 | | Average 5 years Yield per acre | |
|---|---|---|---|---|
| | Grain | Straw | Grain | Straw |
| | bush. | tons | bush. | tons |
| 2 bushels | 44·97 | 2·18 | 43·44 | 1·62 |
| 2·5 bushels | 45·79 | 2·14 | 45·38 | 1·60 |
| 3 bushels | 48·71 | 2·27 | 47·00 | 1·66 |
| 3·5 bushels | 48·85 | 2·22 | 50·15 | 1·74 |
| 4 bushels | 50·32 | 2·25 | 48·03 | 1·71 |

The results show that under soil and climatic conditions obtaining at Fredericton, the yield of oats is increased as the rate of seeding is increased up to 3·5 bushels per acre.

The following experiments were also carried on during the year: Cost of producing oats in a six-year rotation (1) following hoed crop; (2) following third-year hay; cost of producing wheat in a three-year rotation; rates of seeding Marquis Wheat; growing corn in hills versus drills, and the rotation experiments. Results of these experiments will be published when more data accumulate.

# HORTICULTURE

## TREE FRUITS

The winter of 1929-30 was free from extremes and the orchard suffered practically no winter injury. Most varieties were in full bloom by June 4, which was approximately two days earlier than the preceding year. Bloom was heavy on most varieties with the exception of Wealthy and McIntosh, and the date of harvesting was from one to two weeks earlier than the preceding year, depending upon the variety.

### ORCHARD FERTILIZER EXPERIMENT

Orchard fertilizer experiments, begun in previous years, were continued and will be reported at a later date. Trees not in these experiments were given an application of 5 pounds Chilean nitrate of soda, 2 pounds acid phosphate and 1 pound muriate of potash.

### APPLE POLLINATION

POLLINATION OF THE MCINTOSH VARIETY.—Hand pollination studies, with the object of determining the relative suitability of some of our common varieties as pollinators of McIntosh, commenced in 1929, were continued during the year. The varieties tested for this purpose were Dudley, Wealthy, Alexander, Lobo, Fameuse, and McIntosh, used also during the preceding year, and one additional variety, Melba. In order to reduce the possibility of error, due to individuality of trees, to a minimum, pollen from the above-mentioned varieties was applied to each of three McIntosh trees, using approximately the same number of blossoms for each kind of pollen. In addition, a check of a corresponding number of blossoms was left on each tree to be pollinated by natural agencies, and serving as a check on the hand-pollination work.

All flower clusters were thinned to two blossoms and the pollination work was done according to the Sax method, whereby blossoms are emasculated but not bagged.

The results of this experiment are given in table 16.

TABLE 16.—HAND-POLLINATION RESULTS WITH MCINTOSH

| Parent varieties | | Number blossoms pollinated | Blossoms maturing fruit | | Seed content | | Summary of 1929 and 1930 Experiments | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Mother variety | Pollen variety | | Number | Per cent | Number fruits | Number seeds per fruit | Blossoms pollinated | Per cent blossoms maturing fruit | Number fruits counted for seed content | Number filled seeds per fruit |
| McIntosh | McIntosh | 75 | 4 | 5·3 | 0 | 0·0 | 287 | 1·4 | 0 | 0·0 |
| " | Wealthy | 121 | 13 | 10·7 | 10 | 7·2 | 333 | 5·4 | 15 | 5·5 |
| " | Dudley | 91 | 13 | 14·3 | 13 | 6·5 | 313 | 16·6 | 45 | 5·8 |
| " | Lobo | 125 | 18 | 14·4 | 18 | 5·7 | 330 | 18·2 | 60 | 5·6 |
| " | Melba | 117 | 21 | 17·9 | 20 | 3·7 | ..... | ..... | ..... | ..... |
| " | Fameuse | 99 | 23 | 23·2 | 23 | 5·2 | 285 | 17·9 | 51 | 4·9 |
| " | Alexander | 113 | 27 | 23·9 | 26 | 5·2 | 291 | 16·8 | 48 | 4·3 |
| " | Open-pollinated Check | 105 | 46 | 43·8 | *70 | 5·0 | 307 | 30·0 | 110 | 4·9 |

*Seventy apples selected from the open-pollinated McIntosh Crop.

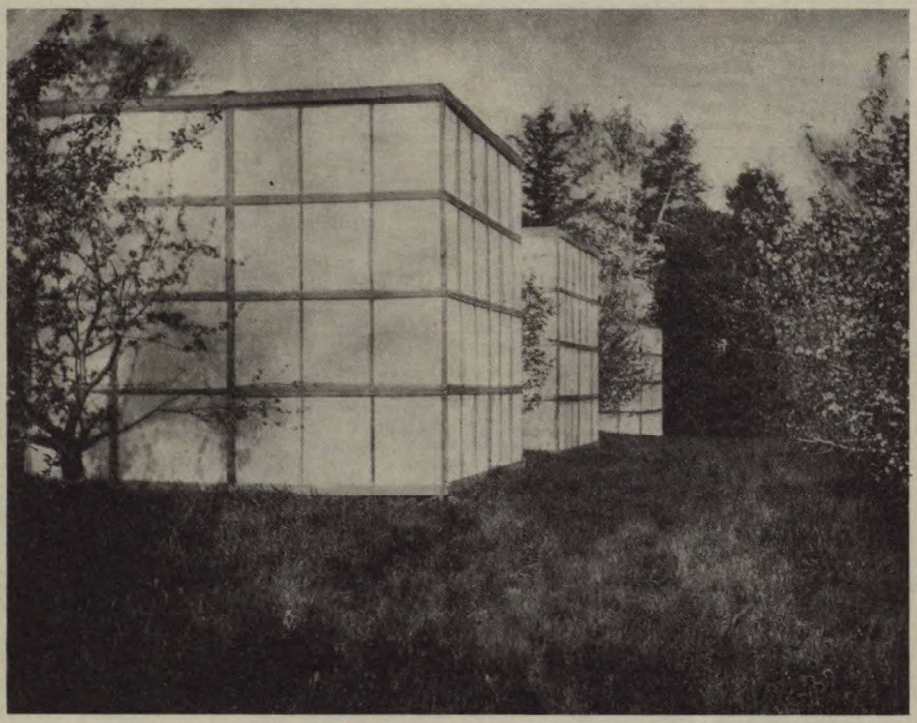
In the number of fruits reaching maturity, as determined by averaging the 1929 and 1930 results, Lobo leads with a set of 18·2 per cent and is followed in order by Fameuse, Alexander, Dudley, Wealthy, and McIntosh with percentage sets of 17·9, 16·8, 16·6, 5·4, and 1·4 respectively. Melba, tested for only one

year, proved fairly efficient as a pollinator of McIntosh, giving a percentage set at maturity of 17·9. In this year, Fameuse led with a percentage set at maturity of 23·9, and was followed by Alexander and Melba with sets of 23·2 and 17·9 per cent respectively.

These results, although representing only two years' work and with Melba only one year's, cannot be regarded as conclusive, but are least suggestive of the value of the different varieties as pollinators of the McIntosh. The evidence to date indicates that McIntosh must certainly be regarded as commercially self-unfruitful, and that for the purpose of pollinators, any of the six varieties tested, with the possible exception of Wealthy, are quite satisfactory, providing they fulfil certain other requirements, which are discussed later in this report.

### POLLINATION RESULTS WITH CAGED MCINTOSH TREES

Eight McIntosh trees were used in this experiment, each tree being entirely enclosed in a cage, the framework of which was constructed of 2- by 4-inch lumber, and the covering consisting of an exceptionally fine, but at the same



Section of orchard showing type of cage used in pollination studies.

time heavy, grade of cheesecloth. This cheesecloth was fastened to a wooden frame, making a panel approximately 8 feet long and 3½ feet wide. The collapsible framework was constructed to accommodate these panels, and the entire cage can thus be used year after year. An idea of the construction of this type of cage may be obtained from the accompanying photograph (Fig. 1).

In selecting these trees, special attention was given to such points as size, vigour, and the previous year's crop record.

Each tree was enclosed in its respective cage before the opening of any blossoms with a hive of bees to serve as the pollinating agent. Several branches,

hereafter termed a bouquet, on which no open blossoms were present, were then placed in the cage with the ends immersed in a pail of water. Pollination was brought about by the bees on their flights back and forth between blossoms on the bouquet and blossoms on the tree. The arrangement, found to give most satisfaction, was to place the hive of bees in one corner of the cage, a bouquet in the opposite corner, and a second bouquet suspended in the centre of the tree.

Of the eight trees, one was left to be self-pollinated, and the others furnished with bouquets of one of the following varieties: Melba, Dudley, Wealthy, Alexander, Lobo, Famcuse, and Cortland. In table 17 under the heading "Pollen Variety" is found the name of the variety used as bouquets on that particular tree.

Approximately 1,200 to 1,400 blossoms on ten representative branches covering the entire tree area were counted on each tree. The number of apples reaching maturity from these blossoms were also counted and the per cent set deducted therefrom.

The results are given in tables 17 and 18.

TABLE 17.—SEED CONTENT OF MCINTOSH APPLES FROM CAGED TREES

| Tree number | Parent varieties | | Date picked | Number fruits used | Per cent fruits with 5 or more seeds | Per cent fruits with less than 5 seeds | Number empty seeds per fruit | Number filled seeds per fruit | Total seeds per fruit |
|---|---|---|---|---|---|---|---|---|---|
| | Mother variety | Pollen variety | | | % | % | | | |
| 13 | McIntosh | McIntosh | Oct. 3 | 77 | 6·5 | 93·5 | 0·22 | 1·47 | 1·69 |
| 84 | " | Cortland | Sept. 30 | 116 | 18·1 | 81·9 | 0·58 | 3·09 | 3·67 |
| 36 | " | Melba | Oct. 3 | 83 | 21·7 | 78·3 | 0·94 | 3·45 | 4·39 |
| 56 | " | Fameuse | Oct. 2 | 72 | 38·9 | 61·1 | 0·54 | 4·10 | 4·64 |
| 80 | " | Alexander | Oct. 2 | 32 | 46·9 | 53·1 | 1·28 | 4·34 | 5·62 |
| 62 | " | Wealthy | Oct. 2 | 81 | 59·3 | 40·7 | 0·52 | 5·16 | 5·68 |
| 17 | " | Lobo | Oct. 3 | 61 | 50·8 | 49·2 | 0·82 | 4·84 | 5·64 |
| 58 | " | Dudley | Oct. 2 | 45 | 51·1 | 48·9 | 1·20 | 4·40 | 5·60 |

TABLE 18.—POLLINATION RESULTS FROM CAGED TREES

| Parent varieties | | Number blossoms counted | Number fruit maturing | Per cent blossoms maturing fruit | Actual yield | Average yield for preceding 6 years | *Comparative yield | Number filled seeds per fruit | Check—Hand-pollinated with Lobo | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mother variety | Pollen variety | | | | | | | | Number blossoms pollinated | Number fruit matured | Per cent blossoms maturing fruit |
| | | | | % | lb. | | | | | | |
| McIntosh | McIntosh | 1,221 | 27 | 2·2 | 35·0 | 192·7 | 18·2 | 1·47 | 57 | 16 | 23·1 |
| " | Cortland | 1,244 | 52 | 4·2 | 153·0 | 101·6 | 150·6 | 3·09 | 104 | 15 | 14·4 |
| " | Melba | 1,422 | 135 | 9·5 | 283·3 | 265·0 | 106·9 | 3·45 | 60 | 4 | 6·7 |
| " | Fameuse | 1,437 | 196 | 13·6 | 459·3 | 278·4 | 165·0 | 4·10 | 65 | 12 | 18·5 |
| " | Alexander | 1,267 | 178 | 14·0 | 249·3 | 220·9 | 112·9 | 4·34 | 70 | 18 | 25·7 |
| " | Wealthy | 1,316 | 192 | 14·6 | 183·5 | 225·7 | 83·5 | 5·16 | 29 | 5 | 17·2 |
| " | Lobo | 1,277 | 205 | 16·1 | 221·0 | 147·5 | 149·8 | 4·84 | 44 | 9 | 20·5 |
| " | Dudley | 1,313 | 234 | 17·8 | † 308·5 | 220·6 | 139·8 | 4·40 | 50 | 4 | 8·0 |

*Comparative yield is obtained by allotting the average yield for preceding six years a value of 100, and deducting therefrom the value of the 1930 actual yield.

†Only a five year average, as this tree bore no crop in 1925.

In considering the information given in the above tables, it is not advisable to give undue stress to the data presented in any one column. Thus, Wealthy pollen giving a percentage set at maturity of 14·6, at the same time gave a comparative yield of only 83·5, being the only tree, with the exception of the one which was selfed, to fall below in yield the average of the six preceding years.

Melba pollen, although producing a commercial crop this year, gave only a 9·5 per cent set at maturity and a comparative yield of 106·9.

The fact that Cortland pollen gave a comparative yield of 150·6 merits a word of explanation. The tree, to which this pollen was applied, produced exceptionally small crops until 1928, resulting in a very low six-year average. Hence, it is unwise to stress the comparative yield in this case. Offsetting this to some extent is the fact that it was impossible to maintain satisfactory bouquets of Cortland, owing to the lateness of its bloom, and the small extent to which it is planted in this district. The fact that it did produce a fair crop under these conditions would at least indicate that Cortland would be satisfactory as a pollinator of McIntosh, providing their bloom periods overlap sufficiently.

McIntosh with a percentage set at maturity of 2·2 produced only a 35·0 pound crop and gave a comparative yield of only 18·2. This clearly indicates that McIntosh will not produce a commercial crop when pollinated by its own pollen.

After giving due consideration to these various points, it may be stated that our one-year results with caged trees indicate that Lobo, Dudley, Fameuse and Alexander are satisfactory pollinators. However, one-year results with caged trees, in which the individuality of the tree may play a very important part, are far from conclusive, and negative results especially must not be emphasized.

### INTER-FERTILITY OF MCINTOSH WITH LOBO

Investigations to determine the inter-fertility of McIntosh and Lobo were continued during the year. The results are given in table 19.

Over a two-year period, Lobo pollen on McIntosh pistils gave a percentage set at maturity of 17·7 and McIntosh pollen on Lobo pistils 16·4 per cent, thus indicating that the two varieties will readily pollinate each other.

Of the 604 McIntosh blossoms pollinated with Lobo, 125 blooms on three trees were emasculated and left unbagged, giving a percentage set at maturity of 14·4. The remaining 479 blossoms on eight trees were not emasculated but were covered with cheese cloth bags, and gave a set at maturity of 17·3 per cent. This would at least suggest the advisability of the elimination of the emasculation process in pollination studies with McIntosh.

TABLE 19—INTER-FERTILITY OF MCINTOSH AND LOBO

| Parent varieties | | Number trees used | Number blossoms pollinated | Blossoms maturing fruit | | Summary of 1929 and 1930 results | | |
|---|---|---|---|---|---|---|---|---|
| Mother variety | Pollen variety | | | Number | Per cent | Number blossoms pollinated | Number blossoms maturing fruit | Per cent blossoms maturing fruit |
| McIntosh..... | Lobo..... | 11 | 604 | 101 | 16·7 | 809 | 143 | 17·7 |
| Lobo..... | McIntosh..... | 1 | 142 | 15 | 10·6 | 292 | 48 | 16·4 |

### GENERAL CONCLUSIONS

For the benefit of orchardists in New Brunswick especially, contemplating extensive plantings in McIntosh, the writer wishes to make the following general statements.

(1) McIntosh is commercially self-unfruitful and adequate provision for cross pollination must be provided, if satisfactory crops are to be obtained.

(2) Of the varieties tested, Lobo, Dudley, Fameuse and Alexander may be regarded as efficient pollinators of McIntosh.

(3) Further investigations will probably prove that Melba, Cortland and possibly Wealthy, are also satisfactory.

(4) Owing to the scarcity of data on this subject, it is unwise to depend upon any one variety alone for pollination purposes. Any planting list should include two and preferably three such varieties, carefully chosen so that the entire bloom period of McIntosh is overlapped. If any three of the above mentioned seven varieties are chosen and fulfil the one condition of completely overlapping the bloom period of McIntosh, the writer believes that all difficulty due to faulty pollination, will be avoided.

## THINNING EXPERIMENT WITH APPLES

The thinning of apples is a very necessary orchard practice if a high quality crop is going to be obtained. The amount of thinning desirable is dependent upon many factors, and must be modified to suit such considerations as the variety, the individual condition of the tree, the habit of bearing, the season, pruning practice, and the local market requirements.

Owing to the many outside factors which enter into an experiment such as this, conclusions cannot be based on one year's work alone, unless it is replicated many times. Even then, seasonal conditions may be such as to make the results misleading. For this reason, this experiment is to be carried on over a period of years, and full results will be published at a later date.

During the past summer, the McIntosh variety was used for the major part of the experiment. Two series of three trees each were selected, one series being left unthinned, and the other thinned to approximately six inches between the fruits. Thus all results quoted are totals of the performance of three trees. These trees were selected on the basis of uniformity of size, vigour and load of fruit they were carrying.

The crop was picked on October 5 and transferred to the Central Packing Plant of the New Brunswick Fruit Exchange, where it was graded and packed in boxes. Full results are given in the following table. Costs of thinning and picking are figured from the actual operations, as performed by the ordinary type of labour as available in this district. Crop returns represent the actual amount of money received by the grower for his crop after all warehouse and selling charges have been deducted and are based on figures compiled by the New Brunswick Fruit Exchange allowing prices per box as follows: Extra Fancy, $2.11; Fancy, $1.51; and C grade, $1.26. In all cases, a discount of 25 cents per box is made on all counts over 175.

In the following table, no account is taken of windfalls, which however, were present in considerably larger quantities under the unthinned trees.

The results of this experiment are given in table 20.

TABLE 20—MCINTOSH THINNING RESULTS

| McIntosh | | Thinned to 6 inches between fruits | Unthinned |
|---|---|---|---|
| Number of trees in test | | 3 | 3 |
| Date of thinning | | July 29 | ..... |
| Date of picking | | Oct. 5 | Oct. 5 |
| Number apples removed in thinning process | | 3,281 | ..... |
| Cost of thinning—202 minutes at 25 cents per hour | $ | 0·84 | ..... |
| Cost of picking—329 minutes at 25 cents per hour | $ | 1 37 | ..... |
| " 345 minutes at 25 cents per hour | $ | ..... | 1 44 |
| Total cost of thinning and picking | $ | 2 21 | 1 44 |
| Total yield | lb. | 1,099 | 1,113·5 |
| Pack out— | | | |
| Extra Fancy | boxes | 1·35 | 0·05 |
| Fancy—175 and under | boxes | 10·8 | 5·88 |
| " over 175 | boxes | 1·91 | 1·27 |
| C. Grade—175 and under | boxes | 9·68 | 10·98 |
| " over 175 | boxes | 3·00 | 7·37 |
| Culls | boxes | 1·69 | 3·69 |
| Total | boxes | 28·43 | 29·24 |

TABLE 20—MCINTOSH THINNING RESULTS—*Concluded*

| McIntosh | | Thinned to 6 inches between fruits | Unthinned |
|---|---|---|---|
| Crop Returns to Grower— | | | |
| Extra Fancy | $ | 2 85 | 0 11 |
| Fancy—175 and under | $ | 16 31 | 8 88 |
| Fancy—over 175 | $ | 2 41 | 1 60 |
| C. Grade—175 and under | $ | 12 20 | 13 84 |
| C. Grade—over 175 | $ | 3 03 | 7 44 |
| Culls | $ | 0 85 | 1 85 |
| Total | $ | 37 65 | 33 72 |
| Total profit after deducting cost of thinning and picking | $ | 35 44 | 32 28 |
| Increased profit per thinned tree | $ | 1 06 | ..... |

These results indicate that thinning, even with a variety such as McIntosh, may be a profitable practice. Several very interesting points are brought out in this table—3,281 apples were removed from the three trees in the process of thinning and yet they produced a crop of 1,099·0 pounds as compared to 1,113·5 pounds from the unthinned trees. With a variety such as Wealthy, thinning always reduces the total yield considerably, but this is not nearly so marked with McIntosh. Apparently this is due to the fact that the normal drop on unthinned trees is very heavy and beneficial results of thinning must result from from the earlier removal of these surplus apples, thus eliminating the competition for food material at an earlier date.

The crop from the thinned trees was of better quality than that from the unthinned trees. The thinned trees produced 10·8 boxes of Fancy Grade 175's and under, as compared to 5·88 boxes from the thinned trees. In the lower grades, the unthinned trees had the advantage producing 7·44 boxes, C Grade, counts over 175 as compared to 3·03 boxes from the thinned trees. There was also considerably more cull fruit in the crop from the unthinned trees. In total crop, there was very little difference between the two series.

Crop returns to the grower, after deducting all charges incidental to thinning, picking, grading, packing, shipping and selling were $35.44 from the thinned trees and $32.28 from the unthinned trees. In other words, the increased profit per thinned tree was $1.06. This would be somewhat reduced if a market value were allowed windfalls.

It must be borne in mind that these are results based on only one year's experimental work with this variety. However, any practice which may increase the profit per tree by approximately $1 is well worth considering and fruit growers in New Brunswick, and especially those whose crop is box-packed would be well advised to seriously consider the advisability of thinning even a variety such as McIntosh.

## APPLE BREEDING

The seedling orchard of approximately 3,000 trees was maintained under clean cultivation during the summer. It was given an application of one-half pound of nitrate of soda per tree and made excellent growth.

Approximately 3,000 seeds were saved from controlled pollinations made during the summer, and in time will furnish further material for this orchard.

# VEGETABLE GARDENING

## PAPER MULCH VERSUS CULTIVATION FOR VEGETABLES

Experimental work with mulch paper was continued in 1930, and 13 different kinds of vegetables were tested under mulch paper, Gator Hide, Type B, in comparison with ordinary earth culture. These vegetables were grown in duplicate 30 foot rows, except where otherwise mentioned, and the results given in the accompanying table are in terms of straight percentage of increased or decreased yields, as the case may be, owing to the use of mulch paper.

TABLE 21—PAPER MULCH VERSUS CLEAN CULTIVATION FOR VEGETABLES

| Vegetable | Variety | Specific portion of crop | Increase due to paper mulch | |
|---|---|---|---|---|
| | | | 1930 | Average of 1929 and 1930 |
| | | | % | % |
| Beans | Round Pod Kidney Wax | Green beans | 13 | 8 |
| " | " " | Ripe beans | 31 | 43 |
| " | Stringless Green Pod | Green beans | −10 | − 3 |
| " | " " | Ripe beans | 13 | 24 |
| Beets | Detroit Dark Red | Crop harvested as bunch beets | 14 | 13 |
| " | " | Crop allowed to mature until fall | 0 | 14 |
| Carrots | Chantenay | Crop harvested as bunch carrots | −11 | 2 |
| " | " | Crop allowed to mature until fall | 21 | 25 |
| Celery | Golden Plume | Marketable crop | −20 | −9 |
| Corn | Golden Bantam | First picking | 200 | ..... |
| " | " | Second picking | 72 | ..... |
| " | " | Total crop | −22 | − 7 |
| Cucumber | Harris Perfection | Crop for first 2 weeks | 166 | 144 |
| " | " | Total crop | 41 | 57 |
| Egg plant | Extra Early Dwarf | Mature crop | 55 | 94 |
| Lettuce | All Heart 1929; Iceberg 1930 | Marketable crop | 33 | 26 |
| Muskmelon | Hearts of Gold | Ripe melons | 96 | 198 |
| Onions | Yellow Globe Danvers | Total crop | 40 | 56 |
| Pepper | Harris Earliest | Ripe fruit | 22 | 7 |
| " | " | Green fruit | 73 | 35 |
| Spinach | King of Denmark | Marketable crop | 16 | 10 |
| Tomatoes | Bonny Best | Ripe fruit for first 3 weeks | 441 | 260 |
| " | " | Total ripe fruit for season | 50 | 69 |
| " | " | Green fruit | −38 | −7 |

Beans—fifteen feet of each row picked as green beans and remaining half as ripe beans.
Beets and carrots—fifteen feet of each row pulled as bunch vegetables and remaining half left to mature until fall.
Celery—yields based on weights of 12 average plants.
Cucumbers—1930 records taken on duplicate 1151 acre plots.
Lettuce—yields based on weights of 6 average heads.
Muskmelon—1930 records taken on single 129 foot row.
Spinach—yields based on crop from 15 feet of each row.

The two-year results indicate that many of our common garden vegetables respond favourably to the use of mulch paper with increased earliness of crop as well as larger yields. Muskmelon showed the greatest amount of benefit with a 198 per cent increase in yield, and was followed in order by egg plant, tomato and cucumbers with increases in total yields of 94, 69 and 57 per cent respectively.

The factor of increased earliness has been very pronounced with muskmelons and cucumbers during both years of the experiment. With muskmelons, the entire crop may be considered as the early crop, as only the early crop has any chance of ripening under our conditions. With cucumbers, the crop during the first two weeks of picking was increased 144 per cent as compared with a 57 per cent increase in the total crop.

Lettuce was also hastened by the use of paper. In 1930, with Grand Rapids, the paper plots were three days earlier than the earth plots, and with Iceberg, fully a week earlier.

Corn, although giving a 7 per cent decrease under paper in total crop over a two-year period, has been considerably earlier. This is shown by the fact that in 1930, in duplicate plots of Golden Bantam, paper gave an increase of 200 per cent in the first picking, and 72 per cent in the first two pickings. Also in quadruplicate plots of Banting in 1930, not reported in this table, paper gave an increased yield of 300 per cent in the first picking, 93 per cent in the first two pickings, and only 13 per cent in total crop. The season of 1930 like the season of 1929 was an exceptionally favourable one for corn in New Brunswick, and another year's trial is necessary to determine the effect of mulch paper upon the corn crop in a normal season.

### COST OF PRODUCTION STUDIES WITH CUCUMBERS UNDER MULCH PAPER

In order to obtain some definite information as to whether the use of mulch paper is an economical practice with the cucumber crop, duplicate one-eighth (actually ·1151 acre) plots of the variety Harris Perfection, were sown on a light sandy loam soil on June 6 and 7, and careful cost of production records kept on all operations in which figures for paper and earth plots were not identical. The plots alternated across the field in the following order: one-eighth acre paper, one-eighth acre earth, one-eighth acre paper and one-eighth acre earth, and were separated from each other by two filler rows, which are not included in the records. Records were therefore taken on 0·2302 acre of cucumbers under paper and 0·2302 acre under ordinary earth culture, but as given below are reduced to an acre basis.

Rows were 6 feet apart, and hills 1 foot apart in rows. All hills were thinned to 1 plant to the hill. In the paper plots, the seed was sown through the paper. A T-shaped slit about 4 inches long was cut in the paper with an ordinary jack-knife, and 2 to 3 seeds sown through each opening. For the actual sowing, a 12 inch wood plant label was pressed into the ground to the required depth, moved slightly to one side and the seed dropped close to the label. When the label was removed, the soil dropped back and thus provided sufficient coverage.

In the earth plots, the seed was also sown by hand, in order to get the plants spaced uniformly with the paper plots. By using a machine planter, the cost of seeding in the earth plots would be slightly reduced.

The paper was laid according to the method described in detail under heading "Laying and Holding Paper," sub-heading (4).

A statement of production costs of all those operations, not common to the two systems of cultivation, is given below. It must be noted that this statement does not include common charges, such as, preparation of land, cost of fertilizer, etc., nor does it include picking charges, as the picking had to be done much more carefully than under ordinary commercial practice. No charge is made either for cleaning up the paper after cropping, as it was so badly disintegrated as to render this unnecessary.

TABLE 22—STATEMENT OF PRODUCTION COSTS OF CUCUMBERS

| Item | One acre under paper | One acre under earth culture |
|---|---|---|
| | $ cts. | $ cts. |
| Paper—17 rolls Gator Hide, Type A, at $8.80 per roll | 149 60 | ..... |
| Laying paper—39 hours 19 minutes at 25 cents per hour | 9 83 | ..... |
| Repairing paper during summer—7 hours at 25 cents per hour | 1 75 | ..... |
| Seeding—22 hours 11 minutes at 25 cents per hour | 5 55 | ..... |
| Seeding—12 hours 6 minutes at 25 cents per hour | ..... | 3 03 |
| Thinning and weeding—34 hours 54 minutes at 25 cents per hour | 8 73 | ..... |
| Thinning, hoeing and weeding—74 hours 52 minutes at 25 cents per hour | ..... | 18 72 |
| Cultivating—1 man 1 horse—6 hours 9 minutes at 35 cents per hour | ..... | 2 15 |
| Total charges | 175 46 | 23 90 |

From this table, it will be noted that the additional charge against the acre under paper, due entirely to the use of paper, is $151.56.

A statement of yield, reduced to an acre basis, is given in the following table 23.

TABLE 23—YIELD OF CUCUMBERS AS REDUCED TO AN ACRE BASIS

| Size of plot | Paper or earth | *Number marketable cucumbers | | | | | | Weight of small cucumbers at final picking Oct. 4 |
|---|---|---|---|---|---|---|---|---|
| | | 1st picking Aug. 6 | 1st 2 pickings Aug. 6 and 8 | 1st 3 pickings Aug. 6 8 and 11 | 1st 4 pickings Aug. 6 8, 11 and 13 | 1st 5 pickings Aug. 6 8, 11, 13 and 19 | Entire season | |
| | | | | | | | | lb. |
| 1 acre | Paper | 130 | 564 | 1,347 | 2,394 | 7,146 | 46,190 | 4,818 |
| 1 acre | Earth | 0 | 56 | 143 | 413 | 2,685 | 32,845 | 4,296 |
| Per cent increase due to paper mulch | % | | 907 | 842 | 480 | 166 | 41 | |

*Marketable cucumbers—Approximately 8-10 inches in length, fit for table use.

TABLE 24.—CUCUMBERS—CROP RETURNS

| Date of picking | Number of marketable cucumbers | Price per dozen | One acre under paper | One acre under earth culture |
|---|---|---|---|---|
| | | $ | $ | $ |
| Aug. 6 | 130 | 0 60 | 6 50 | ..... |
| Aug. 8 | 434 | 0 36 | 13 02 | ..... |
| Aug. 8 | 56 | 0 36 | ..... | 1 68 |
| Aug. 11 | 783 | 0 36 | 23 49 | ..... |
| Aug. 11 | 87 | 0 36 | ..... | 2 61 |
| Aug. 13, 19, 21, 25, 27 and 29 | 17,893 | 0 10 | 149 11 | ..... |
| Aug. 13, 19, 21, 25, 27 and 29 | 12,493 | 0 10 | ..... | 104 11 |
| Sept. 3, 6, 9, 13 and 19 | 24,566 | 0 10 | 204 72 | ..... |
| Sept. 3, 6, 9, 13 and 19 | 18,284 | 0 10 | ..... | 152 37 |
| Sept. 24, Oct. 4 | 2,385 | 0 07 | 13 91 | ..... |
| Sept. 24, Oct. 4 | 1,924 | 0 07 | ..... | 11 22 |
| Total returns | ..... | ..... | 410 75 | 271 99 |

Total returns from marketable cucumbers from one acre under paper are $410.75 as compared to $271.99 from one acre under ordinary earth cultivation, leaving a balance of $138.76 in favour of the acre under paper. However, the acre under paper had an increased production charge of $151.56 against it, resulting in a decreased profit of $12.80.

CONSIDERATION OF RESULTS.—Although paper resulted in an actual decreased profit of $12.80 per acre, the results do not necessarily condemn the use of paper with the cucumber crop. Owing to lack of greenhouse facilities, the cucumbers could not be started under artificial heat, but had to be sown directly outside, and at a late date as well, i.e. June 6 and 7, in order to escape possibility of injury from June frosts, which occur in this individual district at intervals of four or five years.

This crop had to compete on the market with crops from growers in more favourable localities, having greenhouse facilities for starting their plants, and hence did not secure the top prices, ranging from 65 cents to $2 per dozen. The increased yields from the paper plot were very encouraging, and if a portion of the early crop could have been marketed at the top prices, the final results might have been considerably different.

The results indicate that early planting, which, however, incurs the possibility of frost injury, or a system of starting the plants inside and transplanting into the open after the danger of frost is over, might make the use of paper a profitable undertaking with the cucumber crop. The paper charge per acre of $149.60 is excessive, and it is possible that this may be considerably reduced by the partial coverage system of mulch paper gardening, as is commonly practised in many sections of the United States. With cucumbers this would imply the laying of an 18-inch strip of paper, and planting a row of cucumbers down the centre of it. Additional strips of paper would be laid at the required distances, and the exposed ground between kept cultivated. Such a system would reduce the paper charge to approximately $40 per acre, but would necessitate additional horse cultivation between the rows, which need not be excessive, providing it is timely and thorough. However, before this can be definitely recommended, further experimental evidence is necessary, as the actual increase in crop, due to the use of paper, might be different under this system.

Laying and Holding the Paper.—Various methods of laying and holding the paper have been tried during the past three years, most of which have proven very expensive, in fact, prohibitive. These have included the following methods:—

(1) Board refuse, preferably narrow, laid along the edge of the paper, and anchored where necessary with stone or wire staples. This is effective as far as holding the paper down is concerned, but is unsightly unless boards of an even width, preferably not more than 2 inches, are used, and costly. It is extremely doubtful if this method is practical under commercial conditions.

(2) Lath laid along the edges of the paper or crossways at intervals of 3 or 4 feet, and held in place by means of heavy wire staples. The spacing of the lath, whether used lengthwise or crosswise, would depend to a large extent upon the exposure of the individual location. For the home garden, and especially with those crops which are sown along the edge of the paper, this method although expensive would seem to be the most satisfactory.

(3) Heavy gauge wire, stretched along the edge of the paper and anchored by means of wire staples. Owing to the stiffness of the wire, it was found impossible to stretch it tightly enough to take out the kinks, resulting in a condition in which the wire did not touch the paper for approximately half the distance, giving the wind an ideal opportunity to get under and lift the paper. Wire will not follow unevenness in the contour of the land, and if used, must be reinforced by the use of considerable quantities of earth. This method is very expensive, owing both to the initial cost of the wire and the large amount of labour involved in stretching and anchoring the wire, and at the same time is very unsatisfactory.

(4) Earth.—The means of applying this earth would depend upon the system of paper coverage employed. In partial coverage, where a space of 14 to 24 inches is left uncovered between the rows, this is easily accomplished by hilling up the earth along the edge of the paper by some sort of mechanical device, such as a plough attachment on an ordinary garden hand wheel cultivator. Such a method is also open to the development of a machine that will lay the paper and cover it at the same operation. This method has never been practised at this Station, as we have always followed the system of total coverage with paper.

This involves a different and more complicated procedure, which in most instances has proven very costly. In order to keep the production costs within bounds, it was essential to devise a new system. The system followed this year in our cucumber work, and described in detail below, has proven very satisfactory, and with some slight modifications, making it still more efficient, should solve the problem of laying and holding paper wherever total coverage is practised.

As with any other system, the ground should be brought to a high state of tilth, and the surface made as smooth as possible. For the final operation in this procedure, we have found a Scotch Chain Harrow to be very effective. For the actual unrolling of the paper, a special handle was made, similar to that on an ordinary hand lawn-mower, but with the irons at the base, broad enough to fit over and fasten to a small roller going through the roll of paper.

Three men are required for the work, and the additional equipment consists of two shovels and three garden rakes.

The procedure is then as follows:—

Starting at the side of the field next to the direction of the wind, and after anchoring the end of the paper in a trench in the soil, man No. 1 backs across the field drawing the roll of paper after him. Man No. 2 follows as closely as possible, placing a shovelful of earth at intervals of approximately 3 feet on the outside edge of the paper. Man No. 3 follows, shovelling earth in a narrow pile along the entire outside edge of the paper. The paper is anchored at the end, and the section of ground, 3 feet in width, adjoining this strip of paper, is roughly raked by hand, to prepare it for the second strip of paper. On the back trip, the same procedure is followed. Man No. 1 is careful to lap the second strip approximately 1 inch. Man No. 2 follows closely, anchoring it with shovelfuls of soil at approximately 3 foot intervals on the lap, and 6 to 8 foot intervals near the other side of the strip, but not right on the edge, as this would spoil the succeeding lap. Man No. 3 follows, shovelling earth in a narrow pile, until the entire lap is covered by a narrow pile of earth about 6 inches wide. This procedure is repeated until the given area is covered.

In shovelling, in order to keep the amount of raking necessary down to the minimum, the earth should be scooped up shallowly and not deeply.

An improvement upon our apparatus would be to fasten a light roller to the handle in front of the roll of paper. This would aid in smoothing the soil, and would counteract the tendency of the roll of paper, after three-quarters of it has been unrolled to raise, due to the direction of the pull upon the handle.

A statement of costs, based on records taken on ·2302 acre of paper and reduced to an acre basis is as follows:—

| | |
|---|---|
| Laying paper—39 hours 19 mintues at 25 cents per hour | $ 9 83 |
| Repairing paper during summer—7 hours at 25 cents | 1 75 |
| Total cost | $11 58 |

The soil in question was a very light sandy loam in an exposed location. Even under these unfavourable conditions, the amount of time expended in refixing paper after winds during the entire summer was only 7 hours.

### *General Remarks*

1. Cost of Paper.—The cost is excessive, and must be reduced if its use, even with such crops as cucumbers and muskmelons, is to be encouraged.

2. Durability.—A more durable paper is highly to be desired. Gator Hide Mulch Paper, Type A, was used in our cucumber work and the ends of the strips were anchored by trenching in the soil. By midsummer, the paper had completely disintegrated at point of entry into soil. Where held by merely placing soil on top of the paper, allowing for a certain amount of drying out of the soil, disintegration was not nearly so rapid.

### *General Conclusions*

1. Under New Brunswick conditions and with present market facilities, our two years' results indicate that from an economic standpoint, mulch paper has considerable possibilities with only two crops, namely, cucumbers and muskmelons. Even with these, it cannot be definitely recommended without further experimental evidence.

2. Under special conditions, it might also have slight possibilities with corn and tomatoes.

3. With the city gardener, who wants early vegetables, and is not especially interested in costs, mulch paper also has a place.

## ETHYLENE GAS EXPERIMENTS

Owing to favourable reports as to the value of ethylene gas as a means of hastening the ripening of various fruits, of blanching celery and shortening the dormant period of tubers, cuttings and seeds, tests were initiated at this Station to determine its effectiveness and possible practical application under local conditions.

An airtight chamber 6 by 8 by 8 feet, thoroughly insulated with Ten Test, was constructed and fitted with tiers of sliding trays, approximately 2 feet square. Heat was provided by means of an automatic electrical apparatus, regulated so as to hold a uniform temperature of 70° F. Even distribution of heat was looked after by an electric fan which worked in conjunction with the heating coils. Proper humidity was maintained by draping a piece of flannel with the ends submerged in a basin of water over a wire in front of the fan. This did not prove altogether successful, and it was found advisable to further increase the humidity by keeping damp sawdust on the floor of the chamber.

In all experiments, a concentration of one part of ethylene to 1,000 parts of air was used and a temperature of 70° F. maintained.

Artificial Ripening of Tomatoes.—The effectiveness of ethylene gas as a means of ripening tomatoes was first demonstrated on some tomatoes raised in the greenhouse. The ripening was satisfactory, but it was impossible to estimate exactly how much acceleration in ripening was due to ethylene.

To attempt to determine this, a more comprehensive experiment was carried on with the out door crop, using three varieties, namely, Alacrity x Earlibell, Bonny Best and Pink No. 2.

Plants were set out in rows 5 feet apart with 4 feet between plants in row. The rows were 70 feet in length, and were subjected to two methods of treatment regarding the ripening process. On one row, the fruit was allowed to ripen naturally on the vine. On the next row, the fruit was picked when it reached a definite degree of maturity, and ripened in the ethylene chamber. This procedure was followed across the entire plot, resulting in alternate rows of the two treatments. In every case, a row of a given variety on which the fruit was allowed to ripen naturally on the vine was compared with an adjacent row of the same variety, containing the same number of plants, but on which the fruit was ripened in the ethylene chamber.

The results of yields obtained are given in table 25 and, the per cent increase in yield, based on weight of fruit produced, of the "ethylene ripened" plots over the "natural ripened" plots is given in table 26.

TABLE 25—RESULTS OF ETHYLENE GAS EXPERIMENT WITH TOMATOES

| Variety | Number of 70-foot rows in plot | Ripe fruit for 1st two weeks picking | | | | Ripe fruit for 1st three weeks picking | | | | Total ripe fruit for season | | | | Green fruit | | Total ripe and green fruit | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Natural ripening | | Ethylene ripening | | Natural ripening | | Ethylene ripening | | Natural ripening | | Ethylene ripening | | Natural ripening | Ethylene ripening | Natural ripening | Ethylene ripening |
| | | Number fruit | Weight | Number fruit | Weight | Number fruit | Weight | Number fruit | Weight | Number fruit | Weight | Number fruit | Weight | Weight | Weight | Weight | Weight |
| | | | lb. oz. | | lb. oz. | | lb. oz. | | lb. oz. | | lb. oz. | | lb. oz. | lb. oz. | lb. oz. | lb. oz. | lb. oz. |
| Alacrity x Earlibell | 7·5 | 328 | 77 13 | 498 | 97 7 | 865 | 197 12 | 1,482 | 286 14 | 1,853 | 474 11 | 4,278 | 905 9 | 989 0 | 270 0 | 1,463 11 | 1,175 9 |
| Bonny Best | 2·0 | 10 | 2 14 | 33 | 7 6 | 47 | 11 6 | 91 | 21 4 | 84 | 23 0 | 360 | 111 15 | 472 0 | 369 0 | 495 0 | 480 15 |
| Pink No. 2 | 2·0 | 19 | 5 1 | 80 | 17 14 | 49 | 14 9 | 92 | 20 8 | 120 | 33 9 | 229 | 57 7 | 642 0 | 513 0 | 675 9 | 570 7 |

TABLE 26—PER CENT INCREASE IN YIELD

| Variety | Per cent increase in yield of ethylene ripened plots over natural ripened plots | | | | |
|---|---|---|---|---|---|
| | Ripe fruit for 1st 2 weeks picking | Ripe fruit for 1st 3 weeks picking | Total ripe fruit for season | Green fruit | Total ripe and green fruit |
| | % | % | % | % | % |
| Alacrity x Earlibell | 25·2 | 45·1 | 90·8 | −72·7 | −19·7 |
| Bonny Best | 156·5 | 86·8 | 386·7 | −21·8 | −2·8 |
| Pink No. 2 | 253·1 | 40·8 | 71·1 | −20·1 | −15·6 |

The most important parts of table No. 26 are the figures representing the percentage increase in yield of ripe fruit during the early part of the season. For the first three weeks' picking, ethylene gas gave a 45·1 per cent increase in yield of ripe fruit with the Alacrity x Earlibell variety, 86·8 per cent increase with Bonny Best, and 40·8 per cent increase with Pink No. 2. These results indicate that it is possible to very materially increase the yield of extra early fruit by picking the green mature fruit and ripening it artificially with ethylene.

One point of interest which this table fails to bring out is the fact that it is very poor policy to attempt to ripen anything but mature green fruit. Ethylene will ripen the immature fruit, but a certain amount of softening and shrinkage will accompany the ripening, thus lowering the market value of the fruit. This was encountered early in this experiment, and must be borne in mind when considering the percentages of increase. If only fully mature green fruit had been picked, these percentages would probably have been somewhat lower.

The quality of the artificially ripened fruit is equal to that of the fruit ripened under natural conditions, providing mature green fruit is used. The colour is perhaps not quite so deep a red, although it has an advantage in that the stem end, so frequently green under natural conditions of ripening, is usually fully coloured.

The length of treatment necessary is also in direct proportion to the stage of maturity. Fruits which have assumed the greenish white bloom which appears just before the red pigment begins to become evident will ripen in from four to seven days. Fruits which are not mature in size may require as much as fifteen to twenty days, and it is in these cases that some softening is likely to take place.

RIPENING OF PEPPERS.—Ethylene proved very effective as a means of ripening peppers, but no attempt was made to determine the acceleration in the ripening process. Both large and small peppers ripened thoroughly in from five to thirteen days, fully one-half the peppers turning a brilliant red in seven days.

RIPENING OF MUSKMELONS.—Muskmelons ripened with varying quality. As with tomatoes, a fair degree of maturity is essential to a high quality product. Considerable difficulty was encountered with the growth of moulds on the melons. This was finally partially controlled by dipping the melons in a 5 per cent borax solution.

BLANCHING OF CELERY.—The varieties used in a somewhat limited experiment, testing the effectiveness of ethylene as a means of blanching celery, were Golden Plume, Fordhook, Selected Emperor, French Success, and Giant Pascal. The length of treatment necessary varied from five to twelve days, depending on variety and state of maturity. When well-developed heads were used a high quality product resulted.

RIPENING OF APPLES.—Immature Duchess apples treated with ethylene failed to develop any appreciable amount of red colour and quickly went off flavour. The gas can, however, affect the flavour of fruits nearing maturity. Fameuse, McIntosh, and Bethel apples, picked during the regular fall picking and treated in the ethylene chamber, were rendered less acid in flavour, and became edible much sooner than under ordinary storage conditions.

HASTENING THE SPROUTING OF POTATOES.—Approximately 560 Green Mountain, 560 Irish Cobbler, 280 Bliss Triumph, and 280 Spaulding Rose potatoes were used in an experiment comparing various lengths of treatment with ethylene as a means of hastening sprouting. Each variety was divided into eight equal lots and subjected to the following treatments:—

Lot 1—No treatment.
Lot 2—Three hours.
Lot 3—Six hours.
Lot 4—Twelve hours.
Lot 5—Twenty-four hours.
Lot 6—Forty-eight hours.
Lot 7—Seventy-two hours.
Lot 8—Ninety-six hours.

After removal from chamber, the potatoes were placed stem-end down on soil in the greenhouse, and covered with two inches of damp moss and finally a canvas. Notes on dates of sprouting and length of individual sprouts were recorded. Results indicated that a higher concentration of gas may be advisable with potatoes, as the dormant period was not broken nearly so effectively as other investigators have stated. Another very interesting point, however, was noted. The longer treatments did not necessarily hasten the early growth of the sprouts, but later growth was very much accelerated.

This question of shortening the dormant period and hastening the sprouting of potatoes will be more fully investigated during the coming year in an attempt to check the above observations.

CONCLUSIONS.—The use of ethylene gas was successful with the ripening of tomatoes and peppers, the blanching of celery, and to a smaller extent with the ripening of muskmelons. With apples, the effect is not nearly so pronounced.

Plans are under way for the continuance of tests with ethylene gas so that some idea of the possibility of its commercial application in this district may be obtained.

## PRODUCTION OF FOUNDATION SEED POTATOES

The production of disease-free potatoes for seed purposes has become a project of major importance at this Station. Owing to a combination of circumstances, growers of table stock potatoes in this province are not in an enviable position, and as a result, many are contemplating a change to certified seed. In view of the possibility of a greatly increased acreage in certified seed potatoes during the next few years, and a consequent heavy demand for foundation stock, this Station in co-operation with the Fredericton Laboratory of Plant Pathology, has initiated an extensive program of seed production with the object of being able to furnish, in considerable quantities, seed potatoes of the highest quality.

Work is being concentrated on four varieties, Bliss Triumph, Spaulding Rose, Irish Cobbler and Green Mountain with particular attention being paid to the Bliss Triumph variety. The latter variety is in considerable demand for the export trade to Cuba, and at the present time, seed stock of good quality is not readily available. Every effort possible is being put forward to make the Province self-supporting in respect to the seed requirements of this variety, as is already the case with our other common varieties.

Briefly, the procedure followed is to take potatoes of the best stock available, and grow them in the greenhouse during the winter months according to the Tuber Index Method. Those that do not show disease are then grown in the field according to the Tuber Unit Method. In this way, we have a double check on disease every year. This process is repeated year after year, and the surplus stock is made available to leading farmers throughout the Province, who have already proven themselves capable of producing high class seed. The potatoes are multipled on these farms for one year, and are then available for general distribution. In this way, we are hoping to exercise a beneficial influence upon the already high standard of seed potatoes available in New Brunswick.

### ORNAMENTAL GARDENING

Work in this division has been of a more or less general nature and attention is not focused on definite projects to such an extent as with vegetables, small fruits and tree fruits. However, considerable information is accumulating regarding suitable planting lists of flowers and shrubs and the gardens are a continual source of interest and education to visitors.

### ADDITIONAL HORTICULTURAL PROJECTS UNDER INVESTIGATION

In addition to the experiments recorded in this Report, a number of other horticultural projects are under investigation.

In the Tree and Small Fruit division, experiments are being carried on with the control of mice in orchards, the testing of commercial varieties of apples, the comparing of cultivation and sod culture in orchards, grass mulch versus removing hay in orchards, variety tests with plums and apples, and strawberry breeding.

Experiments in vegetable gardening include variety tests of celery, corn, muskmelons, peas and tomatoes, growing of certified seed potatoes, hill selections of potatoes for seed, and potato breeding.

Special projects in ornamental gardening include variety test of roses, methods of wintering roses, test of various trees and shrubs as hedge plants, and aster breeding for immunity to Fusarium Wilt.

The results of many of these projects have been published at intervals in the Annual Reports of this Station, and further reports will be made from time to time as more data accumulate.

## CEREALS

The total precipitation from April 8 to May 14, inclusive, was 0·44 inches. This light precipitation together with the warm weather the first two weeks in May, dried and warmed the soil. Seeding was early and germination was good. The rainfall in June was only 1·79 inches. This was 1·37 inches less than a seventeen-year average. The dry weather in June, however, did not check growth to any appreciable extent. The rainfall, although light, was timely and as the crops were well established earlier than usual, they were able to withstand the dry weather. Speaking generally, cereal crops were free from disease, the losses from shelling were small and both quality and yields were good.

#### VARIETY TESTS—WHEAT, OATS AND BARLEY IN FIELD PLOTS

The field on which these plots were located was a medium loam in fair state of fertility. In order to obtain field conditions, the two outside rows of each side of every plot were removed at harvest time and discarded, while a foot was trimmed off each end. The plots were $\frac{1}{150}$ acre each when the sides and ends were thus removed.

WHEAT—VARIETY TEST

Five varieties of wheat were sown in quadruplicate plots on May 6. The wheat was remarkably free from disease. Stem rust was not noticed on any of the varieties except Garnet which had a trace of stem rust on one plot.

Although Aurore gave the highest yield this year it has the lowest comparative yield for the two years grown. Of the varieties tested for an extended period, Huron and White Russian among late maturing, and Garnet among the early maturing varieties, appear best adapted for the district. Yields are given in table 27.

TABLE 27.—WHEAT—VARIETY TEST

| Name of variety | Number of days maturing | Average length of straw including head | Strength of straw on scale of 10 points | Yield of grain per acre | Weight per measured bushel after cleaning | Comparative yield for 3 years |
|---|---|---|---|---|---|---|
| | | in. | | bush. lb. | lb. | % |
| Aurore | 102 | 37·0 | 8·3 | 28 59 | 61·0 | 80·0 |
| Early Red Fife Ottawa 16 | 104 | 39·3 | 9·5 | 26 49 | 62·5 | 84·9 |
| Huron Ottawa 3 | 107 | 39·8 | 9·0 | 26 26 | 62·5 | 100·0 |
| Garnet Ottawa 652 | 92 | 36·8 | 9·5 | 25 55 | 64·5 | 102·6 |
| White Russian | 112 | 41·3 | 8·0 | 25 32 | 60·5 | 97·2 |

BARLEY—VARIETY TEST

Nine varieties of barley were tested this year in quadruplicate plots, and one variety, viz., Canadian Thorpe, was tested in triplicate plots. They were sown on May 6. All the varieties stooled well this year and were free from stem rust. Stripe disease (Helminthosporium) was worse than usual. It had, apparently, very little effect on the yields. Star, which was the worst affected, gave the second largest yield.

Trebi and Star gave the highest yields this year. Both varieties have short straw, however, and this is a decided disadvantage unless growing and soil conditions are good. Star was grown as a field crop on land of average fertility in 1929 and the straw was too short for satisfactory binding. The heads of Star have a tendency to break off. This may not effect yields on carefully handled test plots but it does cause considerable loss when this variety is handled under field conditions. Until more information is available, this Station will continue to recommend O.A.C. No. 21 as a six-row variety and Charlottetown No. 80 as a two-row variety. O.A.C. No. 21 is favoured because it is earlier maturing, less liable to lodge, and is a better nurse crop when seeding to grass and clover.

The yields are given in table 28.

TABLE 28.—BARLEY—VARIETY TESTS

| Name of variety | Number of days maturing | Average length of straw including head | Strength of straw on scale of 10 points | Yield of grain per acre | Weight per measured bushel after cleaning | Comparative yields for years grown | Number of years grown |
|---|---|---|---|---|---|---|---|
| | | in. | | bush. lb. | lb. | % | |
| Trebi | 91·8 | 30·5 | 9·5 | 58 35 | 52·0 | 129·5 | 1 |
| Star | 88·3 | 32·3 | 7·8 | 52 29 | 52·0 | 114·4 | 3 |
| Bearer Ottawa 475 | 93·0 | 42·0 | 8·8 | 51 45 | 49·0 | 93·0 | 3 |
| Gold | 92·0 | 33·0 | 7·0 | 50 44 | 56·0 | 81·8 | 5 |
| Charlottetown No. 80 | 94·0 | 39·5 | 8·3 | 48 23 | 55·5 | 110·3 | 10 |
| Hannchen Sask. 229 | 93·0 | 36·0 | 4·0 | 46 2 | 55·0 | 81·9 | 2 |
| O. A. C. No. 21 | 88·3 | 37·0 | 7·8 | 45 16 | 52·0 | 100·0 | 10 |
| Mensury Ottawa 60 | 89·0 | 41·5 | 8·8 | 43 17 | 51·0 | 89·0 | 10 |
| Canadian Thorpe | 98·0 | 39·7 | 8·0 | 37 24 | 53·0 | 82·7 | 1 |
| Plumage Archer C.D. 991 | 100·0 | 35·8 | 8·8 | 34 2 | 53·0 | 69·4 | 2 |

## OATS—VARIETY TESTS

Six varieties of oats were sown in quadruplicate plots on May 6. No stem rust was noticed but there was considerable halo blight in all the plots.

The results this year, as well as the results on previous years, indicate that the late maturing varieties, Victory, Banner, and Gold Rain, will give the best yields in this district. Alaska is the best of the early maturing varieties which have been tested sufficiently to make results reliable.

The yields are given in table 29.

TABLE 29.—OATS—VARIETY TESTS

| Name of variety | Number of days maturing | Average length of straw including head | Strength of straw on scale of 10 points | Yield of grain per acre | | Weight per measured bushel after cleaning | Per cent hull | Yield of kernels per acre | Average yield for 5 years | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | in. | | bush. | lb. | lb. | % | lb. | bush. | lb. |
| Victory | 101 | 48·5 | 8·0 | 66 | 22 | 45·5 | 26·78 | 1,659 | 53 | 6 |
| Banner Ottawa 49 | 99 | 45·8 | 8·5 | 66 | 5 | 43·5 | 26·80 | 1,646 | 52 | 13 |
| Gold Rain | 97 | 46·0 | 9·0 | 59 | 16 | 42·5 | 25·33 | 1,510 | 53 | 23 |
| Legacy Ottawa 678 | 92 | 40·5 | 7·5 | 54 | 29 | 41·0 | 25·85 | 1,383 | ..... | |
| Alaska | 86 | 40·3 | 9·5 | 50 | 12 | 45·0 | 18·61 | 1,392 | 38 | 25 |
| Laurel Ottawa 477 | 93 | 37·8 | 9·8 | 50 | 10 | 58·0 | ..... | ..... | 34 | 19 |

1928 yields neglected.

## BEANS—VARIETY TEST

Eight varieties of beans were sown in quadruplicate plots on May 28. Each plot consisted of 3 rows, each row being 16½ feet in length. The rows were 28 inches apart. The beans were sown on the flat and no trimming was done at harvest.

The land on which the beans were grown was a clay loam. Fifteen tons barnyard manure and 1,200 pounds 2-12-5 fertilizer per acre were applied for mangels in 1929. The mangels were a rather light crop. Therefore, this spring 100 pounds Chilean nitrate of soda, 750 pounds superphosphate and 160 pounds potash were applied broadcast and harrowed into the soil.

Notwithstanding the fertilizer applied, the beans made less growth than usual. They were, however, very well podded. Nearly all the varieties were affected with anthracnose and bacterial leaf blight but the infection was not serious enough to affect the quality of the beans.

Michigan Robust was tested for the first time this year. It is a small white bean and a splendid yielder but the percentage of discoloured beans was very high. No. 118 is especially promising. The quality is excellent, comparing favourably with White Marrowfat and it is decidedly earlier than that variety. Navy, while a fair yielder, has a large percentage of discoloured beans. Norwegian is a brown bean and has rather poor quality. Soldier and Yellow Eye, while not especially heavy yielders, are usually free from discoloured beans and as they mature early, they give satisfactory yields even when seasons are unfavourable. White Marrowfat has the best quality of those which have been given an extended test but it is rather late maturing for this district.

The yields for 1930 and 1929 are given in table 30.

TABLE 30—BEANS—VARIETY TESTS

| Name of variety | Date of ripening | Number of days maturing | Average length of straw | Average length of pod | Yield per acre | | Weight per measured bushel after cleaning | Yield per acre 1929 | |
|---|---|---|---|---|---|---|---|---|---|
| | | | in. | in. | bush. | lb. | lb. | bush. | lb. |
| Michigan Robust | Sept. 23–30 | 120·0 | 17·0 | 3·6 | 50 | 10 | 66·5 | .. | .. |
| No. 118 | Sept. 10–23 | 108·0 | 14·8 | 4·5 | 41 | 4 | 64·0 | 34 | 8 |
| Navy, Ottawa 711 | Sept. 8–10 | 105·0 | 14·3 | 3·8 | 41 | 4 | 61·5 | 37 | 3 |
| No. 114 | Sept. 30 | 125·0 | 16·8 | 4·0 | 41 | 2 | 61·5 | .. | .. |
| Norwegian, Ottawa 710 | Sept. 6–7 | 101·3 | 11·8 | 4·4 | 36 | 27 | 61·0 | .. | .. |
| Yellow Eye, Kentville | Sept. 6–7 | 101·3 | 13·3 | 4·0 | 33 | 17 | 62·0 | 29 | 8 |
| White Marrowfat | Sept. 30 | 125·0 | 12·0 | 3·4 | 28 | 26 | 62·0 | 31 | 41 |
| Soldier | Sept. 6–7 | 101·3 | 11·0 | 5·0 | 28 | 18 | 61·0 | 29 | 17 |

Yields given are actual yields per acre. All the varieties had good stands except White Marrowfat.

PEAS—VARIETY TEST IN ROD-ROW PLOTS

Ten varieties of peas were sown on May 7 in quadruplicate rod-row plots of five rows each. Each five-row plot was separated by five rows of Garnet wheat. All five rows of peas were harvested. The peas all germinated well and made splendid growth but the yields were below average. The peas were free from disease but they became so badly affected with aphids that it was necessary to dust them with nicotine sulphate dust on July 19. Although this treatment rid the peas of aphids it is possible that the injury caused by the aphids accounts for lessened yields.

The results are given in table 31.

TABLE 31.—PEAS—VARIETY TEST IN ROD-ROW PLOTS

| Name of variety | Number of days maturing | Average length of straw | Average length of pod | Yield of grain per acre | Weight per measured bushel after cleaning | Average yield per acre for 6 years |
|---|---|---|---|---|---|---|
| | | in. | in. | lb. | lb. | lb. |
| Early Blue | 93·5 | 62·8 | 2·1 | 2,208 | 64·0 | ..... |
| Lemaire R-76-26 | 82·5 | 25·0 | 2·5 | 1,820 | 62·0 | ..... |
| Canadian Beauty | 108·8 | 65·0 | 2·5 | 1,772 | 62·0 | 2,794 |
| Early Raymond | 103·3 | 61·5 | 2·1 | 1,639 | 61·5 | ..... |
| Champlain | 104·5 | 53·5 | 2·0 | 1,520 | 63·0 | ..... |
| O. A. C. No. 181 | 103·8 | 65·3 | 2·1 | 1,514 | 62·0 | ..... |
| Mackay, Ottawa 25 | 112·0 | 62·8 | 2·0 | 1,394 | 61·5 | 2,227 |
| Chancellor, Ottawa 26 | 97·0 | 61·3 | 1·6 | 1,375 | 63·5 | 2,429 |
| Arthur, Ottawa 18 | 109·8 | 50·5 | 2·0 | 1,368 | 62·5 | 2,375 |
| Golden Vine | 108·0 | 67·5 | 1·9 | 842 | 63·5 | ..... |

GRAIN MIXTURES

The grain mixtures shown in tables 32 and 33 were sown on May 13 in duplicate $\frac{1}{180}$ acre plots. The grains used in the mixtures were Huron wheat, Victory oats and Charlottetown No. 80 barley.

The yield of grain for the six years the mixtures were tested seems to indicate that there is no advantage in adding Huron wheat to a mixture of Victory oats and Charlottetown No. 80 barley. The average yields were decreased in all cases by adding the wheat. Seeding at the rate of 2 bushels of oats and 1 bushel of barley per acre gave the highest yield of the oat and barley mixtures tested. This mixture gave an average yield of 157 pounds per acre over Victory

oats sown at the rate of 3 bushels per acre. However, a study of the table shows that 131 pounds of this average increase was obtained in one year, viz., 1926. Also, in an experiment in "Rates of Seeding Victory oats," seeding at the rate of 3½ bushels per acre has given a six-year average of 73 pounds per acre higher yields than seeding at the rate of 3 bushels per acre.

The results are given in tables 32 and 33.

TABLE 32.—WHEAT, OATS AND BARLEY—SOWN IN COMBINATION

| Mixture per acre, bushels | Number of days maturing 1930 | Yield of grain per acre 1930 | Yield of grain per acre 1929 | Yield of grain per acre 1928 | Yield of grain per acre 1927 | Yield of grain per acre 1926 | Yield of grain per acre 1925 | Average yield for 6 years 1926-30 |
|---|---|---|---|---|---|---|---|---|
| | | lb. | lb. | lb. | lb. | lb. | lb. | lb. |
| Wheat 1, oats 1, barley 1 | 100 | 1,447 | 1,575 | 1,100 | 1,112 | 1,563 | 2,250 | 1,507·8 |
| Wheat ½, oats 1, barley 1 | 100 | 1,265 | 1,435 | 1,050 | 975 | 1,825 | 2,550 | 1,516·7 |
| Wheat ¼, oats 2, barley 1 | 100 | 1,117 | 1,400 | 1,250 | 850 | 2,088 | 2,383 | 1,514·7 |
| Huron wheat 1¾ | 106 | 1,029 | 523 | 505 | 128 | 800 | 1,400 | 730·8 |
| Victory oats 3 | 100 | 1,694 | 1,384 | 1,200 | 1,238 | 1,516 | 2,637 | 1,612·0 |
| Charlottetown No. 80 barley 2½ | 97 | 2,222 | 1,031 | 581 | 946 | 1,488 | 2,250 | 1,419·7 |

TABLE 33.—BARLEY AND OATS—SOWN IN COMBINATION

| Mixture per acre, bushels | Number of days maturing 1930 | Yield of grain per acre 1930 | Yield of grain per acre 1929 | Yield of grain per acre 1928 | Yield of grain per acre 1927 | Yield of grain per acre 1926 | Yield of grain per acre 1925 | Average yield for last 6 years 1925-30 |
|---|---|---|---|---|---|---|---|---|
| | | lb. | lb. | lb. | lb. | lb. | lb. | lb. |
| Oats 1, barley 1 | 97 | 2,079 | 1,153 | 925 | 1,013 | 1,694 | 2,250 | 1,519·0 |
| Oats 1½, barley 1½ | 97 | 2,107 | 1,408 | 925 | 1,075 | 2,069 | 2,266 | 1,641·7 |
| Oats 2, barley 1 | 97 | 1,986 | 1,575 | 950 | 1,388 | 2,301 | 2,416 | 1,769·3 |
| Victory oats 3 | 100 | 1,694 | 1,384 | 1,200 | 1,238 | 1,516 | 2,637 | 1,612·0 |
| Charlottetown No. 80 barley 2½ | 97 | 2,222 | 1,031 | 581 | 946 | 1,488 | 2,250 | 1,419·7 |

## ROD-ROW VARIETY TEST OF CEREALS

Tables 34, 35 and 36 give the comparative yields for 1930 of the varieties of wheat, oats and barley which were tested either four or eight times each in rod-row plots. A number of varieties which were only allowed one plot each are not included.

These variety tests have been carried on the last seven years. (A summary of the results for the first six years are given on pages 32, 33 and 34 of the report of this Station for 1929).

This spring a number of varieties of wheat, barley and oats which did not show sufficient promise to justify further testing, were discarded and a number of varieties which were giving good results in other districts were added.

The rod-row plots were especially uniform this year. They were practically free from disease and were nearly all standing when harvested.

Each plot consisted of five rows 7 inches wide and 18½ feet long. At harvest a foot was cut off both ends of each plot and discarded. Yields were taken only of the three centre rows in each plot.

The results are given in tables 34, 35 and 36.

TABLE 34.—WHEAT—VARIETY TEST IN ROD-ROW PLOTS

| Name of variety | Number of days maturing | Average length of straw including head | Strength of straw on scale of 10 points | Comparative yields for 1930 |
|---|---|---|---|---|
| | | in. | | % |
| *Tested eight times—* | | | | |
| Huron, Cap Rouge | 109·0 | 46·6 | 8·5 | 104·9 |
| Garnet, Ottawa 652 | 92·0 | 38·8 | 9·1 | 103·2 |
| Early Red Fife, Ottawa 16 | 109·0 | 46·6 | 8·8 | 100·4 |
| White Russian | 112·0 | 48·3 | 8·1 | 100·2 |
| Huron, Ottawa 3 | 109·0 | 46·5 | 8·5 | 100·0 |
| White Fife, Ottawa 3 | 113·1 | 47·5 | 8·5 | 84·1 |
| *Tested four times—* | | | | |
| Goose | 110·0 | 50·0 | 6·5 | 131·1 |
| Mindum | 110·0 | 50·3 | 6·5 | 121·7 |
| O. A. C. No. 85 | 111·0 | 51·0 | 7·5 | 116·2 |
| Ceres | 98·0 | 42·8 | 10·0 | 105·8 |
| Red Fife, Ottawa 17 | 112·0 | 48·3 | 8·5 | 102·7 |
| Garnet 22-17 | 96·0 | 41·8 | 10·0 | 100·1 |
| Huron, Ottawa 3 | 109·0 | 47·8 | 8·3 | 100·0 |
| Marquis, Ottawa 15 | 103·0 | 44·3 | 9·3 | 93·6 |
| Red Quality A | 96·0 | 38·0 | 10·0 | 88·3 |
| Quality A | 93·0 | 36·0 | 10·0 | 86·9 |
| Reward, Ottawa 928 | 93·0 | 38·5 | 10·0 | 79·8 |

Eight plots of Huron, Ottawa 3, gave an average yield 32·43 bushels per acre
Four plots of Huron, Ottawa 3, gave an average yield 32·98 bushels per acre.

TABLE 35.—OATS—VARIETY TEST IN ROD-ROW PLOTS

| Name of variety | Number of days maturing | Average length of straw including head | Strength of straw on scale of 10 points | Per cent hull | Comparative yields for 1930 |
|---|---|---|---|---|---|
| | | in. | | % | % |
| *Tested eight times—* | | | | | |
| Victory | 98·0 | 49·8 | 8·5 | 24·60 | 104·4 |
| Gold Rain | 92·6 | 49·9 | 9·3 | 23·53 | 101·5 |
| Banner, Ottawa 49 | 97·0 | 49·3 | 8·3 | 24·62 | 100·0 |
| Banner M.C. 44 | 97·0 | 49·6 | 7·9 | 24·50 | 99·4 |
| Legacy, Ottawa 678 | 90·3 | 44·9 | 7·9 | 25·32 | 87·2 |
| Alaska | 84·0 | 43·1 | 8·8 | 20·18 | 78·1 |
| Liberty, Ottawa 480 | 91·6 | 46·1 | 8·1 | ..... | 57·9 |
| *Tested four times—* | | | | | |
| Victory x Alaska | 95·5 | 49·3 | 8·0 | 25·87 | 106·9 |
| Star | 95·0 | 46·5 | 8·8 | 25·07 | 104·5 |
| Banner Sask. 99 | 97·0 | 49·0 | 8·6 | 22·79 | 100·5 |
| Banner, Ottawa 49 | 97·0 | 48·3 | 8·3 | 24·62 | 100·0 |
| Leader B | 93·5 | 46·3 | 5·3 | 26·63 | 98·8 |
| Mansholt 3 | 96·0 | 46·3 | 9·3 | 25·00 | 98·2 |
| Banner Waugh | 96·3 | 49·0 | 8·8 | 24·49 | 98·1 |
| Irish Victor P | 94·3 | 50·3 | 9·0 | 23·65 | 97·1 |
| Lincoln | 96·8 | 52·0 | 8·8 | 23·68 | 95·1 |
| Longfellow, Ottawa 478 | 90·5 | 49·5 | 7·5 | 27·53 | 93·8 |
| Banner Cap Rouge | 96·8 | 48·8 | 8·3 | 25·53 | 92·6 |
| Gopher | 88·0 | 39·3 | 8·5 | 21·84 | 83·7 |
| O. A. C. No. 72 | 97·5 | 49·3 | 8·0 | 23·64 | 83·6 |
| Prolific Ottawa 77 | 95·3 | 46·8 | 8·8 | 24·44 | 81·6 |
| Abundance | 93·7 | 47·7 | 8·0 | 25·85 | 81·0 |
| Laurel Ottawa 477 | 93·5 | 45·8 | 9·0 | ..... | 76·1 |
| O. A. C. No. 3 | 86·5 | 41·0 | 7·3 | 21·26 | 71·9 |
| Cole | 82·5 | 40·8 | 5·0 | 24·30 | 70·7 |
| Leader A | 88·3 | 43·3 | 4·3 | 21·65 | 66·4 |
| White Cross | 83·0 | 43·0 | 8·8 | 26·94 | 58·7 |

Eight plots of Banner Ottawa 49 gave an average yield 78·15 bushels per acre.
Four plots of Banner Ottawa 49 gave an average yield 79·03 bushels per acre.

TABLE 36—BARLEY—VARIETY TEST IN ROD-ROW PLOTS

| Name of variety | Number of days maturing | Average length of straw including head | Strength of straw on scale of 10 points | Comparative yields for 1930 |
|---|---|---|---|---|
| | | in. | | % |
| *Tested eight times—* | | | | |
| Charlottetown No. 80 | 95·0 | 40·0 | 8·4 | 115·3 |
| Bearer, Ottawa 475 | 90·0 | 44·4 | 7·5 | 109·5 |
| Gold | 88·0 | 35·5 | 6·6 | 105·0 |
| Mensury Ottawa 60 | 85·0 | 42·5 | 9·0 | 101·5 |
| O. A. C. No. 21 | 85·5 | 42·0 | 7·5 | 100·0 |
| Early Chevalier Ottawa 51 | 84·0 | 39·4 | 6·8 | 97·9 |
| Star | 86·0 | 34·0 | 7·4 | 89·8 |
| *Tested four times—* | | | | |
| Trebi | 86·0 | 29·3 | 10·0 | 126·5 |
| Binder | 90·0 | 34·3 | 7·8 | 117·6 |
| Horn | 88·0 | 39·8 | 7·8 | 102·9 |
| O. A. C. No. 21 | 86·0 | 41·8 | 7·8 | 100·0 |
| Pontiac M.C. 909 | 87·0 | 43·3 | 10·0 | 97·7 |
| Velvet Minn. 447 | 88·0 | 44·5 | 8·8 | 95·7 |
| Glabron Minn. 445 | 90·0 | 43·3 | 8·5 | 92·0 |
| French Chevalier | 91·0 | 47·3 | 9·5 | 85·0 |
| Gordon A | 89·0 | 46·3 | 10·0 | 82·3 |
| Hannchen Sask. 229 | 89·0 | 36·8 | 4·0 | 80·9 |
| Canadian Thorpe | 95·0 | 39·5 | 8·8 | 80·9 |
| Manchurian Cap Rouge | 88·0 | 44·5 | 6·5 | 78·8 |
| Himalayan Ottawa 59 | 83·0 | 30·8 | 6·5 | 77·9 |
| Stella Ottawa 58 | 88·0 | 43·8 | 6·8 | 77·8 |
| Albert | 81·0 | 34·3 | 9·0 | 73·7 |
| Manchurian Ottawa 50 | 87·0 | 44·8 | 6·5 | 71·7 |
| Guymayle | 83·0 | 30·5 | 6·5 | 70·6 |
| Plumage Archer C. D. 991 | 101·0 | 34·3 | 0·0 | 68·1 |
| Duckbill Ottawa 57 | 94·0 | 38·8 | 7·8 | 64·8 |
| Duckbill M. C. 207 | 95·0 | 37·3 | 7·8 | 59·5 |
| Monck M.C. 813 | 89·0 | 44·7 | 7·7 | 49·3 |

Eight plots of O. A. C. No. 21 gave an average yield 42·13 bushels per acre.
Four plots of O. A. C. No. 21 gave an average yield 44·13 bushels per acre.

## OTHER WORK

Thirty-one varieties or selections of buckwheat were tested in duplicate rod-row plots. Tartarian and rye buckwheat gave larger yields than the Japanese and Silverhulls.

This Station co-operated with the Dominion Seed Branch in testing the crop of each contestant in the New Brunswick Field and Bin Competition 1929-1930. Approximately one acre of Elite Victory was grown and heads were selected for head rows in 1931.

## FORAGE CROPS

The dry weather in April and early May dried up the fields and permitted early seeding. Crops germinated well and were apparently little affected by the dry weather in June. Yields were good and ideal weather made harvesting easy.

Unless otherwise stated, yields were taken for only those portions of each plot which had a perfect stand. Duplicate composite samples were taken at harvest from each plot of swedes, turnips, kale, rape, mangels, sugar beets, cabbage, corn and soy beans. These were air dried at the Station and shipped to the Division of Forage Plants, Central Experimental Farm, Ottawa, for dry matter determination.

### FIELD ROOTS

The variety tests of field roots were located on light clay loam of rather poor natural fertility. The field was given a broadcast application of 4 tons ground limestone in 1927 and seeded with 15 pounds alfalfa and 4 pounds alsike clover per acre. The field was bare during most of the winter of 1927-28 and the alfalfa winter-killed but the alsike clover was not affected. There was a good crop of alsike in 1928 and a fair crop of mixed alsike brown top in 1929.

The field was ploughed in 1929 shortly after the hay was removed and harrowed at frequent intervals to destroy the weeds. Twenty tons of barnyard manure per acre were applied broadcast this spring and ploughed under. The field was harrowed twice with both the disk and spring-tooth harrow, then 1,200 pounds 4-8-6 fertilizer were applied broadcast and harrowed in with the smoothing harrow. The field was then ribbed up into 30-inch drills. The seed bed was in very fine condition but packed rather loosely, therefore, all drills were rolled after seeding to pack the soil around the seed.

#### SWEDES—VARIETY TESTS

Each variety was tested in quadruplicate and each plot consisted of 1 drill, 88 feet long and 30 inches wide. Thirty varieties of swedes were sown on May 19. They were thinned to an average of slightly less than 11 inches apart on June 14 and 16. One plot of each variety was pulled on October 14, 17, 21 and 23 respectively. The stands were excellent for all varieties and the roots were of good size and uniform but the quality was poor. A considerable number of the roots were affected with bacterial rot and at least 80 per cent of the roots were more or less affected with brown heart or water core. This disease was first noticed in the swedes at the Station in 1929 but was not as severe as this year. In 1929 and again this year, none of the varieties grown at the Station were immune to this disease. This disease makes the swedes worthless for table consumption. Apparently it does not, however, lessen the value for live stock feeding appreciably nor does it appreciably affect their keeping qualities.

The yields per acre, both green and dry weight for each variety or strain of swedes grown at this Station from 1924-30 inclusive are given in table 37.

TABLE 37—SWEDES—RESULTS OF VARIETY TESTS

| Name of variety | Source | Yield per acre | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1924 | | 1925 | | 1926 | | 1927 | | 1928 | | 1929 | | 1930 | |
| | | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry |
| | | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. |
| *Grown 4-7 Years—* | | | | | | | | | | | | | | | |
| Olsgaard Bangholm | Hjalmar Hartman & Co. | 51,657 | 7,552 | 64,241 | 6,527 | 62,083 | 6,009 | 56,723 | 5,799 | 88,440 | 8,739 | 50,095 | 5,293 | 81,760 | 8,548 |
| Ditmars | H. H. McNutt | 55,743 | 7,101 | 64,455 | 6,645 | 65,720 | 5,191 | 72,867 | 6,770 | 84,853 | 7,993 | 50,834 | 5,137 | 80,520 | 8,141 |
| Shepherd | Trifolium | 55,576 | 7,163 | 60,106 | 5,518 | 66,141 | 5,853 | ..... | ..... | 84,547 | 8,421 | ..... | ..... | ..... | ..... |
| Mammoth Clyde Purple Top | Wm. Ewing Co. | 42,924 | 6,258 | 58,006 | 6,526 | 64,527 | 6,169 | 58,157 | 6,110 | ..... | ..... | 47,298 | 5,378 | 67,282 | 7,135 |
| Bangholm | General Swedish Seed Co. | 42,687 | 5,493 | 59,933 | 6,089 | 62,973 | 5,845 | 51,148 | 5,496 | 82,564 | 8,087 | 46,546 | 5,330 | 78,009 | 8,406 |
| Shepherd's Golden Globe | Hjalmar Hartman & Co. | 51,878 | 7,449 | 63,177 | 6,097 | 57,074 | 5,613 | 45,646 | 4,987 | ..... | ..... | 41,193 | 4,365 | ..... | ..... |
| Improved Yellow Swedish | General Swedish Seed Co. | 36,675 | 4,463 | 56,644 | 5,976 | 58,520 | 6,616 | 59,362 | 6,033 | 71,827 | 7,339 | 44,725 | 5,453 | 72,107 | 8,046 |
| Best of All | Wm. Rennie Seed Co. | 53,173 | 5,997 | 60,184 | 6,373 | 56,205 | 4,819 | 57,072 | 6,066 | 68,217 | 7,363 | 52,763 | 5,542 | 67,741 | 7,664 |
| Kangaroo | Wm. Ewing Co. | 41,788 | 6,063 | 60,363 | 6,036 | 48,678 | 4,234 | 48,152 | 5,247 | 80,359 | 8,581 | 50,065 | 5,550 | 73,373 | 8,060 |
| Irish King Bronze Top | Wm. Rennie Seed Co. | 42,267 | 6,382 | 58,759 | 5,623 | 55,794 | 4,754 | 53,464 | 5,477 | 83,579 | 8,163 | 50,723 | 5,021 | 73,570 | 7,884 |
| Best of All | Wm. Ewing Co. | 44,925 | 6,177 | 54,613 | 5,461 | ..... | ..... | 51,219 | 5,639 | 73,840 | 7,179 | 51,436 | 5,692 | 72,101 | 7,584 |
| Kangaroo Bronze Green Top | Wm. Rennie Seed Co. | 35,391 | 5,099 | 60,205 | 6,677 | 52,737 | 5,086 | 46,918 | 4,841 | 72,485 | 7,741 | 42,054 | 4,553 | 76,285 | 8,551 |
| Magnum Bonum | Wm. Rennie Seed Co. | 45,408 | 5,957 | ..... | ..... | 56,552 | 5,146 | 50,665 | 5,085 | 74,042 | 7,511 | 48,734 | 5,146 | 68,249 | 7,648 |
| Bangholm | Wm. Ewing Co. | 47,635 | 6,116 | 56,013 | 5,949 | 57,889 | 5,187 | 48,016 | 5,311 | 68,968 | 7,493 | 48,323 | 5,413 | 59,421 | 6,863 |
| Bangholm | Kentville | ..... | ..... | ..... | ..... | 48,894 | 5,154 | 43,828 | 4,782 | 60,211 | 6,910 | 43,316 | 5,227 | 64,484 | 7,760 |
| Canadian Gem Purple Top | Wm. Rennie Seed Co. | 39,407 | 4,551 | ..... | ..... | 47,428 | 3,907 | 57,070 | 5,798 | 67,570 | 7,275 | 52,370 | 5,441 | 71,018 | 7,797 |
| Garton's Superlative | Wm. Ewing Co. | 51,196 | 6,517 | 63,246 | 5,882 | 57,127 | 4,565 | 53,147 | 4,953 | 79,444 | 7,320 | 46,550 | 4,467 | 66,489 | 6,466 |
| Invicta Bronze Top | Wm. Rennie Seed Co. | 34,966 | 4,615 | 58,660 | 5,637 | 59,190 | 5,033 | 53,207 | 5,394 | 78,372 | 7,394 | 53,101 | 5,420 | 63,647 | 6,610 |
| New Century Purple Top | Wm. Rennie Seed Co. | 33,971 | 4,759 | 47,637 | 4,616 | 58,643 | 5,003 | 53,192 | 5,624 | 74,220 | 7,860 | 46,105 | 4,895 | 69,262 | 6,937 |
| Universal | Wm. Ewing Co. | 37,759 | 4,957 | 62,290 | 5,986 | 51,927 | 4,966 | ..... | ..... | ..... | ..... | 41,012 | 4,351 | ..... | ..... |
| Corning | Yarmouth Fruit Producers | ..... | ..... | ..... | ..... | ..... | ..... | 48,717 | 4,901 | 73,433 | 7,454 | 45,030 | 4,713 | 71,710 | 6,816 |
| Bangholm | Nappan | 31,792 | 4,873 | 49,580 | 5,885 | 47,086 | 5,021 | 46,674 | 5,293 | 58,717 | 6,896 | 40,073 | 4,889 | 51,564 | 6,130 |
| Magnum Bonum | Wm. Ewing Co. | 46,857 | 2,464 | ..... | ..... | 53,753 | 4,969 | 55,118 | 5,662 | 72,700 | 7,240 | 45,318 | 4,801 | 67,040 | 7,225 |
| Hartley's Bronze Top | Wm. Rennie Seed Co. | 31,657 | 4,137 | ..... | ..... | ..... | ..... | ..... | ..... | 76,692 | 6,546 | 43,805 | 4,652 | 75,134 | 7,582 |
| *Grown 1-3 Years—* | | | | | | | | | | | | | | | |
| Bangholm No. 1116A | Trifolium | 48,339 | 7,632 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bangholm Pajberg | Trifolium | ..... | ..... | ..... | ..... | 63,402 | 5,768 | ..... | ..... | 80,612 | 9,528 | ..... | ..... | ..... | ..... |
| Bangholm Steelsgaard 5018 | Trifolium | ..... | ..... | ..... | ..... | 51,816 | 5,899 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bangholm Klark | Trifolium | ..... | ..... | ..... | ..... | 56,773 | 5,775 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bangholm | Halifax Seed Co. | ..... | ..... | 59,571 | 6,726 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Hall's Westbury | Wm. Rennie Seed Co. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 50,846 | 5,485 | 76,224 | 8,486 |
| Bangholm Lyngly & Studsgaard. | Danske Landboforeningers Frøforsyning. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 49,389 | 5,684 | ..... | ..... |
| Mustiala | Hjalmar Hartman & Co. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 48,289 | 5,140 | 80,123 | 8,656 |
| Bangholm Klank M | Trifolium | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 72,603 | 8,213 | ..... | ..... | ..... | ..... |
| Derby Green Top | J. A. Bruce | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 46,001 | 4,936 | 72,733 | 8,065 |
| Hall's Westbury | Wm. Ewing Co. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 52,033 | 5,339 | 71,395 | 7,658 |
| Bangholm Purple Top | Wm. Rennie Seed Co. | ..... | ..... | 56,216 | 6,195 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Hazard's Improved | Steele Briggs | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 44,916 | 4,680 | 76,734 | 8,226 |
| Bangholm Klank | Hjalmar Hartman & Co. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 47,100 | 5,385 | 62,855 | 7,405 |
| Derby Bronze Green Top | Wm. Rennie Seed Co. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 52,280 | 5,243 | 68,899 | 7,163 |
| Bangholm | Charlottetown | ..... | ..... | 53,456 | 5,554 | 44,230 | 5,065 | 43,922 | 5,311 | ..... | ..... | ..... | ..... | ..... | ..... |
| Bangholm Studsgaard | Trifolium | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 62,845 | 7,457 | ..... | ..... | ..... | ..... |
| Improved Bronze Top | Drummond | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 51,523 | 4,921 | ..... | ..... |
| White Butter | Hjalmar Hartman & Co. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 34,626 | 4,378 | 55,623 | 6,476 |
| Bangholm No. 1322 | Trifolium | ..... | ..... | 52,618 | 5,099 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bangholm Purple Top | Wm. Ewing Co. | 38,175 | 4,936 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Hazard's Improved | Wm. Rennie Seed Co. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 40,410 | 4,311 | 58,992 | 6,322 |
| Purple Top | Central Experimental Farm | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 61,195 | 6,270 | ..... | ..... | ..... | ..... |
| Halewood Green Top | Wm. Ewing Co. | 35,499 | 4,316 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

The following varieties of swedes from Canadian sources have given good yields:—

Purple tops—Mammoth Clyde, Hall's Westbury and Best of All.

Bronze tops—Ditmar, Kangaroo and Irish King.

Hall's Westbury has only been tested two years, all the other varieties have been grown at least six years. Mammoth Clyde is rather rough for market purposes but as it is a heavy yielder and good keeper, it is an excellent root to grow for stock feed. Hall's Westbury has given good yields and has produced uniform roots the two years it has been tested. The three Bronze tops mentioned are all good yielders. Ditmar has been the most uniform and is also the heaviest yielder.

### TURNIPS—VARIETY TESTS

Each variety was tested in quadruplicate and each plot consisted of 1 drill, 88 feet long and 30 inches wide. Six varieties of turnips were sown on May 19. They were thinned to an average of slightly less than 11 inches apart on June 13 and 14. They were so badly infected with bacterial rot that in order to obtain yields, it was necessary to pull them on August 25.

The yields per acre both green and dry weight for each variety or strain of turnips grown at the Station from 1924-30 inclusive are given in table 38.

TABLE 38—TURNIPS—RESULTS OF VARIETY TESTS

| Name of variety | Source | Yield per acre | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1924 | | 1925 | | 1926 | | 1927 | | 1928 | | 1929 | | 1930 | |
| | | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry |
| | | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. |
| *Grown 4-7 Years—* | | | | | | | | | | | | | | | |
| Fynsk Bortfelder | Danske Landboforeningers Frofor-syning Roskilde. | ..... | ..... | ..... | ..... | 47,931 | 2,952 | 45,337 | ..... | 40,441 | 2,982 | 49,066 | 3,642 | 50,875 | 3,468 |
| Yellow Tankard | " " " | 73,822 | 7,677 | ..... | ..... | 42,527 | 3,010 | 41,465 | ..... | 38,529 | 2,208 | 39,845 | 3,120 | 42,477 | 2,735 |
| Dales | " " " | 41,363 | 4,566 | ..... | ..... | ..... | ..... | ..... | ..... | 37,612 | 2,894 | 42,594 | 3,556 | 38,886 | 2,786 |
| *Grown 1-3 Years—* | | | | | | | | | | | | | | | |
| Bortfelder | Hjalmar Hartman & Co. | ..... | ..... | ..... | ..... | ..... | ..... | 46,883 | ..... | 41,669 | 2,423 | 47,130 | 3,884 | ..... | ..... |
| Fynsk Bortfelder | " " | ..... | ..... | ..... | ..... | 46,460 | 3,093 | ..... | ..... | 38,880 | 2,531 | 45,869 | 3,555 | ..... | ..... |
| Early Six Week | Sutton & Sons | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 46,965 | 3,865 | 35,209 | 2,388 |
| Red Paragon | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 44,506 | 3,359 | 40,218 | 2,603 |
| Greystone | Steele Briggs | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 43,492 | 3,517 | 36,178 | 2,103 |
| Fynsk Bortfelder Parti 2660 | Danske Landboforeningers Frofor-syning Roskilde. | 54,271 | 4,987 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Funen Bortfelder Swede | Hjalmar Hartman & Co. | 50,940 | 4,401 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

All the fall turnips tested were light yielders and were also very susceptible to bacterial rot. It is doubtful if this crop has any economic importance in this district.

MANGELS—VARIETY TESTS

Each variety was tested in quadruplicate and each plot consisted of 1 drill, 88 feet long and 30 inches wide. Twenty-eight varieties of mangels were sown on May 14. They were thinned to an average distance of 10·43 inches apart on June 17 and were harvested on October 2, 3 and 4. The stands were good and the mangels made good growth early in the season. In August they became infected with blight (*Phoma betae*). This disease first appeared in the sugar beets and spread from there to the adjoining mangels. This was the first time the disease was noticed at the Station.

The yields per acre both green and dry weight for each variety or strain of mangels grown at this Station from 1924-30 inclusive are given in table 39.

TABLE 39.—MANGELS—RESULTS OF VARIETY TEST

| Name of variety | Source | Yield per acre | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1924 | | 1925 | | 1926 | | 1927 | | 1928 | | 1929 | | 1930 | |
| | | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry |
| | | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. |
| *Grown 4–7 years—* | | | | | | | | | | | | | | | |
| Giant White Half Sugar | Wm. Ewing Co | 28,226 | 5,041 | 73,483 | 8,098 | 66,170 | 6,143 | 39,786 | 4,512 | 65,533 | 7,748 | 45,029 | 6,384 | 62,650 | 7,165 |
| White Green Top Half Sugar | Hjalmar Hartman & Co | 28,009 | 4,867 | ..... | ..... | 61,492 | 7,210 | 36,918 | 4,676 | 72,150 | 8,065 | 39,156 | 5,164 | ..... | ..... |
| Danish Sludstrup | Wm. Ewing Co | 23,661 | 4,372 | ..... | ..... | 64,332 | 7,636 | 40,634 | 4,484 | 75,202 | 7,307 | 50,110 | 5,961 | 61,740 | 7,439 |
| Red Top White Half Sugar | Wm. Ewing Co | 16,592 | 5,189 | 32,170 | 7,576 | 54,899 | 6,358 | 34,120 | 4,079 | ..... | ..... | ..... | ..... | ..... | ..... |
| Barres Sludstrup | Hjalmar Hartman & Co | 30,896 | 4,915 | ..... | ..... | 69,871 | 6,871 | 48,120 | 5,532 | 75,495 | 6,969 | 40,606 | 5,421 | 63,844 | 6,841 |
| Yellow Intermediate | Central Experimental Farm | 22,915 | 3,460 | 76,135 | 7,583 | 63,290 | 6,716 | 37,648 | 4,444 | 66,191 | 7,424 | 37,745 | 5,446 | 61,261 | 7,369 |
| Stryno Barres | Hjalmar Hartman & Co | 31,883 | 4,479 | 81,137 | 7,603 | 71,167 | 6,688 | 41,654 | 4,323 | 74,405 | 7,143 | 46,900 | 5,519 | 71,996 | 7,102 |
| Barres Half Long | General Swedish Seed Co | 34,939 | 6,089 | 62,036 | 7,029 | 65,106 | 5,831 | 35,736 | 4,086 | 67,883 | 6,908 | 40,619 | 5,446 | 62,795 | 7,430 |
| Elevethan Mammoth | Hjalmar Hartman & Co | 26,617 | 5,131 | 60,333 | 7,234 | 60,190 | 7,078 | 32,432 | 3,671 | 67,543 | 6,720 | 36,196 | 5,587 | 59,962 | 6,392 |
| Danish Sludstrup | Kenneth McDonald & Sons | 34,404 | 5,301 | 54,661 | 5,253 | 69,529 | 6,308 | 39,005 | 4,170 | 68,668 | 6,789 | 44,249 | 5,433 | 73,418 | 8,208 |
| Ideal | Wm. Rennie Seed Co | 38,410 | 5,312 | ..... | ..... | 80,856 | 7,227 | 38,952 | 4,634 | 66,702 | 6,437 | 41,165 | 5,710 | 53,503 | 5,532 |
| Taaroje Barres | Hjalmar Hartman & Co | 40,081 | 5,430 | 66,618 | 5,103 | 69,731 | 6,668 | ..... | ..... | ..... | ..... | 50,472 | 6,212 | 63,930 | 6,319 |
| Rosted Barres | Hjalmar Hartman & Co | 33,733 | 5,215 | 65,842 | 5,682 | 72,665 | 6,454 | 43,246 | 4,434 | 70,317 | 6,937 | ..... | ..... | 60,625 | 6,307 |
| Barres Sludstrup | General Swedish Seed Co | 38,603 | 5,385 | ..... | ..... | ..... | ..... | 38,416 | 4,089 | 66,212 | 6,664 | 39,664 | 5,272 | ..... | ..... |
| Long Red Mammoth | Wm. Ewing Co | 28,995 | 4,384 | 62,907 | ..... | 63,825 | 6,703 | 37,571 | 4,500 | 65,721 | 6,942 | 37,921 | 5,068 | 54,458 | 6,405 |
| Perfection Mammoth Long Red | Wm. Rennie Seed Co | 27,362 | 4,908 | 66,525 | 6,340 | 60,635 | 6,276 | 37,316 | 4,203 | 62,028 | 6,622 | 37,668 | 5,279 | 60,207 | 6,498 |
| White Red Top Half Sugar | Hjalmar Hartman & Co | 24,628 | 4,046 | 61,494 | 6,414 | 50,545 | 5,987 | 33,970 | 4,229 | 62,678 | 7,093 | 38,171 | 5,358 | ..... | ..... |
| Svalof Original Rubra | General Swedish Seed Co | ..... | ..... | 50,009 | 5,666 | 49,033 | 5,462 | 34,163 | 4,621 | 56,022 | 6,080 | 36,578 | 5,532 | 59,408 | 7,382 |
| Leviathan | Wm. Rennie Seed Co | 25,117 | 4,141 | 55,437 | ..... | 61,884 | 5,679 | ..... | ..... | ..... | ..... | 43,849 | 5,689 | 64,642 | 6,937 |
| Yellow Eckendorfer | General Swedish Seed Co | 36,277 | 5,278 | 59,164 | 5,544 | 66,234 | 6,084 | 39,955 | 4,266 | 77,029 | 6,993 | 43,518 | 5,049 | 64,370 | 6,081 |
| Eckendorfer Yellow | Hjalmar Hartman & Co | 38,802 | 4,648 | 81,690 | 6,257 | 68,640 | 5,611 | 42,656 | 4,167 | 79,434 | 6,467 | 48,363 | 5,674 | 66,215 | 6,408 |
| Improved Giant Sugar | Wm. Rennie Seed Co | 29,347 | 4,333 | 48,325 | 5,132 | 54,545 | 5,271 | 30,842 | 3,808 | 58,460 | 6,743 | 37,438 | 5,510 | 61,619 | 7,116 |
| Svalof Original Alfa | General Swedish Seed Co | 30,445 | 4,603 | 61,494 | 6,463 | 51,055 | 5,709 | 30,699 | 3,295 | ..... | ..... | ..... | ..... | ..... | ..... |
| Giant Yellow Intermediate | Wm. Ewing Co | 28,477 | 4,698 | 76,135 | 6,007 | 59,057 | 5,826 | 36,410 | 3,987 | 72,439 | 7,269 | 44,118 | 5,107 | 53,641 | 4,892 |
| Golden Tankard | Wm. Ewing Co | 29,874 | 4,573 | 67,163 | 7,529 | 51,224 | 5,046 | 32,191 | 3,695 | 55,304 | 5,655 | 44,334 | 5,320 | 48,651 | 5,444 |
| Ferritslev Barres | Hjalmar Hartman & Co | 25,734 | 4,024 | 74,108 | 5,328 | 62,639 | 5,798 | 40,734 | 4,226 | 69,393 | 5,972 | 45,118 | 5,141 | 67,215 | 6,745 |
| Red Eckendorfer | General Swedish Seed Co | 33,385 | 4,233 | 71,743 | 6,364 | 66,100 | 5,770 | 39,693 | 3,466 | 66,722 | 6,214 | 40,114 | 4,726 | 66,131 | 6,276 |
| Barres Oval | General Swedish Seed Co | 34,922 | 5,046 | 51,178 | ..... | 62,758 | 5,633 | 34,372 | 3,703 | 63,214 | 5,882 | ..... | ..... | 57,059 | 5,860 |
| Eckendorfer Red | Hjalmar Hartman & Co | 27,431 | 4,043 | 65,419 | 5,057 | 66,449 | 5,619 | 39,657 | 3,610 | 67,522 | 5,707 | 47,285 | 5,159 | 63,724 | 6,457 |
| Golden Tankard | Wm. Rennie Seed Co | 27,014 | 4,924 | 58,611 | 5,996 | 43,153 | 4,981 | 29,837 | 3,006 | 52,216 | 5,131 | 31,832 | 3,920 | 56,506 | 5,926 |
| Giant Yellow Globe | Wm. Ewing Co | 33,548 | 4,364 | 59,034 | 4,333 | 66,227 | 4,876 | 40,033 | 3,725 | 73,898 | 5,868 | 43,849 | 4,719 | 65,186 | 5,093 |
| Giant Yellow Globe | Wm. Rennie Seed Co | 22,611 | 3,851 | 54,661 | 4,353 | 63,378 | 4,961 | 42,351 | 3,758 | 72,620 | 5,466 | 45,165 | 5,092 | 63,467 | 5,151 |
| *Grown 1–3 Years—* | | | | | | | | | | | | | | | |
| Leviathan Half Rose | Wm. Rennie Seed Co | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 85,317 | 7,872 | ..... | ..... | ..... | ..... |
| Giant Rose Half Sugar | Wm. Ewing Co | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 53,804 | 6,895 |
| Yellow Leviathan | Wm. Rennie Seed Co | ..... | ..... | 60,602 | 6,272 | ..... | ..... | 42,951 | 4,421 | ..... | ..... | ..... | ..... | ..... | ..... |
| Barres Oval | Hjalmar Hartman & Co | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 42,201 | 5,332 | ..... | ..... |
| Svalof Red | General Swedish Seed Co | 25,321 | 4,732 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

The following varieties of mangels from Canadian sources have given good yields:—

Long—Perfection Mammoth Long Red and Long Red Mammoth.

Half Long Sugar Mangel—Giant White Half Sugar, White Green Top Half Sugar and Red Top Half Sugar.

Intermediate—Danish Sludstrup and Yellow Intermediate.

Tankard—Ideal.

The long types mentioned above are fair yielders but they are hard to pull. Half long sugar mangels mentioned are heavy yielders but they are also hard to pull. The intermediate types are good yielders, and are fairly easy to pull. This type is considered most suitable at this Station. Ideal, the only tankard mentioned, is easy to pull and is a good yielder when conditions are favourable. Dry weather apparently checks the growth of roots of the tankard type. The globes tested were all light yielders.

### SUGAR BEETS—VARIETY TESTS

Each variety was tested in quadruplicate and each plot consisted of 1 drill, 88 feet long and 30 inches wide. Three varieties of sugar beets were sown on May 14. They were thinned to an average distance apart of 10·43 inches on June 17 and were harvested on September 30. The stands were good and the sugar beets made excellent growth early in the season. The yields were decreased, however, by a severe attack of blight (*Phoma betae*). This disease was first noticed the last of July and evidently came in the seed.

The yields per acre both green and dry weight for each variety or strain of sugar beets grown at this Station from 1924-30 inclusive are given in table 40.

TABLE 40—SUGAR BEETS—RESULTS OF VARIETY TESTS

| Name of variety | Yield per Acre | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1924 | | | 1925 | | | 1926 | | | 1927 | | | 1928 | | | 1929 | | | 1930 | | |
| | Green | Dry | Sugar in juice | Green | Dry | Sugar in juice | Green | Dry | Sugar in juice | Green | Dry | Sugar in juice | Green | Dry | Sugar in juice | Green | Dry | Sugar in juice | Green | Dry | Sugar in juice |
| | lb. | lb. | % | lb. | lb. | % | lb. | lb. | % | lb. | lb. | % | lb. | lb. | % | lb. | lb. | % | lb. | lb. | % |
| Kitchener | 13,692 | 4,066 | 22·30 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Henning and Harving | 18,978 | 5,264 | 22·10 | 27,342 | 5,649 | 17·56 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sluice Bros | 17,746 | 4,867 | 18·55 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Shreiber & Son | 16,414 | 4,362 | 21·62 | 32,820 | 6,935 | 18·97 | 34,204 | 7,035 | 16·75 | 23,262 | 5,031 | 18·18 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Dr. Burgman | 14,909 | 4,308 | 21·51 | 27,452 | 6,339 | 20·14 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Dieppe | 13,770 | 3,921 | 21·70 | 28,104 | 6,489 | 19·04 | 37,785 | 7,951 | 15·18 | 21,384 | 4,569 | 18·23 | 30,521 | 7,056 | 19·12 | ..... | ..... | ..... | 29,747 | 6,432 | 17·61 |
| Rabbethge & Giesecke | ..... | ..... | ..... | 31,678 | 7,042 | 20·12 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 17,841 | 4,098 | 18·70 | 34,311 | 7,098 | 17·50 |
| Horning | 18,209 | 5,162 | 21·80 | 31,062 | 6,697 | 19·07 | 37,515 | 7,548 | 14·53 | 22,394 | 4,817 | 16·87 | ..... | ..... | ..... | 27,272 | 6,180 | 17·16 | ..... | ..... | ..... |
| Home Grown | ..... | ..... | ..... | 23,945 | 5,294 | 18·39 | ..... | ..... | ..... | 24,108 | 5,039 | 18·18 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Fredericksen | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 30,243 | 6,865 | 19·00 | 27,463 | 6,195 | 17·76 | 31,042 | 6,181 | 16·52 |
| Buszczynski | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 26,914 | 6,400 | 19·93 | ..... | ..... | ..... | ..... | ..... | ..... |
| Vilmorin Improved Selection B | 13,142 | 3,717 | 21·83 | 27,367 | 6,007 | 20·29 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

KALE, RAPE AND CABBAGE—VARIETY TESTS

This test was conducted on the same field and the land was given the same treatment as that used for the Field Roots—Variety Tests. Each variety was tested in quadruplicate and each plot consisted of 1 drill, 88 feet long and 30 inches wide.

Five varieties of kale and one variety of cabbage were sown on May 15; five varieties of rape were sown on May 19. The kale and four varieties of rape were thinned to 4-6 inches between plants on June 16. One variety of rape, viz., Small Seeded Turnip, was not thinned. This variety had been thinned the previous years it was tested and had given very small yields. When not thinned, however, its yields compared favourably with the other varieties. The variety of cabbage was thinned to 16-18 inches apart on June 16. The kale and rape were harvested on September 5 and the cabbage on October 23.

Table 41 gives the yields per acre both green and dry weight of each variety of kale and rape grown at the Station from 1924-30 inclusive.

TABLE 41—RAPE AND KALE—RESULTS OF VARIETY TEST

| Name of variety | Source | Yield per acre | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1924 | | 1925 | | 1926 | | 1927 | | 1928 | | 1929 | | 1930 | |
| | | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry |
| KALE | | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. |
| *Grown 4-7 Years—* | | | | | | | | | | | | | | | |
| Green stemmed Marrow | Webb & Son, England | 30,026 | 4,026 | 40,503 | 4,318 | ..... | ..... | 41,440 | 5,363 | 45,575 | 4,405 | ..... | ..... | ..... | ..... |
| *1,000 Headed | Sutton & Sons, England | 22,071 | 3,518 | 44,070 | 5,509 | 33,840 | 3,531 | 31,581 | 4,423 | 42,635 | 4,479 | 22,572 | 3,695 | 46,852 | 5,901 |
| *Improved 1,000 Headed | Sutton & Sons, England | 21,924 | 3,321 | 42,320 | 4,744 | 39,075 | 3,800 | 34,734 | 4,586 | 44,540 | 4,695 | 21,164 | 3,496 | 39,356 | 5,364 |
| Purple Stemmed Marrow | Webb & Son, England | 21,123 | 3,020 | 37,893 | 4,471 | ..... | ..... | 38,516 | 4,439 | 39,858 | 3,765 | ..... | ..... | ..... | ..... |
| *Curled Sheep | Sutton & Sons, England | 23,661 | 3,052 | 26,138 | 2,926 | 49,070 | 4,064 | 25,391 | 3,229 | 44,486 | 4,064 | 13,772 | 2,315 | 37,077 | 4,558 |
| *Grown 1-3 Years—* | | | | | | | | | | | | | | | |
| Marrow | Sutton & Sons, England | ..... | ..... | 48,175 | 5,530 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| French Marrow | Sutton & Sons, England | 27,390 | 3,659 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Green Stemmed Marrow | Sutton & Sons, England | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 24,332 | 3,619 | 47,055 | 5,575 |
| Purple Stemmed Marrow | Sutton & Sons, England | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 23,672 | 3,597 | 45,738 | 5,234 |
| Marrow Stemmed Kale | Sutton & Sons, England | ..... | ..... | ..... | ..... | 44,588 | 3,787 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| RAPE | | | | | | | | | | | | | | | |
| *Grown 4-7 Years—* | | | | | | | | | | | | | | | |
| Giant Rape | Sutton & Sons, England | ..... | ..... | ..... | ..... | 43,836 | 4,283 | 31,008 | 5,411 | 58,098 | 6,181 | 20,152 | 3,559 | 38,090 | 5,745 |
| Large Seeded Winter Umbrella. | Vilmorin Andrieux & Co | ..... | ..... | ..... | ..... | 60,580 | 5,381 | 32,040 | 4,379 | 59,568 | 5,917 | ..... | ..... | 41,331 | 5,261 |
| Large Seeded Winter (Common Essex Rape). | Vilmorin Andrieux & Co | ..... | ..... | ..... | ..... | 56,932 | 4,957 | 35,135 | 4,784 | 48,842 | 5,156 | ..... | ..... | 38 039 | 5,070 |
| *Grown 1-3 Years—* | | | | | | | | | | | | | | | |
| Dwarf Essex | Garton's, England | ..... | ..... | ..... | ..... | 65,457 | 6,127 | 23,843 | 3,424 | ..... | ..... | ..... | ..... | ..... | ..... |
| Broad Leaved Essex | Sutton & Sons, England | ..... | ..... | ..... | ..... | ..... | ..... | 32,899 | 4,634 | ..... | ..... | ..... | ..... | ..... | ..... |
| Improved Dwarf Essex | K. McDonald & Sons | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 28,668 | 4,038 |
| Small Seeded Turnip Rape (Winter or German Winter Rape). | Vilmorin Andrieux & Co | ..... | ..... | ..... | ..... | 35,992 | 2,786 | 32,269 | 2,357 | ..... | ..... | ..... | ..... | 40,825 | 4,582 |
| Large Seeded Colza (Summer Rape). | Vilmorin Andrieux & Co | ..... | ..... | ..... | ..... | 16,245 | 1,428 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Large Seeded Koubja (Russian Summer Rape). | Vilmorin Andrieux & Co | ..... | ..... | ..... | ..... | 12,220 | 1,070 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Small Seeded Turnip Rape (Summer or German Rape). | Vilmorin Andrieux & Co | ..... | ..... | ..... | ..... | 4,456 | 576 | ..... | ..... | 3,771 | 371 | ..... | ..... | ..... | ..... |
| *Cabbage*—Drumhead | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 58,452 | 6,996 |

CORN—VARIETY TESTS

The corn variety tests were located on medium loam. This field was given a broadcast application of 4 tons ground limestone per acre in 1927 and seeded with 15 pounds alfalfa and 4 pounds of alsike clover per acre. The field was bare during most of the winter of 1927-28 and the alfalfa winter-killed but the alsike clover was not affected and gave good yields of hay in 1928 and 1929. The field was ploughed in 1929 shortly after the hay was removed and harrowed at frequent intervals to destroy the weeds. This spring 20 tons of manure per acre were applied broadcast and ploughed under. The land was then disked both ways, and 1,200 pounds per acre of a 2-12-5 fertilizer were applied broadcast and mixed with the soil with a chain harrow.

The corn was planted in hills 3 feet apart each way and later thinned to three plants to each hill. Four plots were sown with each variety. The area of each plot was 297 square feet when the outside hills were removed.

Twenty-four varieties of corn were sown on May 23. The corn germinated well and made good growth throughout the season. The corn was much better matured this year than usual. Harvesting was finished on September 22.

Table 42 gives the yields per acre both green and dry weight of each variety of corn grown at this Station from 1924-30 inclusive.

TABLE 42.—CORN—RESULTS OF VARIETY TESTS

| Name of variety | Source | Yield per acre | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1924 | | 1925 | | 1926 | | 1927 | | 1928 | | 1929 | | 1930 | |
| | | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry | Green | Dry |
| | | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. |
| *Grown 4-7 Years—* | | | | | | | | | | | | | | | |
| Hybrid | Twitchell's Pride x Wisconsin No. 7 | ..... | ..... | 33,837 | 5,370 | 21,866 | 2,540 | 21,416 | 3,523 | 32,412 | 4,742 | 34,131 | 5,963 | ..... | ..... |
| Longfellow | Dakota Improved Seed Co | 48,286 | 6,669 | 38,438 | 5,318 | 21,005 | 2,179 | 26,248 | 3,296 | ..... | ..... | ..... | ..... | ..... | ..... |
| Burr Leaming | G. S. Carter | 50,835 | 7,281 | 31,751 | 4,357 | 18,988 | 1,875 | 30,437 | 3,818 | 37,831 | 4,815 | 39,120 | 6,481 | 53,938 | 9,333 |
| Compton's Early | J. O. Duke Seed Co | 52,330 | 8,207 | 39,741 | 4,741 | 23,025 | 2,379 | 23,019 | 3,025 | 32,558 | 4,189 | ..... | ..... | 46,752 | 9,623 |
| Hybrid | A. J. Wimple | 44,102 | 6,701 | 33,099 | 4,733 | 17,081 | 1,796 | 22,420 | 2,816 | 34,015 | 4,478 | 39,902 | 6,089 | 55,587 | 10,080 |
| North Dakota | Steele-Briggs | 39,703 | 5,968 | 44,230 | 5,694 | 15,988 | 1,935 | 17,540 | 2,195 | 32,744 | 4,091 | 36,988 | 5,753 | 62,945 | 10,650 |
| Wisconsin No. 7 | J. O. Duke Seed Co | 42,573 | 6,656 | 31,093 | 4,710 | 18,143 | 1,871 | 26,116 | 2,736 | 31,134 | 4,573 | 32,869 | 5,276 | 50,787 | 10,244 |
| Northwestern Dent | Wm. Rennie Seed Co | 43,855 | 6,566 | 32,073 | 4,674 | 14,065 | 1,629 | 22,314 | 2,841 | 31,475 | 4,162 | ..... | ..... | ..... | ..... |
| Longfellow | J. O. Duke Seed Co | 43,111 | 6,200 | 33,036 | 4,552 | 23,749 | 2,556 | 25,367 | 3,343 | 30,852 | 3,865 | 29,529 | 4,862 | 45,719 | 8,928 |
| White Capped Yellow Dent | Steele-Briggs | 36,150 | 5,596 | 26,384 | 3,779 | 12,436 | 1,373 | 23,258 | 3,062 | 35,081 | 4,556 | 33,583 | 5,509 | 54,582 | 9,479 |
| Northwestern Dent | Dakota Improved Seed Co | 33,138 | 5,075 | 28,586 | 4,441 | 18,387 | 1,961 | 21,477 | 2,909 | 28,106 | 3,668 | 27,340 | 5,277 | 38,636 | 8,885 |
| Golden Glow | J. O. Duke Seed Co | 40,601 | 6,321 | 27,923 | 4,117 | 15,262 | 1,791 | 19,669 | 2,793 | 28,348 | 3,961 | 27,175 | 4,693 | 42,472 | 8,315 |
| Leaming | J. O. Duke Seed Co | 37,526 | 5,942 | 28,463 | 4,345 | 18,270 | 1,642 | 19,172 | 3,194 | 27,900 | 3,996 | 29,436 | 5,049 | 39,589 | 7,793 |
| 90 Day White Dent | Dakota Improved Seed Co | 39,296 | 5,982 | 31,007 | 4,494 | 15,115 | 1,618 | 19,617 | 2,626 | 29,473 | 3,882 | 31,168 | 4,570 | 43,360 | 8,565 |
| Northwestern Dent | MacDonald College | ..... | ..... | ..... | ..... | 17,261 | 2,052 | 16,472 | 2,392 | 27,783 | 3,903 | 29,198 | 4,897 | 36,648 | 8,218 |
| Pride Yellow Dent | Dakota Improved Seed Co | 32,959 | 5,404 | ..... | ..... | 12,437 | 1,498 | 20,257 | 2,620 | 24,304 | 3,690 | 31,254 | 4,937 | 36,771 | 8,298 |
| Yellow Dent | A. J. Wimple | 41,530 | 6,124 | 31,156 | 4,563 | 14,413 | 1,618 | 18,407 | 2,516 | 30,043 | 3,895 | 16,497 | 2,661 | 48,647 | 8,436 |
| Northwestern Dent | O. Will | 33,498 | 5,200 | 19,889 | 3,302 | 12,819 | 1,609 | 16,311 | 2,383 | 23,628 | 3,624 | ..... | ..... | 34,577 | 8,267 |
| Northwestern Dent (North Dakota Grown). | A. E. MacKenzie | 32,797 | 5,486 | 21,720 | 3,493 | 12,751 | 1,456 | ..... | ..... | ..... | ..... | 22,296 | 4,365 | 33,362 | 7,956 |
| Twitchell's Pride | Fredericton | 28,472 | 4,610 | 25,661 | 4,640 | 15,047 | 1,851 | 14,784 | 2,248 | 23,621 | 3,659 | 19,220 | 3,608 | 31,352 | 7,640 |
| Quebec 28 | MacDonald College | 31,464 | 5,092 | 22,513 | 3,721 | ..... | ..... | 14,951 | 2,203 | 25,136 | 3,978 | 19,694 | 3,733 | 29,209 | 6,902 |
| Northwestern Dent | Brandon | 27,161 | 4,926 | 19,352 | 3,556 | 12,138 | 1,378 | 13,667 | 2,004 | 18,178 | 3,105 | 15,189 | 3,247 | 19,089 | 5,120 |
| Amber Flint | A. J. Wimple | 24,271 | 3,181 | 17,406 | 2,414 | 8,836 | 938 | 11,554 | 1,473 | 22,534 | 2,967 | 33,678 | 5,221 | 29,861 | 5,935 |
| *Grown 1-3 Years—* | | | | | | | | | | | | | | | |
| Hybrid | Wisconsin No. 7 x Twitchell's Prid | ..... | ..... | ..... | ..... | ..... | ..... | 24,553 | 3,243 | ..... | ..... | ..... | ..... | ..... | ..... |
| Wisconsin No. 7 | John Park | 2,643 | 6,566 | 34,416 | 5,363 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Lancaster County Sure Crop | A. H. Hoffman | ..... | ..... | ..... | ..... | ..... | ..... | 25,475 | 3,008 | 41,589 | 5,169 | ..... | ..... | 55,887 | 9,750 |
| Canada Leaming | G. S. Carter | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 33,809 | 5,237 | 51,822 | 9,723 |
| Northwestern Dent (South Dakota Grown). | A. E. MacKenzie | ..... | ..... | ..... | ..... | ..... | ..... | 22,767 | 2,956 | ..... | ..... | ..... | ..... | ..... | ..... |
| Leaming | John Park | 37,055 | 5,655 | 35,726 | 5,084 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Longfellow | Popp & Lang | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 32,969 | 4,045 | ..... | ..... | ..... | ..... |
| Northwestern Dent (Nebraska Grown). | A. E. MacKenzie | 33,223 | 5,467 | 33,051 | 4,513 | 14,906 | 1,671 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Northwestern Dent No. 2 | A. E. MacKenzie | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 26,985 | 3,746 | ..... | ..... | ..... | ..... |
| Northwestern Dent (Crookston Strain). | A. E. MacKenzie | ..... | ..... | ..... | ..... | ..... | ..... | 17,858 | 2,576 | ..... | ..... | 24,812 | 4,708 | 34,029 | 8,142 |
| White Capped Yellow Dent | Wm. Rennie Seed Co | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 38,620 | 7,924 |
| Northwestern Dent No. 1 | A. E. MacKenzie | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 24,300 | 3,526 | ..... | ..... | ..... | ..... |
| Hybrid | Wisconsin No. 7 x Howes Alta Flint. | ..... | ..... | ..... | ..... | 17,617 | 2,408 | 15,775 | 2,440 | ..... | ..... | ..... | ..... | ..... | ..... |

The Hybrids of Wisconsin No. 7 and Twitchell's Pride gave the largest average yield. As these crosses are still in the experimental stage, no seed is available.

The late maturing varieties as Longfellow, Burr Leaming, Compton's Early and North Dakota, gave the best results. These varieties gave much larger yields both green and dry weight, than the early maturing varieties, viz., Twitchell's Pride, Quebec 28, Northwestern Dent (Brandon) and Amber Flint.

### CORN BREEDING

Corn-breeding work this year grouped itself under four general headings:—

(1) Testing of Intercrosses between inbred strains of Twitchell's Pride, made in 1928, and already tested once in 1929.

(2) Testing of more promising crosses between inbred strains of Twitchell's Pride and Wisconsin No. 7, made in 1928, and noted as promising in 1929 tests.

(3) Testing for the first time of crosses between inbred strains of Twitchell's Pride and Howes Alberta Flint.

(4) Further propagation of inbred strains of Twitchell's Pride.

Some promising crosses were noted, but owing to the fact that present circumstances indicate that many of the best inbred strains are lost, due to their loss of germinability, no further data are herewith presented.

### SOY BEANS—VARIETY TEST

Eleven varieties or strains of Soy beans were sown on June 5. Each variety was tested in quadruplicate and each plot consisted of a drill 66 feet long and 30 inches wide. Two plots of each variety had excellent stands, the other two plots had rather uneven stands and were discarded. The beans were cut on September 9. The average yields of all the varieties grown in 1928, 1929 and 1930 are given in table 43.

TABLE 43—SOY BEANS—VARIETY TEST

| Variety | Source | Yield per acre | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1928 | | 1929 | | 1930 | |
| | | Green | Dry | Green | Dry | Green | Dry |
| | | lb. | lb. | lb. | lb. | lb. | lb. |
| O. A. C. No. 211 | E. S. Harrow | ..... | ..... | ..... | ..... | 27,634 | 6,727 |
| O. A. C. No. 211 | Robt. Knister | ..... | ..... | ..... | ..... | 25,456 | 6,288 |
| Yellow 210 | E. S. Harrow | 17,947 | 3,504 | 15,206 | 3,793 | 23,822 | 6,260 |
| Manchu | E. S. Harrow | ..... | ..... | ..... | ..... | 25,456 | 6,081 |
| Black Eyebrow | E. S. Harrow | ..... | ..... | ..... | ..... | 24,503 | 6,072 |
| Early Brown | E. S. Harrow | 8,364 | 1,749 | 14,995 | 3,798 | 22,869 | 5,851 |
| Yellow 17 | E. S. Harrow | ..... | ..... | ..... | ..... | 24,563 | 5,826 |
| Summerland | E. S. Harrow | ..... | ..... | ..... | ..... | 23,822 | 5,664 |
| Mandarin | E. S. Harrow | 10,455 | 2,520 | 12,408 | 3,360 | 22,461 | 5,612 |
| Chinatown | E. S. Harrow | ..... | ..... | ..... | ..... | 20,691 | 4,987 |
| Green | E. S. Harrow | ..... | ..... | ..... | ..... | 20,964 | 4,945 |
| MacDonald 92 | MacDonald College | 14,985 | 3,437 | 16,262 | 3,975 | ..... | ..... |

### OTHER EXPERIMENTS

The land used in the "Alfalfa—Variety Test and Red Clover Seed Growing versus Hay for Profit" grew a crop of swedes this year. A new series of these experiments will be started on this land next spring. Ten alfalfa plants were caged and selfed and a small amount of seed secured.

## EXPERIMENTS WITH FERTILIZERS

The work of the Division of Chemistry during the year consisted largely of potato fertilization and pasture improvement projects.

In the potato fertilization experiments, a three-year rotation of potatoes, grain and hay was practised. These include experiments with fertilizer formulae, different sources of nitrogen, ammo-phos and nitrophoska. In all these experiments the fertilizer was applied for the potato crop.

The projects in pasture improvement include a rotational and fertilization experiment, a companion experiment on small plots, an experiment to determine the value of breaking up old pastures and reseeding them with a pasture mixture and applying basic slag, superphosphate, ground limestone singly and superphosphate and ground limestone in combination at the time of reseeding. An experiment testing the value of a complete fertilizer for eradication of the moss on old pastures. Experiments were also conducted testing different fertilizer formulae for a growing orchard, the effect of nitrate of soda on aftermath and heavy fertilization of mangels.

### PASTURE FERTILIZER EXPERIMENT

The experiment testing the merits of close grazing, rotational grazing and fertilization of pastures was continued this summer.

The fertilized area had been given an application of 350 pounds superphosphate and 100 pounds muriate of potash per acre, in the spring of 1928 for that year's grazing season, and a similar application in the fall for the 1929 grazing season. No mineral fertilizers were applied for the 1930 grazing season, as it was believed that there was sufficient mineral fertilizer residue from the two previous applications to supply the needs of the pasture in the 1930 grazing season.

The experiment is being conducted on medium clay loam which has been in pasture since 1918. A fifteen-acre field is divided into six fields of 2·5 acres each. Each of the fertilized plots was given the same application of either Chilean nitrate of soda or nitro-chalk as the previous year. The treatment was as follows:—

Plot 1—Continuously grazed and fertilized:—
- 100 pounds Chilean nitrate of soda per acre, applied April 29, 1930.
- 50 pounds Chilean nitrate of soda per acre, applied June 25, 1930.

Plot 2—Rotationally grazed and fertilized: —
- 100 pounds Chilean nitrate of soda per acre, applied April 29, 1930.
- 50 pounds Chilean nitrate of soda per acre, applied June 7, 1930.

Plot 3—Rotationally grazed and fertilized:—
- 100 pounds Chilean nitrate of soda per acre, applied April 29, 1930.
- 50 pounds Chilean nitrate of soda per acre, applied June 25, 1930.

Plot 4—Rotationally grazed and fertilized:—
- 100 pounds nitro-chalk per acre, applied April 29, 1930.
- 50 pounds nitro-chalk per acre, applied June 27, 1930.

Plot 5—Rotationally grazed and fertilized:—
- 100 pounds nitro-chalk per acre, applied April 29, 1930.
- 50 pounds nitro-chalk per acre, applied June 17, 1930.

Plot 6—Continuously grazed and not fertilized:—

The first application of nitrogenous fertilizers was made at commencement of growth and the second when the conditions of the fields seemed to indicate that they would be benefited by further applications of nitrogenous fertilizers.

Rotational grazing means that the pasture area is divided into a number of fields—in this case four. Stock is grazed on one field until the growth is eaten down. This usually takes from three to five days, but is largely dependent upon the amount of stock on the field. When the herbage is eaten down in one field, the stock is moved to the next, and so on until the whole series of fields is grazed. The process is repeated throughout the growing season. When stock used for grazing consists of milch cows, dry cows, heifers, etc., the milch cows are moved to the fresh field a couple of days before the other animals in order that they may have the best grazing.

Cows were at pasture a few days before they were put on these plots May 26. During the early part of the season, milch cows were largely used for grazing. Beginning August 11, cows nearing the end of their lactation period and heifers were used on the rotationally grazed areas and continuously grazed plot which received fertilizer. There was an abundance of after-grass at that

Spreading fertilizer on pastures.

time, so the heavier milking cows were taken off the plots to utilize this feed. Beginning July 1, horses were largely used for grazing on the continuously grazed, unfertilized plot because the pasture was in poor condition and it was thought that horses would utilize the grass better than cows or heifers. The pasture season ended on the rotationally grazed plots and also on the continuously grazed, fertilized plot on October 21. From October 11 to October 21, however, the animals were kept in the barn at night and grazed only in the daytime. The grazing period on the continuously grazed, unfertilized plot ended on September 22.

During part of the month of June, there were not enough cows and heifers on hand to keep the grass grazed short enough, so horses and sheep were also used for a short time. For a few days there were 12 cows, 9 heifers, 2 horses, 34 sheep and 29 lambs on the rotationally grazed, fertilized area of ten acres.

An animal unit has been calculated as follows:—

1 mature cow equal to 1 animal unit.
1 heifer (weight July 1 from 670 to 925 pounds) equal to 0·75 animal unit.
7 sheep equal to 1 animal unit.
12 lambs equal to 1 animal unit.
1 horse equal to 1 animal unit.

No grain was fed from June 1 to June 11. From then on it was thought advisable to feed from 2½ to 5 pounds to some of the cows making R.O.P. records. Toward the end of the grazing period, some of the dry cows also received a small amount of grain. In the rotationally grazed area, a total of 252·7 pounds of grain per acre was fed as compared with 42·1 pounds in 1929 and 679·1 pounds in 1928. In the continuously grazed and fertilized plot, a total of 343·2 pounds of grain per acre was fed, compared with 71·2 pounds in 1929.

The cows on both the rotationally grazed and the continuously grazed, fertilized plots gained in weight during the summer, but these gains were probably in part due to the cows becoming more advanced in their lactation period. The average weight of seven heifers on the rotationally grazed area on June 1 was 724·2 pounds and on October 1 was 929·2 pounds, or an average gain of 205 pounds in a four-months' feeding period. The weights recorded on the continuously grazed, unfertilized plot are of little value because different animals were used on this plot from time to time.

A summary of the carrying capacity of pasture treated, as outlined, is shown in table 44.

TABLE 44—CARRYING CAPACITY OF PASTURES

| Treatment | Grazing Period | | Carrying Capacity | | Cow Days per acre | |
|---|---|---|---|---|---|---|
| | 1929 | 1930 | 1929 | 1930 | 1929 | 1930 |
| | days | days | cows | cows | | |
| Rotationally grazed and fertilized..... | 139·5 | 143 | 1·14 | 1·48 | 160·32 | 212·03 |
| Continuously grazed and fertilized..... | 138·5 | 143 | 1·45 | 1·21 | 201·1 | 173·72 |
| Continuously grazed and not fertilized.. | 134·5 | 143 | 0·82 | 0·68 | 110·5 | 97·8 |

NOTE.—In 1930, all plots were considered to have a grazing period of 143 days, this being the number of days between the date the cattle went to pasture and the last day they were on any plot in the fall.

CONTINUOUS VERSUS ROTATIONAL GRAZING

In the fertilized area in 1929 and 1930, one 2½-acre plot was continuously grazed and four plots of 2½ acres each were rotationally grazed. In 1929, Plot 5, which was continuously grazed, had 201·1 cow days per acre as compared with an average of 160·32 cow days for Plots 1, 2, 3 and 4, which were rotationally grazed. In 1930, Plot 1, which was continuously grazed, had 173·72 cow days per acre and Plots 2, 3, 4 and 5, which were rotationally grazed, had an average of 212·03 cow days per acre. The continuously grazed area was changed from Plot 5 to Plot 1 in 1930 in an effort to ascertain if the greater cow carrying capacity of the continuously grazed area in 1929 was due to Plot 5 being located on more fertile land. Therefore, careful note was taken this year of the carrying capacity of Plot 5 as compared with the other three plots which were rotationally grazed. While it is impossible to make definite comparisons between the different plots in the rotationally grazed area, Plot 5 had less cow days per acre than Plot 2. Therefore, the high cow carrying capacity of Plot 5 in 1929, as compared with Plots 1, 2, 3 and 4 must have been due to some other cause.

In 1929, clumps of grasses with buttercups and rank growth around the cow droppings were left by the stock. These were cut with the mowing machine to prevent the accumulation of mature grass and to stimulate the production of fresh grass. The dates of cutting were:—

| | |
|---|---|
| Plot 1—June 26<br>Plot 2—June 29<br>Plot 3—July 2<br>Plot 4—July 8 | These were the four rotationally grazed plots. |
| Plot 5—Not cut | Continuously grazed plot. |

In 1930, the clumps of grasses with buttercups and the rank growth around the cow droppings were left on all plots. It was noticed that when the pastures became short in August, the cows ate nearly all this grass. This would indicate that mowing the rotationally grazed plots in 1929 decreased the carrying capacity of these plots.

Chain harrow used on pastures, fall and spring, to spread manure droppings and loosen up the sod.

### MANURE

The manure is somewhat of a problem on heavily fertilized cow pastures. The practice of this Station has been to harrow the field occasionally during the grazing season with a Scotch chain harrow. While this harrow spreads the manure fairly effectively, it also drags manure over clean grass and thus increases the area which the cows will not eat.

Observations made during the 1930 grazing season indicated that a large part of the rank growth which the cows rejected was around the droppings of the previous year; therefore, after the cows were removed at the end of the 1930 grazing season, the fields were harrowed both ways with a chain harrow

in order to spread all the droppings of that season. It is planned to harrow them again early in the spring. The object of this extra harrowing is to avoid the rank growth resulting from last year's droppings.

The harrowing has been done with a Scotch chain harrow. It is possible, however, that this harrow is not severe enough and that better results would be obtained by using a spike tooth harrow with teeth slightly slanted back, or a harrow with short spikes on the chains.

### LIME

In order to ascertain what effect lime would have on the growth of grasses and clover one-half of each of the fertilized 2½-acre fields was given an application of one ton ground limestone per acre last November.

### METHODS OF INCREASING CARRYING CAPACITY IN LATE SUMMER

The pasture fertilizer experiments carried on at the Station the past three years have greatly increased carrying capacity of the pasture. It is doubtful, however, if it has made much change in the ratio of the carrying capacity for the different months. Thus, at the Fredericton Station the ten acres of rotationally grazed pasture had an average of 64 cow days per acre in June as compared with 42 cow days in August and 35 cow days in September. This indicates that if cows are to be carried without supplementary feeding, at least one-third more pasture acreage is necessary in August and September than in June.

Two solutions of this problem are under consideration:—

(1) To increase the number of rotationally grazed fields to six. The stock to be kept off two of these fields while the pastures are good, but they will be given the same fertilizer treatment. These fields will be cut with a mowing machine about the middle of June and when the aftermath is well grown, they will be added to the rotated fields.

(2) Cut a hay field early and as soon as the hay is removed apply 100 pounds of Chilean nitrate of soda, or some other nitrogenous fertilizer, per acre, to stimulate the aftermath. When this aftermath is five or six inches high, the milch cows are turned in and the dry cows and heifers are left on the pastures.

Preliminary work on this method was begun this year. A second year hay field, largely timothy, was cut on July 17 and on July 29, 100 pounds Chilean nitrate of soda per acre were applied broadcast to four ⅟₂₀-acre plots. These plots were alternated with checks which were not fertilized. The plots were cut on October 1. The fertilized plots gave an average of 2,090 pounds green weight and the checks an average of 560 pounds green weight per acre. It is believed that the Chilean nitrate of soda would have given even better results if applied earlier.

### ERADICATION OF MOSS

This experiment was begun in 1930 to ascertain the most feasible method of controlling moss on New Brunswick pastures.

History of Plots.—This experiment was located on clay loam which had been in grass since 1918. From 1918 to 1922, cows were pastured on this field. From 1923 to 1929, this land was used in an experiment to determine the value of basic slag, superphosphate, nitrate of soda and ground limestone when applied broadcast to pasture. Basic slag, superphosphate, nitrate of soda and ground limestone were applied singly at different rates. Superphosphate and ground limestone were also applied in combination. Applications of basic slag, super-

phosphate and ground limestone were made at intervals of three years, viz., 1923, 1926 and 1929. Four applications of nitrate of soda were made. (A change to annual application of this fertilizer was made in 1928.)

In 1923 and 1924 the grass was cut four times with a lawn mower each year. In 1925, 1926 and 1927 the grass was cut three times each year with a scythe. In 1927 it was noticed that moss was gradually crowding out the grasses and clovers. Therefore, immediately following the third cutting with a scythe, the plots were cut close with a lawn mower and then grazed with sheep in an effort to check the development of moss. The sheep had apparently no effect on the development of moss. Furthermore, they did not scatter their droppings evenly and the first cutting the following year had to be discarded. In 1928 the plots were cut eight times with a lawn mower and in 1929 they were cut seven times with a lawn mower.

The plots were cut more frequently the last two years in order to ascertain if close cutting would check moss. The moss gradually got worse, however, and in the fall of 1929, it occupied at least 50 per cent of each plot.

### DISCUSSION OF PREVIOUS EXPERIMENT

The following points relating to the previous pasture fertilization experiment should be emphasized:—

(1) While fertilizer was applied at least once every three years, no attempt was made to apply a balanced fertilizer. Furthermore, as the grass was removed after each cutting the fertilizer in the soil was depleted to a greater extent than if the land had been pastured.

(2) While yields were increased by the use of fertilizer, the increase over checks was not sufficient to justify the Station recommending any of the fertilizer treatments.

(3) Moss gradually smothered out the grass on all plots.

(4) No appreciable difference in the moss could be noted on any of the plots that could be attributed to the fertilizer treatment. Plots treated with basic slag, superphosphate, nitrate of soda, ground limestone and a combination of superphosphate and ground limestone, as well as the checks were all infested with moss.

(5) Observations made in 1927 showed that moss was more prevalent than on adjoining land of similar character fertilized with 400 pounds basic slag per acre in 1923 and used as a cow pasture. Moss was bad in the pasture but it was not smothering the grass to the same extent as was the moss on the plots.

(6) Observations made in 1928 and 1929 indicated that while the moss was gradually increasing on the plots, it was practically eradicated on the cow pasture (the cow pasture had been heavily fertilized in 1928 and 1929 with a complete fertilizer).

(7) Observations of an adjoining hay field in a six-year rotation showed the field to be practically free from moss.

In view of the fact that the application of a complete fertilizer on the adjoining pasture had practically eradicated moss and that the adjoining hay field was also comparatively free from moss, it was decided to try the effect of a complete fertilizer and also what effect letting the hay grow would have on the moss in these plots. Accordingly, in 1930, nineteen of the twenty-one plots in the previous experiment were used, the other two being left as examples of the condition of the plots at the beginning of the experiment. These nineteen were given the following treatment:—

1. One-quarter of each plot cut at frequent intervals with hand scythe, fertilized as follows:—

Nitrate of soda, 200 pounds per acre.
Superphosphate, 500 pounds per acre.
Muriate of potash, 100 pounds per acre.

2. One-quarter of each plot cut at frequent intervals with hand scythe, unfertilized.

3. One-quarter of each plot allowed to grow up in hay, fertilized as follows:

Nitrate of soda, 200 pounds per acre.
Superphosphate, 500 pounds per acre.
Muriate of potash, 100 pounds per acre.

4. One-quarter of each plot allowed to grow up in hay, unfertilized.

5. Seven of the nineteen plots in addition to the treatment in 1, 2, 3 and 4 were sprayed with a 5 per cent solution of iron sulphate on May 29.

The application of a complete fertilizer to both the grass and hay section of the plots had an immediate effect on the vegetation. The growth of grasses and clovers was thickened so that the moss was smothered. A casual glance left the impression that the moss was totally eradicated on the fertilized plot. A close examination, however, showed that numerous spindly moss plants were still present although the grasses and clovers had crowded them so that they could not grow. A casual glance also gave the impression that there was more Dutch clover on the fertilized sections of the plots. A close examination of the foliage on the unfertilized sections, however, showed that the different appearance was due to lack of development of the clover on the unfertilized sections.

In other words, the difference in foliage was largely one of vigour, i.e., grasses and clovers were vigorous and the moss weak and spindly on the fertilized sections while the reverse was true of the unfertilized sections.

The iron sulphate spray was apparently as injurious to the grasses and clovers as to the moss. It is possible, however, that if it had been applied at some other season of the year i.e., early in April, results would have been different. There may possibly be some season of the year in which the grasses and clovers are resistant and the moss very susceptible to the spray.

The yields from the plots are given in the following table 45:—

TABLE 45—ERADICATION OF MOSS

| Treatment per acre | Dates of cutting | Average yield per acre from all plots in experiment | | Average yield per acre from untreated plots | | Average yield per acre from plot treated with 5 per cent iron sulphate | | Increased yield on plot treated with 5 per cent iron sulphate | | Decreased yield on plot treated with 5 per cent iron sulphate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Green grass | Dry matter | Green grass | Dry matter | Green grass | Dry matter | Green grass | Dry matter | Green grass | Dry matter |
| | | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. |
| Nitrate of soda, 200 pounds..... | May 29, 1930.... | 2,605 | 504 | 2,660 | 523 | 2,511 | 473 | ..... | ..... | ‡149 | 50 |
| Superphosphate, 500 pounds..... | June 23, 1930.... | 8,399 | 1,409 | 8,835 | 1,467 | 7,650 | 1,310 | ..... | ..... | 1,185 | 157 |
| Muriate of potash, 100 pounds..... | July 32, 1930.... | 4,253 | 993 | 4,353 | 1,026 | 4,080 | 935 | ..... | ..... | 273 | 91 |
| | Sept. 2, 1930.... | 2,457 | 597 | 2,397 | 584 | 2,560 | 619 | 163 | 35 | ..... | ..... |
| *Applied April 5–11, 1930. | Total..... | 17,714 | 3,503 | 18,245 | 3,600 | 16,801 | 3,337 | ..... | ..... | 1,295 | 213 |
| Cut at short intervals with hand scythe. | | | | | | | | | | | |
| No fertilizer..... | June 13, 1930.... | 2,469 | 586 | 2,977 | 689 | 1,596 | 411 | ..... | ..... | 1,381 | 278 |
| | July 22, 1930.... | 3,246 | 847 | 3,263 | 851 | 3,217 | 841 | ..... | ..... | 46 | 10 |
| Cut at short intervals with hand scythe. | Sept. 4, 1930.... | 1,467 | 458 | 1,550 | 477 | 1,326 | 425 | ..... | ..... | 224 | 52 |
| | Total..... | 7,182 | 1,891 | 7,790 | 2,017 | 6,139 | 1,677 | ..... | ..... | 1,651 | 340 |
| Nitrate of soda, 200 pounds..... | July 21, 1930.... | 16,129 | 3,576 | 16,280 | 3,713 | 15,914 | 3,380 | ..... | ..... | 365 | 333 |
| Superphosphate, 500 pounds..... | Sept. 29, 1930.... | 3,932 | 1,019 | 4,200 | 1,086 | 3,549 | 924 | ..... | ..... | 651 | 162 |
| Muriate of potash, 100 pounds..... | Total..... | 20,061 | 4,595 | 20,480 | 4,799 | 19,463 | 4,304 | ..... | ..... | 1,017 | 495 |
| † Applied June 3, 1930. | | | | | | | | | | | |
| Cut as hay, aftermath also cut. | | | | | | | | | | | |
| No fertilizer..... | July 21, 1930.... | 7,191 | 2,054 | 7,596 | 2,158 | 6,611 | 1,907 | ..... | ..... | 985 | 251 |
| | Sept. 29, 1930.... | 2,320 | 721 | 2,416 | 745 | 2,183 | 856 | ..... | ..... | 233 | 60 |
| Cut as hay, aftermath also cut. | Total..... | 9,511 | 2,775 | 10,012 | 2,903 | 8,794 | 2,592 | ..... | ..... | 1,218 | 311 |

* All the plots were not fertilized the same day because perfect calm was necessary to apply fertilizer. Therefore, sowing had to be discontinued if the least bit of wind came up.

† Different date of applying fertilizer to hay section as compared with grass section due to fact that in the experiment as originally drafted, the one-half of each plot which was cut as hay was unfertilized. Late in May, it was decided that the experiment would be improved if half of the hay area was fertilized. This was done the first calm day.

‡ 149 pounds green grass and 50 pounds dry matter not included because the spray was applied on May 29 immediately after the plots were cut.

Deductions from one year's work are dangerous; nevertheless, the results seem to indicate that—

(1) Moss is largely due to low soil fertility.

(2) Grasses and clovers will smother moss if the land is sufficiently fertile to permit their making vigorous growth.

(3) While a 5 per cent solution of iron sulphate will kill a percentage of the moss, it will also kill quite as large a percentage of the clovers and grasses. (There were bare spots on all the plots treated with iron sulphate due to the spray killing all vegetation.)

If deduction (1)—viz., that moss is largely due to lack of fertility—is correct, the iron sulphate treatment when given at the date (May 29) when it was applied this year is of little value. The moss had at least as great a resistance to the spray as the grasses and clovers. Neither volunteered in the bare patches during the summer.

Further work must be done on this project before definite conclusions can be drawn. Also there is a possibility that the control of moss this season was due to the potash in the complete fertilizer. Therefore, potash will be tried alone on a few plots to ascertain what effect it will have on moss.

## POULTRY

The stock on hand December 31, 1930, consisted of Barred Rocks: males 20, hens 443, chickens 153. Black Bresse: males 1, hens 1, pullets 2. Turkeys: toms 1, hens 3.

Feeding, breeding, and hatching experiments begun in previous years were continued. The tenth New Brunswick Egg Laying Contest was concluded with the highest average production per bird since the contest was started, standing second this year among the contests of Canada.

### HATCHING RESULTS

A total of 3,844 eggs were set during the year. The eggs were 78·59 per cent fertile and 1,713 chicks were hatched. An experiment was carried on to determine the best date for incubation. Five settings were made from March 12 to April 16, and one setting was made on May 6 using eggs from pens where males were alternated from pen to pen daily. An experiment was also carried on to determine the hatching results from hens and pullets. The results for six years are shown in table 46.

TABLE 46—HATCHING RESULTS FROM HENS AND PULLETS

| — | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | Totals |
|---|---|---|---|---|---|---|---|
| *Hens:*— | | | | | | | |
| Total eggs set | 1,135 | 2,943 | 2,770 | 3,017 | 2,864 | 1,911 | 14,640 |
| Number fertile | 1,006 | 2,560 | 2,414 | 2,712 | 2,248 | 1,581 | 12,521 |
| Percent fertile | 86·6 | 86·9 | 87·1 | 89·8 | 78·4 | 82·7 | 85·5 |
| Number of chicks | 483 | 941 | 966 | 1,298 | 1,258 | 908 | 5,854 |
| Percent total eggs hatched | 42·5 | 31·9 | 34·8 | 43·0 | 43·9 | 47·5 | 39·9 |
| Percent fertile eggs hatched | 48·0 | 36·7 | 40·0 | 47·8 | 55·9 | 57·4 | 46·7 |
| Number of chicks alive when wing banded | 347 | 639 | 720 | 1,040 | *742 | 802 | 4,290 |
| Percent chicks hatched alive when wing banded | 71·8 | 67·9 | 74·5 | 80·1 | 74·3 | 88·3 | 76·6 |
| Total eggs required for one chick hatched | 2·3 | 3·1 | 2·8 | 2·3 | 2·2 | 2·1 | 2·5 |
| Total fertile eggs required for one chick hatched | 2·0 | 2·7 | 2·4 | 2·0 | 1·7 | 1·7 | 2·1 |
| Total eggs required for one chick when wing banded | 3·2 | 4·6 | 3·8 | 2·9 | 3·0 | 2·3 | 3·3 |

TABLE 46—HATCHING RESULTS FROM HENS AND PULLETS—*Concluded*

| — | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | Totals |
|---|---|---|---|---|---|---|---|
| *Pullets:*— | | | | | | | |
| Total eggs set | 1,596 | 3,637 | 2,688 | 2,949 | 1,893 | 1,933 | 14,696 |
| Number fertile | 1,353 | 2,984 | 2,005 | 2,230 | 1,280 | 1,440 | 11,310 |
| Percent fertile | 84·7 | 82·0 | 74·5 | 75·9 | 68·0 | 74·4 | 76·9 |
| Number of chicks | 596 | 745 | 615 | 767 | 444 | 805 | 3,972 |
| Percent total eggs hatched | 37·3 | 20·4 | 22·8 | 26·0 | 23·4 | 41·6 | 27·0 |
| Percent fertile eggs hatched | 44·0 | 24·9 | 30·6 | 34·2 | 34·4 | 55·9 | 35·1 |
| Number of chicks alive when wing banded | 359 | 389 | 432 | 683 | †273 | 671 | 2,807 |
| Percent chicks hatched alive when wing banded | 60·2 | 52·2 | 70·2 | 89·0 | 87·7 | 83·3 | 73·1 |
| Total eggs required for one chick hatched | 2·6 | 4·8 | 4·3 | 3·8 | 4·2 | 2·4 | 3·6 |
| Total fertile eggs required for one chick hatched | 2·2 | 4·0 | 3·2 | 2·9 | 2·9 | 1·7 | 2·8 |
| Total eggs required for one chick when wing banded | 4·4 | 9·3 | 6·2 | 4·3 | 4·9 | 2·8 | 5·0 |

* Plus 260 sold as day-old chicks.
† Plus 133 sold as day-old chicks.
NOTE.—The results, as shown by the fertility and hatchability of eggs and the viability of chicks, indicate the value of hens over pullets as breeders.

## FEEDING EXPERIMENTS

The feeding experiments conducted during the year were largely a continuation of those carried on in previous years. Records were kept of the egg production, feed costs and hatching results from all pens. The following experiments were conducted during the year:—

Skim-milk versus beef scrap versus fish meal as protein feeds for laying hens; standard (home-mixed) ration containing corn versus ration containing buckwheat (replacing corn); potatoes as a substitute for corn meal in the laying mash; swedes versus mangels versus potatoes for winter egg production; feeds for fertility, hatchability and viability, such as cod liver oil, raw liver and bone meal and various combinations of these supplementary feeds. These experiments have been carried on for five years and four years' results were published in the 1929 report.

The experiment "Home-mixed Grain and Mash versus Commercial Grain and Mash" has been carried on for two years. Results from this experiment will be published when more data are available.

## BREEDING

All of our flock is trapnested and the majority of the birds are of known breeding. Every egg is weighed from each hen during her pullet year and breeders are selected for egg size and production as well as for type, vigour and colour. The system of line breeding has been followed and records are kept of the progeny of each cockerel.

An experiment has been carried on to determine the influence of breeding on egg size. Cockerels with ancestors laying large eggs were mated to hens that laid small eggs and companion hens that laid large eggs; the size of the resulting progeny was noted. Results of this experiment were published in detail in the 1929 report.

## CONTROL OF FOWL TYPHOID

Agglutination tests for fowl typhoid were made in February and again in the fall. All the birds on the farm were tested in October. Some of these samples were damaged so a retest was made of all birds whose samples were damaged, and those which gave a suspicious reaction. Included in this last test were twenty-four hens which were returned from Ottawa and Charlottetown at the conclusion of the laying contest. The four reactors in the retest were sent to Dr. Weaver for further study. The results are shown in table 47.

TABLE 47

| — | Number Tested | Number Reacted |
|---|---|---|
| February Test— | | |
| Hens | 121 | 2 |
| Cocks | 29 | 1 |
| Pullets | 239 | 6 |
| Cockerels | 11 | 0 |
| October and November Test— | | |
| Hens | 252 | 3 |
| Cocks | 40 | 1 |
| Pullets | 648 | 0 |
| Cockerels | 140 | 0 |

The percentage of reactors since this test was begun is as follows:—

| Year | Per cent | Year | Per cent |
|---|---|---|---|
| 1924 | 34·4 | 1928—October | 1·05 |
| 1925 | 3·93 | 1929—February | 9·74 |
| 1926 | 9·8 | 1929—October | 0·75 |
| 1927 | 20·41 | 1930—February | 2·25 |
| 1928—February | 7·37 | 1930—November | 0·37 |

EGG LAYING CONTEST

The tenth New Brunswick Egg Laying Contest was conducted during the year and concluded on October 23. Twenty pens of ten birds each competed in this contest. Two spare birds accompanied the original pen for substitution when necessary.

The score system by points begun in 1926 to give credit to birds laying 24-ounce eggs or over, was continued during the year.

Registration was on the same basis as in previous years. Hens that laid 200 or more eggs averaging 24 ounces or more per dozen were registered, providing they were free from breed disqualifications.

One hundred and seventeen contest birds, including eleven spares moved up to replace original contest birds, laid 200 or more eggs.

One hundred and seven contest birds, including nine spare birds moved up to contest positions, had a credit of 200 or more points.

Eighty-nine birds, including six spares, qualified for registration.

Thirty-four contest birds and four spares were disqualified for registration on account of small eggs.

Twenty-two hens died during the year.

Ninety-one second generation birds were entered in the contest. Thirteen of these died. Thirty-two qualified for registration.

The average production of the forty-eight second generation birds that completed the contest was 208·17 eggs and 204·71 points.

The average production for the year as well as for each year since the contest began was as follows:—

| Year | Eggs | Points | Year | Eggs | Points |
|---|---|---|---|---|---|
| 1921 | 152·13 | ..... | 1926 | 183·38 | 185·58 |
| 1922 | 139·43 | ..... | 1927 | 171·54 | 176·85 |
| 1923 | 162 25 | ..... | 1928 | 186·4 | 194·7 |
| 1924 | 165·00 | ..... | 1929 | 183·1 | 190·6 |
| 1925 | 164·7 | ..... | 1930 | 202·67 | 202·86 |

The average egg production for the different breeds was as follows:—

| | Eggs | Points |
|---|---|---|
| Barred Plymouth Rock | 203·4 | 203·3 |
| Single comb White Leghorn | *188·1 | 193·8 |

* Only one pen of Single Comb White Leghorns competed.

HIGHEST PRODUCING PENS IN EGG LAYING CONTEST

| Name | Address | Breed | Eggs | Points |
|---|---|---|---|---|
| A. T. Reed | Rollingdam | B.R. | 2,306 | 2,349·8 |
| J. E. Monohan | Elmsville | B.R. | 2,182 | 2,309·0 |
| Begin and Dube | Edmundston | B.R. | 2,138 | 2,219·6 |
| C. E. Gunter | Upper Gagetown | B.R. | 1,959 | 2,165·6 |
| M. J. Scullin | Rollingdam | B.R. | 2,201 | 2,145·5 |

HIGHEST INDIVIDUAL POINT RECORDS

| Name | Address | Breed | Hen No. | Eggs | Points |
|---|---|---|---|---|---|
| A. T. Reed | Rollingdam | B.R. | 9 | 313 | 334·3 |
| J. E. Monohan | Elmsville | B.R. | 1 | 267 | 296·9 |
| W. J. White | Moore's Mills | B.R. | 4 | 252 | 294·7 |
| J. E. Monohan | Elmsville | B.R. | 3 | 250 | 286·9 |
| J. E. Monohan | Elmsville | B.R. | 4 | 251 | 284·8 |

The list of contestants and individual records of the birds are shown in table 48. The upper line denotes egg production and the lower line denotes points.

TABLE 48—TENTH NEW BRUNSWICK EGG LAYING CONTEST, FREDERICTON, N.B.

| Pen | Name | Address | Breed | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total | Spare | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | No. 1 | No. 2 |
| 1 | W. J. White | Moore's Mills | B.R. | 174 | 152 | 196 | 252 | 152 | 257 | 238 | 239 | 230 | 208 | 2,098 | 254 | 179 |
| | | | | 187·6 | 128·0 | 195·1 | 294·7 | 150·9 | 248·8 | 176·6 | 260·4 | 243·3 | 239·3 | 2,124·7 | 269·0 | 154·8 |
| 2 | M. J. Scullin | Rollingdam | B.R. | 202 | 257 | 145 | 206 | 227 | 193 | 255 | 235 | 276 | 205 | 2,201 | 262 | 211 |
| | | | | 205·7 | 254·3 | 150·6 | 228·5 | 191·3 | 160·6 | 280·8 | 206·6 | 247·7 | 219·4 | 2,145·5 | 212·0 | 216·1 |
| 3 | A. T. Reed | Rollingdam | B.R. | 241 | 233 | 258 | *144 | *228· | 179 | 228 | 247 | 313 | 235 | 2,306 | ..... | ..... |
| | | | | 208·2 | 243·7 | 279·8 | 155·7 | 255·9 | 177·0 | 213·3 | 236·7 | 334·3 | 245·0 | 2,349·8 | ..... | ..... |
| 4 | W. A. Sansom | Durham Bridge | B.R. | 178 | 296 | 24 | 202 | 193 | 182 | 241 | 208 | 261 | 119 | 2,127 | 235 | 274 |
| | | | | 183·0 | 232·1 | 191·3 | 207·6 | 194·0 | 214·2 | 276·7 | 223·8 | 262·8 | 125·7 | 2·111·2 | 247·2 | 257·4 |
| 5 | Exeprimental Station | Fredericton | B.R. | 212 | 173 | 203 | 200 | 225 | 205 | 234 | 190 | 228 | 183 | 2,053 | 160 | 192 |
| | | | | 192·1 | 165·9 | 236·2 | 215·4 | 259·9 | 204·2 | 225·8 | 202·4 | 239·6 | 198·2 | 2,139·7 | 165·9 | 211·5 |
| 6 | Begin and Dube | Edmundston | B.R. | 202 | 240 | 234 | 216 | 174 | 179 | 218 | 249 | 203 | 223 | 2,138 | 187 | 216 |
| | | | | 238·9 | 239·2 | 237·0 | 222·2 | 163·7 | 207·5 | 226·7 | 272·6 | 193·6 | 218·2 | 2,219·6 | 190·6 | 202·4 |
| 7 | J. E. Monohan | Elmsville | B.R. | 267 | 217 | 250 | 251 | 192 | *147 | 189 | 255 | 188 | 226 | 2,182 | ..... | 177 |
| | | | | 296·9 | 179·6 | 286·9 | 284·8 | 227·1 | 156·3 | 213·6 | 246·2 | 199·6 | 218·0 | 2,309·0 | ..... | 174·2 |
| 8 | C. E. Gunter | Upper Gagetown | B.R. | 129 | 239 | 216 | 244 | 125 | 208 | 213 | 177 | 158 | 250 | 1,959 | 216 | 202 |
| | | | | 149·3 | 247·4 | 223·0 | 274·4 | 139·7 | 248·2 | 234·7 | 206·0 | 184·1 | 255·8 | 2,165·6 | 247·0 | 202·5 |
| 9 | Harry Patterson | Hoyt | B.R. | *183 | 248 | 167 | 195 | 125 | 168 | 221 | *105 | 198 | 184 | 1,794 | ..... | ..... |
| | | | | 159·7 | 261·4 | 144·8 | 204·7 | 134·1 | 138·1 | 248·7 | 99·8 | 232·7 | 163·0 | 1,787·0 | ..... | ..... |
| 10 | George Wood | R.R. 1 Bayswater | B.R. | d46 | 250 | 160 | *207 | *183 | 234 | *196 | 230 | 230 | 146 | 1,882 | ..... | ..... |
| | | | | 33·7 | 217·0 | 153·3 | 177·0 | 163·7 | 194·7 | 162·8 | 225·0 | 249·9 | 150·1 | 1,727·2 | ..... | ..... |
| 11 | Fundy Fur & Feather Farm | Saint John | B.R. | 163 | 214 | *157 | 240 | 235 | 227 | 172 | 166 | 131 | 191 | 1,896 | *214 | ..... |
| | | | | 176·9 | 218·0 | 155·8 | 189·3 | 244·9 | 197·3 | 181·5 | 146·2 | 130·1 | 188·2 | 1,828·2 | 234·6 | ..... |
| 12 | N. W. Eveleigh | Sussex | B.R. | 233 | 108 | *226 | 221 | *155 | 208 | 132 | 168 | 193 | *213 | 1,862 | 179 | 183 |
| | | | | 226·9 | 86·4 | 227·4 | 168·4 | 171·0 | 232·8 | 145·2 | 153·9 | 201·0 | 240·6 | 1,853, 6 | 210·0 | 180·0 |
| 13 | John S. Knox | Sussex | B.R. | *128 | *218 | 165 | 245 | 242 | 263 | *209 | 123 | 237 | 206 | 2,036 | ..... | ..... |
| | | | | 117·7 | 217·3 | 177·1 | 275·1 | 272·6 | 279·7 | 171·6 | 121·8 | 251·1 | 213·6 | 2,097·6 | ..... | ..... |
| 14 | John Woods | Bloomfield Station | B.R. | 249 | 261 | *154 | 255 | 278 | 186 | 214 | 200 | 204 | 215 | 2,216 | ..... | 252 |
| | | | | 220·4 | 223·9 | 176·2 | 273·2 | 265·4 | 183·0 | 186·0 | 169·6 | 199·3 | 180·8 | 2,077·8 | ..... | 207·9 |
| 15 | Blair Gaudet | St. Joseph | B.R. | 231 | 221 | 254 | 217 | 251 | 154 | *209 | *160 | 228 | 189 | 2,114 | ..... | ..... |
| | | | | 222·3 | 174·5 | 241·3 | 224·8 | 241·4 | 159·6 | 239·0 | 191·8 | 175·3 | 194·2 | 2,084·4 | ..... | ..... |
| 16 | G. M. Avard | Sackville | B.R. | 232 | 229 | *206 | 234 | 193 | 181 | 245 | 214 | 162 | 208 | 2,104 | ..... | 220 |
| | | | | 221·3 | 270·5 | 207·3 | 223·0 | 177·5 | 165·1 | 221·3 | 188·6 | 156·1 | 222·7 | 2,053·4 | ..... | 246·4 |
| 17 | Ben Robichaud | St. Charles | B.R. | *222 | 201 | *153 | 214 | 220 | 234 | *189 | 179 | 125 | 227 | 1,964 | *113 | ..... |
| | | | | 198·6 | 217·9 | 137·8 | 210·6 | 251·7 | 268·6 | 186·3 | 148·7 | 102·5 | 183·3 | 1,906·0 | 106·6 | ..... |
| 18 | Hilaire R. Babineau | St. Louis de Kent | B.R. | 186 | 159 | 231 | 181 | 178 | 147 | 126 | *136 | 170 | 198 | 1,712 | ..... | 140 |
| | | | | 180·9 | 158·8 | 242·0 | 170·2 | 178·3 | 110·3 | 117·3 | 154·5 | 178·2 | 228·4 | 1,718·9 | ..... | 157·6 |
| 19 | Clarence R. Searle | Centra Napan | B.R. | 129 | 265 | *208 | *117 | 214 | *200 | 236 | 199 | 225 | 217 | 2,010 | *87 | ..... |
| | | | | 114·5 | 240·4 | 232·1 | 90·8 | 222·8 | 228·2 | 244·5 | 196·7 | 190·3 | 195·1 | 1,955·4 | 85·4 | ..... |
| 20 | Miss Helen Parks | Saint John | S.C.W.L. | 182 | 175 | 192 | 239 | *196 | 171 | 107 | 221 | *186 | 212 | 1,881 | ..... | ..... |
| | | | | 204·7 | 206·1 | 171·2 | 270·0 | 211·1 | 137·0 | 93·8 | 226·8 | 194·3 | 223·9 | 1,938·9 | ..... | ..... |

* Production of two birds.
d Dead.

## APIARY

The winter of 1929-30 was free from extremes, but owing to unfavourable conditions during later winter and early spring, bees in this district did not winter as well as usual.

Fifty-six colonies of bees were packed in single, double and quadruple cases in the fall of 1929. Five of these died during the winter. During the season an increase of nine colonies was made, seven from package bees and two from nucleii.

Eight colonies (seven packages and one over-wintered colony) were used in connection with pollination studies in the orchard, being enclosed in cheese cloth cages during the entire apple bloom period. These colonies were seriously weakened by this treatment, and in some instances, brood rearing ceased almost entirely. These colonies did not build up to full strength until after the main honey flow, resulting in the very low production of 7·7 pounds surplus honey per colony.

The total production of honey for the season was 3,488 pounds, with an average production per over-wintered colony of 67·3 pounds. The highest producing colony yielded 127 pounds of extracted honey.

Out-apiaries were conducted at Springhill and Burton. In the fall, the out-apiary at Springhill was closed, as the owner of the property on which this apiary was conducted, had established an apiary of his own. To compensate for this, a new out-apiary was established at Douglas, another apple growing district in the Saint John River Valley, and growers in this section will be encouraged to keep bees for pollination and revenue producing purposes.

Fifty-nine colonies were packed in outdoor wintering cases during the last week of September. Sugar syrup was then fed to bring the weight of 10-frame Langstroth hives without covers to 75 pounds and 10-frame Jumbos to 80 pounds.

### CONTROL OF SWARMING BY SEPARATION OF QUEEN AND BROOD

In order to determine if swarming can be controlled by the separation of the queen and brood, an experiment was carried on at this Station over a five-year period. The manipulation was as follows: When colonies showed preparation for swarming by having larvae in queen cells (eggs only not considered), all combs containing brood were removed from the brood chamber and replaced by empty drawn combs. The queen and the bees shaken from one comb were left in the brood chamber and the combs containing brood were placed in an empty super above the honey supers, and separated from them by a queen excluder. The queen cells on these combs were not destroyed as it was claimed that they are too far away from the old queen to affect her, and that the virgin queens would be destroyed or die if they cannot take flight. A queen excluder was also placed between the brood chamber and the honey supers. The results obtained with this method of swarm control are given in table 49.

TABLE 49.—RESULTS OF SWARM CONTROL BY SEPARATION OF QUEEN AND BROOD

| Year | Number colonies treated | Number colonies making further preparations to swarm | Number colonies producing laying virgin queens |
|---|---|---|---|
| 1924 | 3 | 0 | 1 |
| 1925 | 9 | *4 | 0 |
| 1926 | †6 | 2 | 3 |
| 1927 | ‡11 | 7 | 0 |
| 1928 | 12 | 9 | 0 |
| Total | 41 | 22 | 4 |

* These colonies had 5 frames of foundation and 5 frames of drawn comb put into brood chamber.
† In sixth colony, old queen was missing when examined 9 days later.
‡ One of these colonies developed American Foul Brood.

These results indicate that the separation of queen and brood has not given very satisfactory results as a means of controlling swarming. Of the 41 colonies treated over a five-year period, 22 made further preparations for swarming. Considerable difficulty was experienced with laying virgin queens in four additional colonies.

In every year, swarm control by dequeening and requeening has given much more satisfactory results.

CONTROL OF SWARMING BY DEQUEENING AND REQUEENING

In order to determine if swarming can be successfully controlled by dequeening and requeening nine days later, an experiment was carried on over a six-year period. The procedure was as follows: when colonies showed preparation for swarming by having larvae in queen cells, the queen was removed and all cells destroyed. Nine or ten days later the cells were again all destroyed and a young laying queen introduced.

The results of this method are given in table 50.

TABLE 50—RESULTS OF SWARM CONTROL BY DEQUEENING AND REQUEENING

| Year | Number colonies treated | Number colonies making preparations to swarm |
|---|---|---|
| 1924 | 3 | 1 |
| 1925 | 9 | 0 |
| 1926 | 5 | 1 |
| 1927 | 11 | 0 |
| 1928 | 14 | 1 |
| 1929 | 10 | 0 |
| Total | 52 | 3 |

Of the fifty-two colonies treated according to this method, only three made further preparations for swarming, thus indicating that dequeening and requeening is a very effective means of swarm control. In two of these three colonies, probably a queen cell was overlooked in the first examination, and hence it is not additional swarm preparation, in the strict sense of the term. In 1924, in one colony, a virgin was found on the second examination, which was probably hatched from a cell that was overlooked. Again in 1926, in one colony a cell was apparently overlooked when dequeening, as a small swarm came out before the colony was requeened. If all cells are destroyed the control of swarming apparently is almost perfect.

This method, however, has one major disadvantage in that there is a nine- or ten-day period during the treatment when the colony is queenless. To remedy this, another experiment in swarm control is being carried on in which the brood is raised at the time of dequeening and requeening is done immediately. The results of this experiment will be published later.

OUTDOOR VERSUS CELLAR WINTERING

In order to determine whether wintering bees in the cellar or outdoors will give the most satisfactory results for this district, a project was started at this Station in 1924 comparing the two systems. The cellar used was merely a section of a house basement, boarded off from the main cellar to maintain a lower and more uniform temperature. For outdoor wintering, single, double and quadruple packing cases were used, with buckwheat hulls and sawdust providing the insulation. Four to five inches of packing was used on the bottom and sides and six inches on the top. The top packing was enclosed in sacks. This experiment has been carried on in the Fredericton, Burton and Springhill apiaries, and full results are given in table 51.

TABLE 51—WINTERING IN CELLAR VERSUS PACKING CASES OUTDOORS

| Location of apiary | Year | Type of hive | Where wintered | Number of colonies placed in winter quarters | Number of colonies died during winter | Average strength, fall | Average strength, spring | Average strength, June 20-27 | Average stores fed, fall | Average weight, fall | Average weight, spring | Average stores consumed | Number of colonies prepared to swarm | Average crop all colonies | Number of colonies produced crop | Average crop from producing colonies |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | frames | frames | frames | lb. | lb. | lb. | lb. | | lb. | | lb. |
| Fredericton.. | 1925, 1926, 1927, 1928 | 10-frame Lang..... | Cellar..... | 36 | 5 | 8·26 | 3·77 | 9·52 | 22·18 | 63·46 | 44·06 | 19·40 | 17 | 39·89 | 22 | 40·72 |
| " .. | " " | " " .... | Packing cases outside. | 54 | 1 | 9·07 | 4·90 | 12·17 | 29·76 | 73·06 | 44·96 | 28·10 | 32 | 49·30 | 49 | 49·30 |
| " .. | 1925..... | " Jumbo... | Cellar packing cases... | 3 | 0 | 6·60 | 3·30 | 7·33 | 35·30 | 67·60 | 57·0 | 10·60 | 2 | 7·66 | 1 | 23·00 |
| " .. | " ..... | " " ... | " " .. | 2 | 0 | 7·50 | 4·50 | 14·0 | 41·0 | 74·0 | 46·75 | 27·25 | 0 | 28·25 | 2 | 28·25 |
| Burton..... | 1925..... | " Lang..... | Cellar packing cases... | 6 | 0 | 7·50 | 4·60 | 13·80 | 30·60 | 60·60 | 50·0 | 10·60 | 4 | 28·0 | 6 | 28·00 |
| " ..... | " ..... | " " .... | " " .. | 5 | 0 | 8·80 | 5·80 | 13·40 | 39·60 | 69·60 | 47·30 | 22·30 | 4 | 43·60 | 5 | 43·60 |
| " ..... | 1925 and 1926..... | " Jumbo... | Cellar packing cases... | 4 | 0 | 7·50 | 2·75 | 8·25 | 26·5 | 66·25 | 48·25 | 18·00 | 0 | 32·62 | 3 | 41·00 |
| " ..... | " ..... | " " ... | " " .. | 8 | 0 | 8·28 | 3·35 | 10·00 | 29·00 | 73·00 | 48·42 | 24·57 | 2 | 33·67 | 7 | 37·00 |
| Springhill.... | 1926, 1927 and 1928.. | " Lang..... | Cellar packing cases... | 9 | 0 | 8·55 | 4·11 | 9·55 | 19·44 | 63·76 | 41·44 | 22·32 | 7 | 46·16 | 8 | 50·47 |
| " .... | " ... | " " .... | " " .. | 9 | 0 | 8·88 | 4·55 | 14·11 | 27·33 | 74·33 | 43·39 | 30·94 | 9 | 38·99 | 9 | 38·99 |

The above data indicate that for the most part, wintering in outdoor wintering cases has given slightly better results than cellar wintering. It must be borne in mind that the cellar at this Station is not an ideal cellar by any means, as it is too damp, the temperature ranges a little high, and the system of ventilation is not very effective. However, even with a good cellar, it is probable that outdoor wintering would have given as good, if not better, results than cellar wintering.

A consideration of the above table demonstrates the following facts:—

(1) Colonies wintered in packing cases consume a little more stores (approximately 10 pounds per colony) than colonies wintered in the cellar.

(2) Colonies wintered in packing cases were slightly stronger in the spring than colonies kept in the cellar.

(3) Colonies wintered in packing cases built up considerably faster in the spring, owing probably to the protection given by the packing cases, and produced much stronger colonies by the latter part of June than colonies kept in the cellar.

(4) In general, colonies wintered in packing cases produced a slightly larger honey crop than colonies wintered in the cellar. The size of crop produced is dependent upon so many other factors than method of wintering, that it is unwise to unduly stress this aspect unless it is carried on over a long period of years and with a large number of colonies. At the Springhill apiary for the years 1926, 1927 and 1928, the advantage in honey production has been with the colonies wintered in the cellar. This is accounted for by the fact that in 1928 the colonies wintered in packing cases produced very little honey in comparison with a good crop, produced by those wintered in the cellar. This difference was so great as to make the three-year average in favour of the cellar wintered colonies.

### ADDITIONAL PROJECTS UNDER INVESTIGATION

Experiments were also carried on with different sizes of hives, different types of packing cases including the single, two-colony and four-colony cases, methods of detecting preparation for swarming and methods of swarm control. Results of these experiments will be published from time to time as sufficient data accumulate to warrant the drawing of conclusions.

## EXTENSION AND PUBLICITY

During the year a special effort was made to make a closer contact with the farmers of the province. Timely articles were prepared by the staff, which were carried by many of the leading daily and weekly newspapers. Several articles were also prepared for "Seasonable Hints." The radio was used quite extensively to keep farmers in touch with live stock markets and the provincial egg-laying contest. A number of timely announcements of interest to farmers were also made in this way.

Members of the staff acted on a number of provincial and maritime committees, delivered addresses at farmers' meetings and conferences, judged at a number of exhibitions and assisted in the management of the Fredericton Exhibition. Educational exhibits were also displayed at all the larger exhibitions.

The number of visitors to the Station was greatly increased as compared with former years and every effort was made to assist all who desired information on any subject. The increase in correspondence with farmers was particularly noticeable and is being encouraged in every possible way as it develops personal contacts and enables the Station to render a definite service to the individual farmer. As in former years, special field days played an important part in the Station's extension program.

### WOMEN'S INSTITUTE DELEGATES

The New Brunswick Women's Institute delegates (200) attending their annual convention in Fredericton paid their fifth annual visit to this Station. All these ladies seemed to be particularly interested in flowers, shrubs, hedges, and lawns, but many (especially those from the farms) were greatly interested in the poultry, orchard, vegetable garden, and live stock. Following an inspection of the Station, tea was served in the Agricultural School building and short addresses were delivered to the delegates by members of the staff.

### AMERICAN AGRICULTURAL EDITORS' ASSOCIATION

In June of this year the Station had the pleasure of entertaining ninety members of the American Agricultural Editors' Association. The members of this party devoted several hours to an inspection of the experimental work of the Station and took a special interest in the pasture improvement investigations. Several of these editors have since forwarded us copies of their journals containing reference to the work carried on at this Station.

A group of ex-students of the New Brunswick Agricultural school located at the Fredericton Experimental Station.

### CANADIAN SOCIETY OF TECHNICAL AGRICULTURISTS

The Canadian Society of Technical Agriculturists and the Canadian Seed Growers' Association held their annual conventions at Wolfville in June. Quite a number of delegates (40) travelled by motor and included the Fredericton Station in their itinerary. The delegates began to arrive in the forenoon and were served lunch in the Agricultural School building at noon. Arrangements were made for these delegates to make a general inspection of the Station, and those interested in any special phase of experimental work were taken in charge by an official of the Station specializing in that particular branch of work.

### POULTRY FIELD DAY

The ninth annual Poultry Field Day was held at this Station toward the end of August. Approximately two hundred poultry breeders were present. The program for the day began with an egg-candling demonstration at 10 a.m., followed by the annual meeting of the New Brunswick Poultry Producers' Association. A basket luncheon was served at noon. Immediately after lunch the annual meeting of the New Brunswick Registered Poultry Breeders' Association was held. An address by Mr. A. C. McCulloch, Dominion Live Stock Branch, Winnipeg, Man., was of special interest. He spoke on poultry breeding problems and had a very attentive audience. Mr. McCulloch was for some time superintendent of the New Brunswick Poultry Division and had a great deal to do with the development of the high egg-laying strain of Barred Rocks in this province. Mr. Leslie Wood, superintendent of the Provincial Poultry Division, also gave a very interesting report of the World's Poultry Congress held at the Crystal Palace, London, England.

### AGRICULTURAL SCHOOL

The Agricultural School located at this Station had a larger attendance this year than any year since it was established in 1923. There were thirty-seven students enrolled, representing practically every section of the province. While this school is administered by the Provincial Department of Agriculture, all members of the staff of this Station gave every possible assistance. This took the form of teaching and supplying live stock, poultry and machinery for demonstration purposes. The Station officers also aided in providing entertainment for the boys out of school hours.

### EX-STUDENTS' REUNION

Toward the end of July an invitation was sent to all ex-students of the Agricultural School to meet at the Station on July 30 for the purpose of holding a reunion of ex-students. Over fifty old boys responded and had a very enjoyable and profitable day. Lunch was served at the Station and an interesting program, including several competitions, was carried out. These young farmers decided to make this gathering an annual event and to form a Junior Farmers' Association. For this purpose a committee was appointed to draw up a constitution and by-laws for consideration at the next meeting to be held during the summer of 1931.

### ST. STEPHEN-MILLTOWN ROTARY CLUB

The St. Stephen-Milltown Rotary Club made its fourth annual visit to this Station. Thirty odd Rotarians arrived about 10 a.m. on July 24, with approximately one hundred farm women from Charlotte county. The whole day was devoted to the study of the experimental work at this Station. Every member of the staff devoted their attention to these important visitors and there seemed to be every evidence of their appreciation. We look forward to the annual visit of these Rotarians with their farmer friends.

### SOLDIER LAND SETTLEMENT BOARD

Early in July this Station had the pleasure of entertaining the New Brunswick officials of the Soldier Land Settlement Board and their families. This Station is anxious to be of service to our new settlers and the advantage of having the Land Settlement staff familiar with our work will be apparent to all. The whole day was devoted to the inspection of the work of the Station. It is hoped that more of these meetings will be held.

### BOYS' AND GIRLS' CLUBS

Several groups of boys and girls (members of clubs) were entertained during the summer. These young people were accompanied by their County Agricultural Representative, who was assisted by the Station staff in giving instruction in live stock judging, etc.

### AGRICULTURAL SOCIETIES

The Station entertained a large number of agricultural society members during the summer. The dates of these meetings were arranged by the secretaries with the Superintendent of the Station so that they might get every attention from the time they arrived until they left for home. The careful attention given these visitors no doubt accounts in part for the annual increase in correspondence. Now that the roads are improved and the motor car has become a part of the average farm equipment, we hope to see more of these groups of farmers making annual visits to the Station.

### ILLUSTRATION STATION OPERATORS' CONFERENCE

The Illustration Station operators for New Brunswick held their second conference at the Station during the month of August. Practically all of the operators were present and took an active interest in the program prepared for

C.S.T.A. delegates inspecting experimental work.

them. Careful inspection of all field crop experiments were made and special attention was devoted to live stock.

During the early part of the summer, Field Days were also held at Illustration Stations throughout the province and were well attended by farmers in the respective districts.

### NORMAL SCHOOL STUDENTS

The ninth annual visit to this Station was made by over three hundred Normal School students early in September. These young men and women are prospective teachers in rural districts in this province and it is considered important that they have an intimate knowledge of the work of this Station. To this end, these students were divided into small groups, each group being taken in charge by an official of the staff, who endeavoured to give them a clear conception of the service that this Station may render to the farmers of the province.

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