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This volume includes Progress Reports of the following Experimental Stations of the Canada Department of Agriculture:

CANADA
DEPARTMENT OF AGRICULTURE
EXPERIMENTAL FARMS SERVICE

DOMINION EXPERIMENTAL FARM

INDIAN HEAD

SASK.

W. H. GIBSON, B.S.A., SUPERINTENDENT

PROGRESS REPORT
1937-1946.

WHEAT TEST PLOTS,
DOMINION EXPERIMENTAL FARM,
INDIAN HEAD, SASK.

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Ottawa, Canada.

TECHNICAL PERSONNEL

Dominion Experimental Farm
Indian Head, Sask.

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R. N. MCIVER, B.S.A.—*Illustration Stations*

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Introduction

At Indian Head, Sask., there was established in 1887 one of the original five units of the Dominion Experimental Farms system. Situated in the southeastern part of the province, its primary function is to serve the interests of grain and livestock farmers. In the region of Saskatchewan served by the Indian Head Experimental Farm there are extensive areas of dark brown, black and brown soils. Seven District Experiment Substations, three Illustration Stations and one special horticultural projects station are supervised from Indian Head. Considerable differences exist in farming types and cultural practices throughout the area due to variations in climate and soil conditions.

At this long established experimental farm there have been initiated in past years some highly important developments in prairie farming. Under the first superintendent, Angus MacKay, the practice of summerfallowing was developed. At Indian Head crop rotation and cultural studies are emphasized. Two rotations in particular have been conducted for many years. In these are studied, respectively, a grain rotation consisting of two years wheat and summerfallow, and a nine-year mixed farming rotation which includes grain, hay and intertilled crops. Experiments have been conducted with fertilizers, cultural methods, new and suitable varieties of grains and grasses, the introduction of farm machinery, and other important agricultural problems.

Experiments have been conducted with several branches of livestock. Clydesdale horses are maintained for work and breeding purposes. Shorthorn cattle are kept, the original herd being transferred from Melfort. An excellent herd of Yorkshire swine is maintained. A flock of Barred Plymouth Rock poultry is kept with which numerous studies are conducted.

The last previous progress report from the Indian Head Experimental Farm was published in 1937, in which appeared the results of experiments conducted from 1931 to 1936, inclusive.

FIGURE 1.—Driveway in front of office, Indian Head.

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Seasonal Notes

During the period under review, 1937 was one of the most disastrous years in the history of Saskatchewan agriculture. Continued drought, coupled with high temperatures, caused almost a complete crop failure over the entire farming area of southern Saskatchewan. Pastures were dried up in early July and hay crops were almost a total failure. Grasshoppers, in the early fall, did further damage on the light crop that might have been harvested. On July 5, an all-time high temperature of 109° F. was recorded and during the summer a maximum temperature of over 90° F. occurred on twenty-four days.

In the spring of 1938, moisture was sufficient in May and June to assure an even germination of the grain, but a dry July, grasshoppers and rust all contributed to a marked depreciation in the crop.

The winter of 1938-39 was mild and the snowfall ample to provide the fields with a fair cover but shortly after this snow disappeared, the soil drifted severely. Rains in May and June were adequate to give the crop a good start but extreme heat in July caused some depreciation. The fall of 1939 was one of the driest on record, and there was little snowfall during the winter, the dry surface soil again drifted severely in the spring of 1940.

Conditions improved later in the 1940 season, and although the crop was thin it was well filled and the weather throughout the balance of the season was ideal. Snowfall was normal and spring run-off light. Rainfall later in the season of 1941 was quite satisfactory and excellent yields both of grain and forage crops were harvested. The stock were able to graze in the fields until quite late in the fall.

The year 1942 was extremely favourable, rainfall was heavy in the early part of the season, and on only one day in the whole summer did the temperature go over 90°, quite a contrast to 1937. On November 17 and 18, thirteen inches of snow fell and some farmers were unable to finish combining or picking up their swathed grain. This harvesting was completed the next spring (1943), and although the sample was severely bleached and reduced in weight per bushel, a large percentage of this grain was recovered. Some very high yields were harvested on the Experimental Farm in 1943, namely, 64·8 bushels of wheat to the acre, 114 bushels of oats, and 12·5 tons of corn for ensilage.

The 1943-44 winter was one of extremes, with below-zero temperatures being recorded on 86 days and, as well, there was a heavy snowfall. In the spring of 1944, water again was noted in the many sloughs, a somewhat encouraging sign after seeing them practically dry for some years. Although rainfall was light in May and June, the large reserve of moisture in good summerfallows, carried the crops through until this moisture was supplemented by rain in the early fall. Heavy rains in August and September provided an excellent reserve for 1944. Although an excessive growth of volunteer grain on many farms used some of this moisture, there was still enough, when supplemented by timely rains in June and July, to assure another heavy crop.

The 1945 season was one of moderation and again yields were much above normal. Similar conditions were experienced in 1946 and another excellent crop of both hay and grains was harvested.

The frost-free period (considering a killing frost to be one of more than two degrees, averaged 108·6 days, ranging from 135 days in 1944 to 91 in 1946. In 1946, the actual period without frost was from June 18 to September 1, a period of 74 days, but the first frost in the fall was so light that it did little damage. No exceptionally early or late springs were experienced. The date of starting spring work ranged from April 13 to April 25, with field operations usually beginning the latter part of the third week of April. In the dry years harvesting commenced in late July, in the normal years, from August 1-15.

Complete information is kept at the Experimental Farm on the precipitation, evaporation, temperature and hours of sunshine. These data are summarized in Table I.

TABLE 1.—METEOROLOGICAL RECORDS SUMMARY*
Dominion Experimental Farm, Indian Head, Sask.

Month	Mean Temperature °F.		Precipitation Inches Water		Hours Sunshine		Tank Evaporation Inches Water	
	Average 1937-46	Average 40 Years	Average 1937-46	Average 43 Years	Average 1937-46	Average 55 Years	Average 1937-46	Average 11 Years
January	3·35	7·43	0·73	0·82	82·35	73·20	–	–
February	4·06	5·60	0·90	0·73	98·90	100·70	–	–
March	19·71	18·83	0·89	1·13	132·30	131·90	–	–
April	38·96	37·36	0·78	0·90	178·09	172·80	–	–
May	51·31	50·27	1·48	1·93	210·98	215·80	2·87	2·94
June	58·62	59·37	2·91	3·21	203·34	215·00	2·99	2·01
July	66·79	65·28	1·90	2·26	274·25	275·60	3·65	3·81
August	63·58	62·20	2·02	1·98	243·82	241·30	3·46	3·47
September	53·84	51·99	1·16	1·59	167·01	161·60	2·25	2·26
October	42·61	39·64	0·90	1·13	146·77	130·70	–	–
November	21·53	22·09	0·92	0·94	72·81	70·98	–	–
December	10·43	8·52	0·58	0·73	73·90	58·89	–	–
Annual	36·23	35·71	15·17	17·35	1,884·52	1,848·47	15·22	15·49

* Meteorological records taken in co-operation with the Meteorological Division, Department of Transport.

Animal Husbandry

Horses

W. W. Cram

The Horse Situation in Saskatchewan: 1937-46

Although considerable interest was shown in horse breeding in Saskatchewan during the years 1937 to 1940, a serious shortage of pasture, feed and water in many areas made it necessary for owners to sell or ship to pastures in northern Saskatchewan or Manitoba. Large numbers of horses died from lack of nourishment during this period. Equine encephalomyelitis caused further severe losses

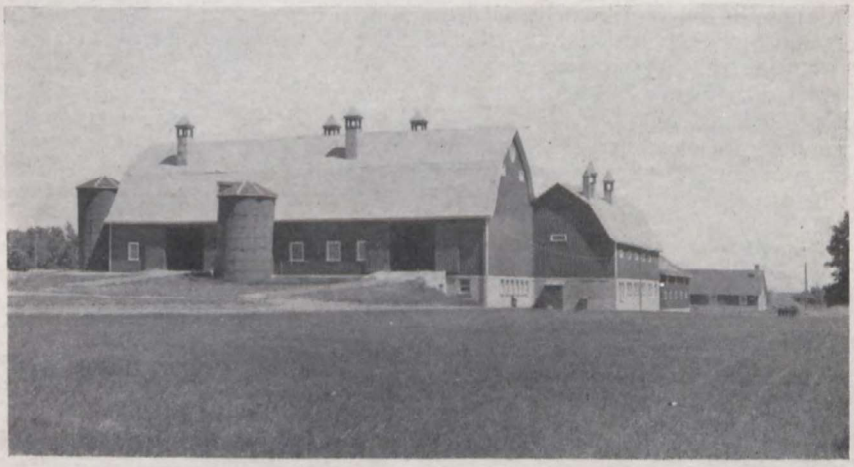


Figure 2.—Horse and cattle barns, Indian Head.

FIGURE 3.—Clydesdale Mares and Foals on Display at Indian Head.

particularly during 1938 and 1939. Heavy shipments of horses also went to Ontario and Quebec for work in cities and lumber camps during the late thirties.

Following 1940, the greatly increased wartime need for food and a lack of farm help resulted in a general tendency to change from horses to tractors as a source of farm power. This trend was greatly hampered by a shortage of tractors and power machinery during the war period.

Interest in horse breeding in this province from 1942 to 1946 waned to a point in 1946 where very few farmers were raising any foals, thousands of useful farm and range horses were being sold annually for slaughter and the horse population was declining rapidly.

THE BREEDING AND USE OF CLYDESDALE HORSES AT INDIAN HEAD

Until recent years, Clydesdale horses were utilized at this Farm as the chief source of power for field, plot and general hauling work. Sufficient foals were raised annually for replacement purposes as well as to provide a surplus of work horses and breeding stock for transfer to other Experimental Farms and for sale to institutions and private breeders.

During the years 1937 to 1943, the Farm stud was maintained at an average of about 37 head including all ages. This was a slight decrease compared with the previous ten-year period. Owing to general lack of interest in heavy-horse breeding in this province and the poor market for draught horses in Western Canada after 1940, the stud was gradually decreased to 19 head by the end of 1946.

THE DOMINION HORSE BREEDING POLICY

CLYDESDALE STALLIONS AT INDIAN HEAD—1937 TO 1943

A number of imported Clydesdale stallions were located at Indian Head under the Dominion Horse Breeding Policy for service to horse breeders during this period.

Muirton Tide 26993, first transferred as a two-year-old to Indian Head in 1934, was located at this Farm until April, 1942, when he was moved to the Experimental Farm, Brandon, Man. This stallion sired many top-prize winners

at leading shows throughout the Dominion and made an important contribution to the Clydesdale breed in Canada. Muirton Tide was mated with approximately 200 mares during the seasons 1937 to 1941 inclusive.

Strathore James 26996 was brought to Indian Head from the Central Station at Lacombe in April, 1941, and was in service at this Farm until September, 1942, when he was moved to the Central Experimental Farm, Ottawa.

Drumlanrig Inspiration 29297 came to Indian Head from the Central Experimental Farm, Ottawa, in September, 1942, and remained until January, 1944, when he was transferred to the Ontario Agricultural College, Guelph.

For the seven-year period 1937 to 1943, three hundred mares including those owned by the Experimental Farm, were bred by stallions maintained at Indian Head under the Dominion Horse Breeding Policy.

No stallion was maintained at Indian Head from 1944 to 1946 and horse breeding on the Experimental Farm was suspended during this period.

WINNINGS AT LEADING EXHIBITIONS

Entries of Clydesdale horses from this Farm at the Royal Winter Fair, Toronto, the Chicago International and other leading shows have been successful in winning many top placings during the past years.

At the Toronto Royal in 1937 a stallion foal and a yearling filly by Muirton Tide won the Reserve Grand Championship and second prize, respectively. Entries at the Toronto Royal in 1938 won first for get of sire, second for yearling filly, second for filly foal, fourth and fifth for stallion foals. From 1939 to 1945 no Royal Show was held.

At the Regina Winter Fair in 1940, four head shown won many Championships and other prizes. In 1941, seven entries at Regina won Grand Championships and other top prizes. Practically all entries in these shows were the progeny of Muirton Tide.

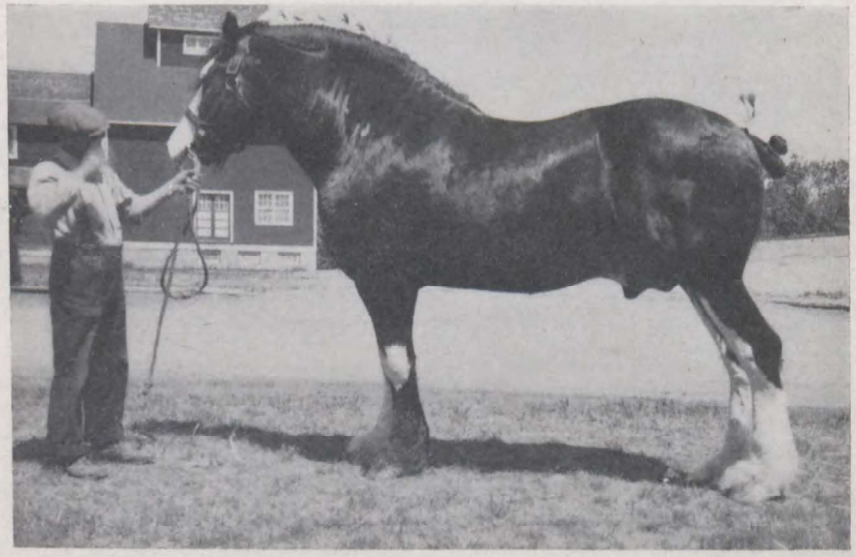


FIGURE 4.—The Clydesdale Stallion Muirton Tide at Six Years of Age.

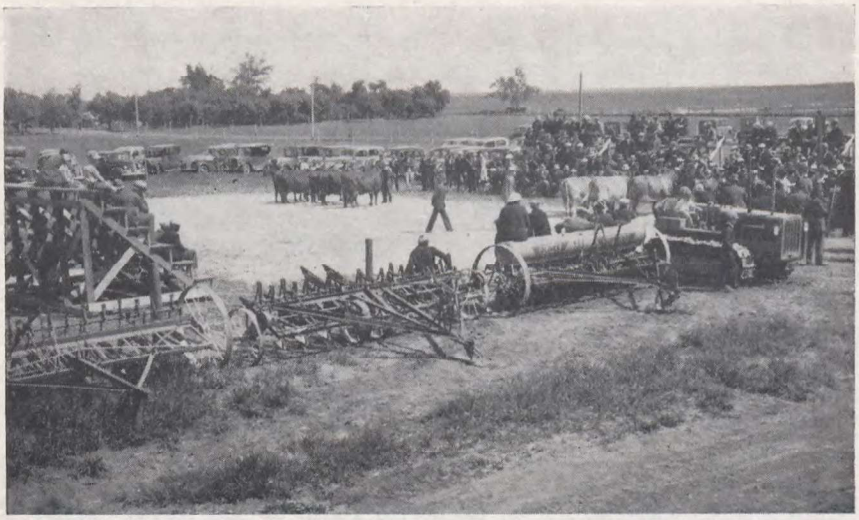


FIGURE 5.—A Livestock Field Day at Indian Head (Shorthorn Cattle in the Ring).

FEED COSTS FOR HORSES

Feed costs for horses over the ten-year period, 1937 to 1947, show considerable variation according to age, kind of feed supplied, feed prices and the amount of work done. Average feed costs over this period were as follows: stallions (7-year average) $72.65; brood mares (8-year average) $55.29; yeld mares (8-year average) $81.63; three-year-old mares (3-year average) $46.67; two-year-old fillies (8-year average) $56.46; yearlings (6-year average) $44.12; work geldings (8-year average) $90.83; two-year-old geldings (4-year average) $42.22.

CATTLE

SHORTHORNS

The present Shorthorn herd was founded in September, 1938, when 12 females, 10 with calves at foot and the imported bull Glastullich Clansman —219904—were transferred from the Dominion Experimental Station at Melfort, Sask. All the females were Rosewoods, about half of which were bred by Frank Wood, Blyth, Ont., the balance at the Melfort Experimental Station. With the exception of the herd bull, every individual in the herd traced on the dam's side to the imported cow Rosewood 92nd by Hean Commodore. Sires of the original female breeding herd were Blythwood Count, Edellyn Count, Clipper's Scout, Resolution and Glastullich Clansman.

During the eight years since the founding of this herd, type, quality and uniformity have been maintained by the use of selected sires in conjunction with the culling of off-type and unsatisfactory breeding females.

All original members of the herd with one exception had been disposed of previous to the fall of 1946. On December 31, 1946, the herd which is fully accredited and free of Bang's Disease consisted of 19 breeding cows, 6 two-year-old heifers, 2 yearling heifers, 10 heifer calves, one herd bull, 2 yearling bulls and 7 bull calves, a total of 47 head.

SHORTHORN HERD SIRES AT INDIAN HEAD

Five herd sires were used with varying degrees of success during the eight-year period from the inception of the herd to the end of 1946.

Glastullich Clansman (imp.)—219904—a son of the noted Calrossie Goldfinder was herd sire from 1938 to November, 1941. Melfort Clansman 17th —242960—a grandson of the first senior herd sire, was mated with a few heifers from 1940 until early in 1942. This bull was then exchanged with the Dominion Production Service for Kinellar Lavender Lad—230526—bred by Duncan Campbell, Moffat, Ont. Kinellar Lavender Lad served as herd sire until August, 1943, and was then replaced by Klaymor Chronicle—237461—a son of the renowned Collynie Royal Barrage. This bull was used in the herd until early in 1945 and was succeeded by a yearling bull Killearn Monarch 40th—267681—from the Gallinger herd of Tofield, Alta. Killearn Monarch 40th was in service from early 1945 until the end of 1946.

Of the sires used to date, Glastullich Clansman proved outstanding owing to the consistent type and uniformity of his progeny in the Farm herd. At the close of 1946 more than one-half of the female breeding herd were daughters of this sire.

MILK PRODUCTION RECORDS OF SHORTHORNS

Although this herd is of beef type and no effort has been made to breed for high milk production, a number of heifers have qualified under Record of Performance test. From a total of 20 females entered in R.O.P. to date, 6 two-year-old heifers have qualified. Of these, 2 qualified in the 305-day division with an average of 5,049 pounds of milk and 247 pounds fat, while 4 heifers in the 365-day division produced an average of 6,002 pounds of milk and 271 pounds of fat.

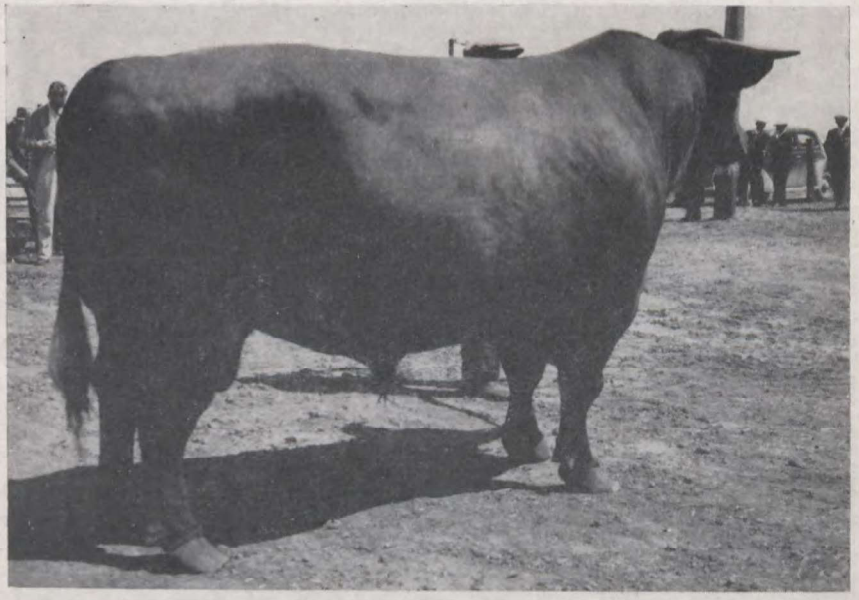


FIGURE 6.—Glastullich Clansman, Shorthorn Herd Bull at Indian Head from 1938 to 1941.

FEED COSTS OF SHORTHORNS

Breeding females and heifers were maintained on pasture through the grazing season with supplementary feeding when necessary during spring, late summer and fall. Cattle of all ages were stabled through late fall, winter and early spring months. Feed cost records were kept for cattle of different ages. Average feed costs, including pasture, were as follows: Herd bulls (5 years) $74.27; breeding cows (8 years) $44.79; two-year-old heifers (6 years) $36.32; yearling heifers (8 years) $35.63.

SALES AND TRANSFERS OF BREEDING SHORTHORNS

Owing to the small original breeding herd which consisted largely of mature and aged cows, practically all of the more promising heifers were retained in the herd and few females were sold for breeding during the period covered by this report. Promising bull calves were saved for breeding and were mostly sold wnen just under one year of age.

Sales of breeding stock include 2 mature bulls, 8 yearling bulls, 16 bull calves and 2 heifers. In addition to sales, one mature bull was transferred to the Central Experimental Farm, Ottawa, 2 young bulls were transferred to the Experimental Station, Kapuskasing, Ont., and one bull, 4 cows and 2 heifers were transferred to the Experimental Station, Swift Current, Sask. Total sales and transfers of breeding stock amounted to 38 head and 44 head were sold for meat.

AYRSHIRE CATTLE

Following establishment of the Ayrshire herd at Indian Head in 1925, the type as well as milk and butterfat records were considerably improved by the use of selected sires in conjunction with rigid culling of off-type individuals and unsatisfactory producers. Average production of the herd for all lactations completed during a period of seven years was over 8,000 pounds of milk and 380 pounds of butterfat per lactation with an average butterfat test of 4·5 per cent.

DISPERSAL OF THE AYRSHIRE HERD

Owing to the necessity of dispersing the Ayrshire herd to provide room for a Shorthorn herd to be established in the fall of 1938 the Ayrshire cattle were gradually disposed of by sales and transfers previous to the winter of 1938.

FIGURE 7.—Shorthorn cattle on pasture, Indian Head.

FIGURE 8.—Ayrshire Cattle on Experimental Pastures.

Transfers at this time consisted of eight selected heifers in 1937 to the Dominion Experimental Station, Morden, Man., and five cows in 1938 to the Dominion Experimental Station, Swift Current, Sask.

LACTATION RECORDS OF AYRSHIRES COMPLETED IN 1937 AND 1938

Eighteen cows and heifers completed lactation records during 1937 and 1938 with an average of 8,630 pounds milk and 372 pounds butterfat. Average costs of production for the two years (based on feed costs only) were 59·5 cents per 100 pounds of milk and 14 cents per pound of butterfat produced.

COMPARATIVE PALATABILITY OF DIFFERENT PASTURE CROPS FOR CATTLE

In this experiment Ayrshire cattle were allowed free choice of different pasture crops during three successive years.

The first season when good stands and growth were secured on all pastures, a mixture of western rye, brome, crested wheat and alfalfa was first in favour, brome was a close second, western rye a rather poor third choice, while crested wheat grass remained almost untouched until the other pastures were practically bare or had dried up during early fall. The leaves and stems of crested wheat, however, retained their green colour after the heads had matured and then appeared more palatable than matured plants of western rye and brome.

Owing to unfavourable conditions for growth through the second and third seasons with a consequent shortage of pasture, grazing preferences were not as marked as for the first year. In general, however, the order of preference remained the same as the first year but the less favoured crops were readily eaten and all pastures were reduced to an over-grazed condition by late summer.

SWINE

Considerable progress was made in the breeding of Yorkshire swine during the period under review. In the selection of breeding stock, Advanced Registry qualified individuals were used to the greatest possible extent with the object of developing prolific, early-maturing strains possessing good bacon type and a low feed requirement.

New blood was introduced through boars obtained principally from the Central Experimental Farm, Ottawa, and Branch Farms at Lacombe, Rosthern, Melfort, and Brandon. A number of boars were also obtained from institutions

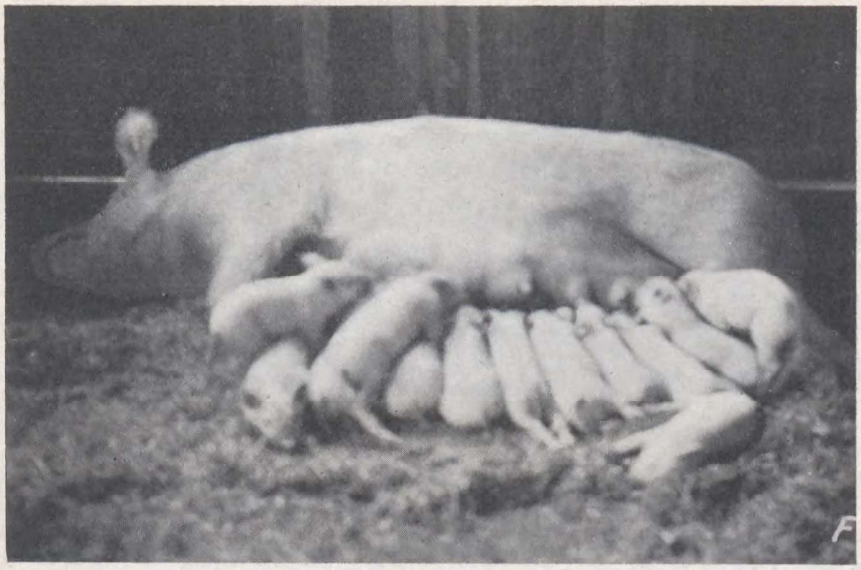


FIGURE 9.—A Yorkshire Sow and Nursing Litter.

and private breeders in this province. Outstanding herd sires during this ten-year period were Lacombe Bob 167P —184673— and Ottawa Rock 67U —217897— both qualified in Advanced Registry at Indian Head.

LITTERS

Mature sows were bred largely for two litters per year with young sows producing one litter the first year. The provision of iodine for pregnant sows, improved methods of rearing and the use of iron for prevention of anaemia in nursing pigs when confined inside resulted in lower mortality and a resultant increase in the percentage of pigs weaned.

During the years 1937 to 1946 inclusive, 214 spring litters averaged 10·01 pigs born and 8·23 pigs weaned per litter, while 102 fall litters averaged 10·11 farrowed and 8·20 weaned. Overall averages for the 316 litters were 10·04 born and 8·22 weaned. Average mortality of spring litters was 17·8 per cent; for fall litters 18·9 per cent and for spring and fall litters combined 18·2 per cent.

BOAR SERVICE SUPPLIED TO FARMERS

One or more boars were maintained at this Farm for service to the public. During the ten-year period under review, slightly over 1,000 sows were bred for farmers and other owners in the Indian Head and surrounding districts.

ADVANCED REGISTRY TESTING

Forty-three sows were entered for Advanced Registry testing during the ten-year period under review. Of these, about one-half of the slaughter test groups were fed at the Farm and the balance were fed at the Advanced Registry Station, Saskatoon. Twenty-one sows, or about 49 per cent of total entries, qualified in all respects. Of the 22 that did not qualify, 15 failed in maturity of test lots, 4 failed in the slaughter test, one in both production and slaughter test, one in production only, while one failed in all scores. Among boars qualified in Advanced Registry during this period were Lacombe Bob 167P —184673— and Ottawa Rock 67U —217897—.

RESULTS FROM FARM-FED SLAUGHTER TEST LOTS

Feeding tests under Advanced Registry were conducted with 20 lots or 97 pigs that were grown and finished at the Farm and forwarded to a Regina plant for slaughter. From these groups the following data were obtained: average daily gain per pig, 1·31 pounds; average meal required per 100 pounds gain, 367 pounds; average net returns per pig based on feed costs $9.51; and average age, birth to finish, 181·3 days.

SALES AND TRANSFERS OF BREEDING SWINE

During and immediately following the second world war, the demand for good boars and females was at times greatly in excess of the supply. For the ten-year period 1937 to 1946, sales of breeding pigs were as follows: boars 214, bred sows 38, gilts 161, with total sales of registered pigs amounting to 413 head. Transfers to Dominion Experimental Farms and Stations included 8 boars and 2 bred sows. In addition to breeders sold and transferred, over 1,900 pigs, including market pigs, feeders, old sows and stags, were sold for meat.

The bulk of sales were to breeders in Saskatchewan with delivery largely by express to more distant points. A considerable number of boars were supplied to the Dominion Production Service and to institutional farms in this province. Breeding animals, principally boars, were transferred to the Central Experimental Farm, Ottawa, and to Branch Farms at Agassiz, Lacombe, Melfort, Scott, Swift Current and Brandon. Two boars were exported to a breeder in Iowa, U.S.A.

Entries of Advanced Registry bred boars from this Farm in the Saskatchewan Swine Breeder's Association Sales over a period of seven or eight years, invariably brought good prices and topped the sales on several occasions.

SWINE PREPOTENCY AND INBREEDING PROJECT

This project, designed to develop a source of supply of purebred pigs of high prepotency for desirable commercial characteristics, was initiated at Indian Head in the fall of 1942 with the Dominion Production Service and the Dominion Experimental Farms Service co-operating.

In the fall of 1942 an Advanced Registry qualified boar and six (three groups of two) of his daughters from three A.R. qualified dams were purchased from a well known Saskatchewan breeder. Early in 1943 this boar was mated with his daughters for May and June litters.

In 1945 a second test was made with a similar group of six sows from the same breeder but of a different strain. As in the first test, these sows were mated to their own sire to farrow in May and June.

Of the twelve first-generation litters born in the two tests, every litter contained one or more defective or deformed pigs at time of, or following birth. Defects included a tongue-tied condition, crooked legs, blindness, rupture, swirls and lack of needle teeth.

Owing to the unsatisfactory litters obtained, inbreeding work with both strains was discontinued at the end of the respective seasons.

BRANDON INBRED STRAIN

Early in 1944 a first generation inbred boar and his litter-mate sister were obtained from the Experimental Farm, Brandon, for further inbreeding work. Mated to her brother in 1944 and 1945 this sow farrowed two litters of 8 and 7 pigs respectively, both apparently normal at birth and free of defects excepting one or two small swirls.

The 1944 litter became unthrifty at two months of age and died or was destroyed soon after.

From the 1945 litter, four pigs were sent to the Advanced Registry Station for testing, one died at three months and a boar and gilt were retained for breeding. Of the four test pigs, two died and the remaining two failed to obtain qualifying scores in the feeding and slaughter test. The gilt saved for breeding was seriously lacking in desirable type. This strain was discarded for further testing in the spring of 1946.

Poultry

W. W. Cram

The Breeding Flock

Breeding work with Barred Plymouth Rock poultry was started in 1933 with foundation females from the Central Experimental Farm, Ottawa, and Branch Farms at Rosthern and Scott, Sask. With the exception of six qualified females obtained from New Brunswick and eleven in British Columbia in 1937, all new blood has since been introduced through males obtained from time to time from the Central Experimental Farm, Ottawa, Branch Farms and private breeders.

Owing to a lack of qualified females prior to 1937, breeding work was carried on to a large extent with hens, having records below 200 eggs and average egg weights less than 24 ounces per dozen, mated to approved males or males from qualified stock. With progressively larger entries on Record of Performance test from 1936 to 1946, the number and percentage of R.O.P. qualified hens and males increased until in 1943, nine breeding pens were qualified and one-third of these consisted of second generation qualified females. By 1946 the twelve pedigreed breeding pens used were all second generation qualified females mated to approved males.

HATCHING RESULTS

During the period under review, a total of 27,206 eggs were set for Farm use. Average fertility of all eggs set was 76·9 per cent while 48·8 per cent of all eggs and 63·5 per cent of fertile eggs set hatched a total of 13,286 chicks.

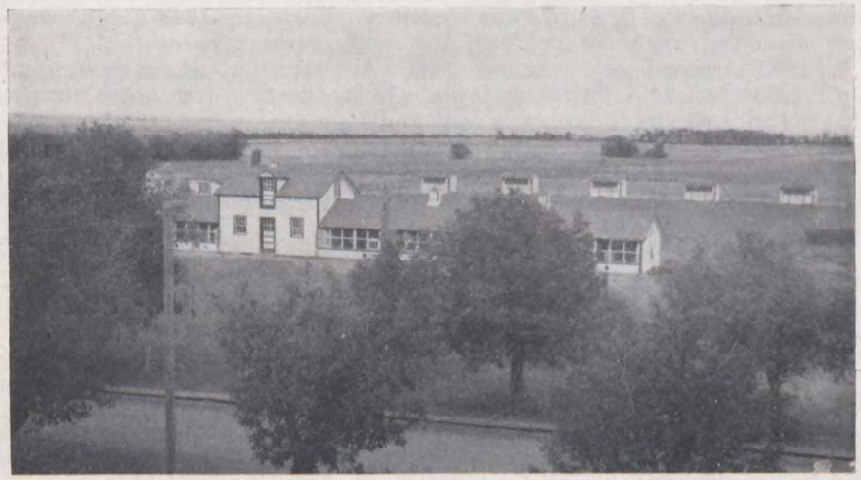


Figure 10.—Poultry Plant at Indian Head.

Losses for the first three weeks after hatching averaged 5·6 per cent. All chicks hatched during this period were individually pedigreed and all chicks from 1943 to 1946 inclusive were from fully qualified dams and sires.

Until 1940, hatching was done with oil-burning incubators of from 100- to 1200-egg capacity. In 1940, a Jamesway Electric 2940-egg capacity incubator-hatcher was installed and used almost exclusively in incubation and hatching work.

SALES AND DISTRIBUTION OF BABY CHICKS AND BREEDING STOCK 1937-1946

In addition to chicks hatched for the home plant, 7628 baby chicks, principally of R.O.P. or R.O.P.-sired grades, were sold to farmers or other residents of the Indian Head and surrounding districts. Approximately 600 chicks were transferred to other Experimental Farms or supplied to district substations. Other sales included 169 approved males, 1507 breeding pullets and 6162 hatching eggs. A number of breeding cockerels were also transferred to Branch Farms and about 500 hatching eggs were supplied gratis to substations.

PROGENY TESTS

Records of progeny tests conducted at Indian Head during the years 1937 to 1946 show a marked increase in egg production and considerable improvement in egg weight for this ten-year period.

From a low average of 147·7-58·3 gram eggs for the 119 pullets tested in the laying year 1936-1937, production showed a fairly consistent upward trend until in the laying year 1945-46 average production of 314 pullets on test was 228-60 gram eggs. For the ten-year period, an average of 208 pullets were tested per year with an overall average of 198·5-58·8 gram eggs per bird.

Mortality of pullets varied from a high of 24·2 per cent for the production year 1936-37 to a low of 4·9 per cent in 1941-42. Average mortality for the entire period was 12·6 per cent.

HOME-MIXED VERSUS COMMERCIAL MASH FOR LAYING BIRDS

In this experiment a simple home-mixed mash consisting of ground wheat, oats and barley and poultry concentrate was compared with a commercial type of mash for laying birds.

Although the cost per 100 pounds of commercial mash was somewhat higher than that of the home-mixed mash, the commercial mash proved most profitable as it increased egg production by 25 per cent and net profit from eggs by 13 per cent in comparison with the home-mixed mash. Hatchability of eggs and livability of chicks favoured the commercial mash by a margin of 10·38 per cent and 11·75 per cent, respectively.

METHODS OF FEEDING LAYERS

In this experiment a basic grain mixture consisting of 200 pounds of wheat and 100 pounds each of barley and oats was fed in conjunction with poultry laying concentrate by three different methods for a 94-day period.

Method No. 1.—Pullets were self-fed a mash consisting of two parts of the basic grain mixture (ground) to one part of laying concentrate by weight. The basic grain mixture (unground) was fed twice daily in amounts approximately equal to the amount of mash consumed.

Method No. 2.—Poultry laying concentrate was kept before the pullets at all times in self-feeders. The basic grain mixture (unground) was fed in troughs morning and evening in such amounts that approximately five parts of grain to one of laying concentrate by weight was consumed.

Method No. 3.—The basic grain mixture (unground) and poultry laying concentrate were fed, free choice in hoppers.

Results of this test indicate that method No. 1 was much more satisfactory and profitable than either of the other methods. Pullets fed by method No. 1 laid 188·75 dozen eggs at a profit over feed cost of $25.67. Method No. 2 gave 51·5 per cent lower production and 97·5 per cent less profit than obtained from Method No. 1. Method No. 3 resulted in 33·9 per cent lower production and 56·7 per cent lower profit as compared with method No. 1.

Cereals

J. G. Davidson

The cereal variety picture is constantly changing. Disease-resistant sorts have displaced many of the popular varieties of ten years ago. The use of the combine has stressed the importance of earliness, strong straw and non-shattering properties. This has been true for wheat, oats, barley and flax.

Cereal Breeding

Breeding wheat, oats, barley and flax occupies an important place in the cereal work at Indian Head. Much progress has been made in obtaining high yielding sorts of wheat and oats. So far these have been useful mainly as parental material or have been found lacking in some essential quality. Considerable attention is being given to flax as an oil-bearing crop. Improved disease-resistant varieties are being sought and as an aid to this end a flax-wilt nursery has been started.

Spring Wheat

The stem-rust epidemic of 1935 was disastrous to the wheat growers of Manitoba and much of Saskatchewan, causing very heavy losses. Marquis and such heavy yielders as Ceres were severely damaged. Some Thatcher wheat, resistant to stem rust, was released in Manitoba. As this was a high yielding sort it quickly became established as the predominant variety over the greater part of the Prairie Provinces. Its main weaknesses are susceptibility to leaf rust and tendency for the grain to bleach readily. Thatcher has outyielded Marquis at this Farm is almost every test in which they have been compared.

In this area, Renown has come and dwindled to a comparatively small acreage as it was inferior to Thatcher in yield. Regent, too, more resistant to leaf rust than Thatcher and popular in some parts for a time, is losing ground. Over the period 1937 to 1945 on fallow land, Regent averaged 2·7 bushels to the acre less than Thatcher but matured a day earlier. In the supplementary tests conducted on ten district substations, Thatcher was slightly superior to Regent, outyielding it in seven out of eight years. Thatcher was superior in the drier areas while Regent was superior where moisture was more plentiful. Apex also has declined in acreage as it was frequently inferior to Thatcher in yield and weaker in the straw as well. Redman is a new variety, released in 1946. It is resistant to stem rust and bunt, more resistant to leaf rust than Regent, although only moderately resistant to loose smut. It is expected that this variety will prove useful in the eastern parts of the province. Here, however, Redman has yielded 1·9 bushels to the acre less than Thatcher during the period 1943 to 1946, maturing at the same time. Rescue, the new wheat variety resistant to stem sawfly, is also somewhat below Thatcher in yield, is lower in quality, susceptible to leaf rust and shows weakness in the straw. Saunders, too, on the average is inferior to Thatcher in yield on this Farm.

Some durum or macaroni wheats are grown in this part of the province, although they are of much less importance than the common wheats. Of these, Mindum and Pelissier have been the standards during most of the ten-year period under review. Mindum is of good quality whereas Pelissier is inferior. Pelissier, however, has outyielded Mindum on the average by 2·3 bushels to the acre over the period 1939 to 1946. Stewart, a new variety, of good quality and resistant to stem and leaf rust is replacing Mindum. From 1943 to 1946, Stewart has equalled Mindum in yield. Carleton, also of good quality, rust resistant and very strong strawed, has yielded 6·5 bushels to the acre less for the same period.

Winter Wheat

A good deal of work on winter wheat has been under way. The main purpose was to search for a strain that would combine winter hardiness with other desirable characters. Much of this work was conducted in co-operation with the United States Department of Agriculture. So far, no satisfactory variety or strain suitable for general use over this area has yet been obtained.

Oats

In this area, rust resistance in oats is important as there is danger from both stem and crown rusts. Therefore, the trend has been to replace non-rust-resistant sorts as soon as suitable rust-resistant varieties became available Both Banner and Victory have been excellent varieties for years but as they have no resistance to rusts both have ceased to be important varieties in this district although Victory is still favoured by some growers as a good yielding market oat. Anthony was the first variety of rust-resistant oats to be grown here but it did not become popular and was replaced by the stem-rust-resistant variety, Vanguard, as soon as the latter became available. Vanguard in turn was replaced by the earlier maturing Ajax. Ajax has been widely grown but it has been severely attacked recently by race 8 of oat stem rust which has become very prevalent and to which it is susceptible. Exeter is a later maturing variety with stem rust resistance which generally yields well. It is gaining in popularity. Beaver is a variety which has a good deal of resistance to crown rust as well as resistance to stem rust. Beacon is resistant to stem rust and to the races of crown rust so far identified in Canada. Garry is resistant to all known races of stem rust and to races of crown rust occurring in Canada. It is also resistant to both smuts that attack oats. This variety appeared to be very promising but has been found to be suspectible to the disease known as *Helminthosporium victoriae* which is a serious weakness. Valor is a very early maturing variety with strong straw and a nice plump kernel. It is susceptible to the rusts and usually has yielded well below the rust-resistant sorts in comparative tests in this region.

In the seven-year period, 1940 to 1946, Exeter averaged 94·2 bushels to the acre; Victory, 93·5; Ajax, 85·6; and Vanguard, 85·4. From 1943 to 1946, Victory averaged 97·3 bushels to the acre; Exeter, 93·5; Beacon, 87·2; Vanguard, 84·6; Beaver, 82·8; and Ajax, 82·0. For the two years, 1945 and 1946, Exeter averaged 96·2 bushels to the acre and Garry 88·6.

Barley

During the ten years under review, smooth-awned varieties of barley have come into general use for feed purposes. None of the smooth-awned sorts have been suitable for the Canadian malting trade except Montcalm which has only recently been released. Regal, Plush, Newal, Prospect, Titan, Montcalm and

Vantage are all six-rowed, smooth-awned varieties. Rex is also smooth-awned, but is two-rowed. O.A.C. 21 is a six-rowed, rough-awned sort that is the standard malting barley in Canada. Hannchen is a rough-awned, two-rowed sort that is used to some extent for pearling. It usually produces a nice sample of threshed grain. Among the foregoing varieties Plush, Titan, Montcalm and Vantage are of special interest at Indian Head. Plush for its general high yield and the fact that it can be combined reasonably well even although the straw may break over after it is ripe; Titan for its smut resistance and strong straw; and Montcalm for its malting quality and the superiority over O.A.C. 21 in yield and bushel weight. Vantage is a new rust-resistant variety that eventually may replace Plush which it closely resembles. It has, however, stronger straw and tends to resist neck breaking and head shattering. Over the period 1937 to 1945, Plush has averaged 53·6 bushels to the acre; Rex, 49·1; Hannchen, 49·0; Prospect, 44·2; Newal, 43·4; and O.A.C. 21, 35·3. For the four years, 1943 to 1946, Plush has averaged 58·2 bushels to the acre; Titan 55·4; Montcalm 51·9 and O.A.C. 21, 38·1. From 1944 to 1946, Plush yielded 57·7 bushels to the acre and Vantage 54·9.

Flax

A number of flax varieties, resistant more or less to wilt and rust, have appeared on the market during the last ten years. Bison, a wilt-resistant sort has been largely displaced because of its susceptibility to rust. Royal, a high yielding, late-maturing variety, moderately resistant to wilt and rust became available at a time when there was need for a greater production of vegetable oils because of the shortage during the war years. It has become the most widely grown variety in the Prairie Provinces at the time of writing. One of its main faults is its tendency to ripen over a prolonged period. Redwing is an early-maturing sort resistant to wilt but susceptible to rust. Rocket is a new sort that gives a high yield of oil. Over the five-year period, 1942 to 1946, Royal has averaged 25·1 bushels to the acre; Redwing, 19·8; Bison, 20·4; Viking, 23·6;

Figure 11.—Barley variety test plots illustrating strength of straw.
L.—Titan R.—Rex

FIGURE 12.—Flax breeding plots, Indian Head.

and Rocket, 22·0. Over the four-year period, 1943 to 1946, the average yields have been Royal, 23·0 bushels to the acre; Redwing, 18·8; Bison, 18·9; Viking, 21·7; Victory 23·5; and Rocket, 20·8. Walsh is a large-seeded variety that has yielded less than Royal in the years tested. It does not usually do well under dry conditions. Dakota is a new sort, highly resistant to both wilt and rust, with medium-sized brown seed. It has not yielded as much as Royal, but matures earlier and more evenly. For the two years, 1945 and 1946, Royal yielded 25·3 bushels to the acre while Dakota yielded 23·3 bushels.

FALL RYE

Nine varieties of fall rye have been under test for varying periods from 1939 to 1943. Of these, Advance, Dakold, Vasa 657, Dakold 23, Russian and Common have shown sufficient winter hardiness to generally withstand the severe winter conditions that usually obtain here. Some winter-killing did take place but not sufficient to take them out of the hardy class. Dakold and Dakold 23 were, perhaps, the hardiest. These are all good yielders. During the period 1941 to 1943, Dakold 23 was the highest yielding variety. Crown, showed severe winter-killing in two years of the test but yielded reasonably well in the others. Petkus and Star have been inferior in hardiness.

FIELD PEAS

Some attention has been given lately to the growing of peas as a field crop in northeastern parts of the province. This has aroused a need for information on the comparative performance of varieties such as Chancellor and Arthur which are good market peas. The highest yielding pea variety here is Mackay, a late maturing, black-eyed yellow pea which is of little importance commercially. Arthur, a medium late maturing, medium large yellow pea has yielded almost as

much. Chancellor, an early maturing, small, yellow pea, important in the pea trade, has been the lowest yielder. Early Blue, an early maturing blue variety, has yielded well but has very short vines, especially under dry conditions. Guinivere, Canadian Beauty and O.A.C. 181, late maturing, large yellow varieties, have also done very well.

Field Beans

Beans are of minor importance as a field crop in Saskatchewan. However, a few beans would be welcome on most farms. Norwegian, a very early maturing brown bean has yielded well and is almost certain to mature seed here. It is very useful for home use. Great Northern is a large white bean of good quality and of medium late maturity. It has been the highest yielder at this Farm and has ripened seed in every year tested. It is suitable for market purposes. Beauty, Early Wonder, Hunter, Navy, Navy Pilot and Small White have not yielded as well as Norwegian or Great Northern. Robust, Darling and Genesee are too late in maturing for this area.

Safflower

Safflower is a thistle-like plant which has been under test for several years to determine its possibilities as an oil-bearing seed crop in this area. Where it can be grown satisfactorily it has been useful for edible and technical purposes. There are two types, spiny and non-spiny. Most of the strains tested here have belonged to the spiny group. So far they have all been too late in

Figure 13.—Pea test plots, Indian Head.

FIGURE 14.—Canadian Seed Growers' Association verification test plots, Indian Head.

maturing. Some of the yields have been very good but the seed contained a large percentage of immature kernels. In a two-year test, the strain Pusa 2 was the earliest ripening and averaged 1,304 pounds of seed to the acre; Pusa 7 was next with 1,147 pounds, while Karrar was last with 1,083 pounds.

MAJOR SEASONAL FIELD OPERATIONS

In connection with the work under the heading of cereals, no doubt it is of interest to know when the various major seasonal field operations were begun for the year. Accordingly, in Table 2 are set forth the first date of tillage, seeding, harvesting and threshing for each of the years 1937 to 1946 inclusive. It will be noted that the threshing date in 1942 was unusually late as a result of wet and unsettled weather.

TABLE 2.—STARTING DATES OF MAJOR SEASONAL FIELD OPERATIONS FROM 1937 TO 1946 INCLUSIVE

Year	Tillage	Seeding	Harvesting	Threshing
1937	April 16	April 23	July 28	Aug. 16
1938	April 16	April 27	July 27	Aug. 17
1939	April 18	April 29	July 29	Aug. 19
1940	April 19	April 27	July 22	Aug. 20
1941	April 25	April 30	Aug. 1	Aug. 21
1942	April 21	April 24	Aug. 18	Sept. 30
1943	April 16	April 23	Aug. 7	Sept. 10
1944	April 18	April 22	July 26	Sept. 2
1945	April 24	April 25	Aug. 14	Sept. 3
1946	April 17	April 17	Aug. 10	Sept. 3

Forage Crops

J. G. Davidson

Forage crops and soil conservation go together in general farm practice. Supplies of native livestock feed are becoming progressively smaller. Erosion by wind and water is increasing and there is need for more attention being given to soil conservation. Over a large part of Western Canada the inclusion of some grass and legumes in the farming program will go a long way to assist in the establishment of a better balanced, more permanent type of agriculture.

The period, 1937 to 1946, has been one of fairly satisfactory yields of forage crops. Only in the year of 1937 were hay yields reduced severely by drought. Very little winter-killing has been experienced.

Corn for Ensilage or Fodder

There have been considerable variations in yield of ensilage or fodder corn during the past ten years. The range has been from 2½ to 17½ tons per acre, green weight. In general, the feeding value of the corn increases with the maturity of the crop. It is important to select a variety which will not only produce the largest tonnage per acre, but also will reach the greatest possible maturity. Over the ten-year period under review, Falconer has been the highest yielder at Indian Head both in green weight and dry matter, followed in order by Minnesota # 13, Early Golden Glow and Northwestern Dent. Other varieties have averaged less. Hybrid corn has also been tested but not for so long a time. The hybrids tend to be later in maturing than varieties like Falconer. Attention is being given only to hybrids classed as very early or early. Some of the hybrids appear to be superior to Falconer in yield of green corn but do not produce as much dry matter. They are very attractive in appearance in the field. Hybrids which appear to be promising are Kingscrost Hybrid D, Canada # 240, # 255, # 275, # 335 and # 355, Canbred # 150 and # 250, and Nodakhybrid # 201.

Corn for Seed

Comparative tests of corn for seed have been conducted with a number of varieties over the past ten years. During that time Saskatchewan White flint has given the best yields ranging from 11·37 to 50·76 bushels to the acre, with an average of 29·10 bushels. Gehu has averaged 15·72 bushels but in three of the ten years the yields were negligible. Howes Albert flint gave an average of 17·33 bushels. Other varieties tested, such as Beacon, Twitchell's Pride, Minnesota 23, Manalta and a number of the hybrids have yielded less.

Field Roots

The acreage of field roots grown in Saskatchewan is comparatively small. This is no doubt due to the amount of manual labour required for their production. However, roots make a useful feed crop, not alone for their nutritive value, but also for their tonic effect. The labour cost can be reduced somewhat by selecting a type of root, that, in addition to yielding well, can be harvested with reasonable ease. By type is meant the general shape of the root. It may be long, half-long, intermediate, tankard, ovoid or globe. Type is of greater importance than varietal name.

Mangels

Experience here has been that the long types are much too difficult to harvest. Intermediate and half-longs are much easier, and tankards are

probably the easiest of all. Globes are easy to harvest but they have the undesirable feature of being easily dislodged during cultivation. Good yielding varieties falling within the type groups which are easy to harvest are in order of average yield: Giant White Sugar, Yellow Intermediate, Danish Sludstrup, and Frontenac.

Swedes

Only globe types have been under test during the period 1937 to 1946. Purple-topped sorts are preferred for market purposes. Acadia, a pleasing shaped purple-top, has been the heaviest yielder, followed by Ditmars, a green-topped variety, and then Laurentian, which is similar to Acadia in appearance. All three are excellent roots. Other good yielders are Wilhelmsburger and Hall's Westbury.

Soybeans

During the ten years under review, tests of soybeans have failed to demonstrate that they are as yet a dependable farm crop for this area. Hay yields have been variable, from ½ to 2¼ tons to the acre over the period, with an average of 1¼ tons. However, in some years the crop has been heavily damaged by drought or frost. Kabott has been the highest yielder, followed by Mandarin and Wisconsin Black. Soybeans and corn have somewhat similar soil and climatic requirements, although soybeans appear to be a little more exacting. The experience here is that the earliest varieties of soybeans do not mature seed as quickly as the earliest varieties of flint corn. Yields of seed cannot be compared with those obtained in Ontario, but over a seven-year period, Wisconsin Black has produced 7·9 bushels to the acre; Kabott 7·3; Manitoba Brown 5·3 and Pagoda 4·9. Soybeans withstand spring frosts but are damaged by fall frosts. A date-of-seeding experiment for seed production showed that early seedings developed slowly in the cool weather of the spring but did not appear to suffer much damage from frost. The later seedings caught up with the early ones, and all dates approached maturity at about the same time. Seedings made about the third week in May produced the highest yield of seed, although those made on the earlier dates usually were more mature. At present any attempt to grow soybeans in this area should be confined to small acreages and to such early varieties as Kabott, Pagoda, Wisconsin Black or Manitoba Brown.

Annual Hays

Cereals such as oats, wheat, barley and spring rye make good annual hay crops for this area. Of these, oats is the best from the standpoint of quantity and quality. Banner oats and Colsess barley, a beardless sort, sown together, have yielded almost as much. Barley, wheat and spring rye have produced good yields of excellent quality hay. The hooded and smooth-awned varieties of barley are preferable to the rough-awned sorts for hay purposes. Banner oats and Mackay peas sown at the rate of two bushels of oats to one of peas have made an excellent combination crop. Chancellor peas, an early maturing sort, mature too quickly to combine well with Banner, or oats of similar maturity. Peas should only be sown where moisture conditions are favourable, as they are likely to do poorly when the soil is dry. Four varieties of oats, Banner, Exeter, Roxton and Beacon, have been tested for hay purposes for a short period. Two dates of seeding, mid-May and late May, were used in each test. The early date of seeding produced the highest yield of hay. Small differences in yield could be noted between varieties, but Banner was somewhat the highest.

Millets are useful as late-sown hay crops. They do not, as a rule, equal the yields obtained from oats sown at the normal time, but they frequently outyield oats that are sown late. Under dry conditions millets do not usually yield well.

Three types have been tested, namely foxtail, proso and Japanese. The Japanese is too late for this district. The best yielding varieties have been Siberian and Hungarian, both belonging to the foxtail group. The proso types, those with spreading panicles, do not yield as much or make as satisfactory hay as the foxtail types. Crown has been the best yielder of the proso types. Hog and Early Fortune also have done well.

Of the legumes, Mackay peas have produced the highest yields, but less than those of the cereals or millets. A mixture of Mackay peas and common vetch has yielded lower on the average than Mackay peas sown alone.

Sweet Clover

Sweet clover is a biennial legume which has proved a fine yielding crop under practically all conditions. It has been particularly valuable, once it was established, in producing a substantial growth when perennial grasses and even alfalfa have suffered severely from drought. Many farmers have reason to be thankful for including sweet clover among their farm crops for hay and pasture. It is relatively resistant to alkali and is valuable as bee pasture.

Erector, a tall, erect-growing, yellow-blossomed sort has been the highest yielder at Indian Head. It is followed closely by Common Yellow Blossom, Zouave and Arctic. In Saskatchewan, Arctic, a white-blossomed sort, is considered the standard variety, on account of its winter hardiness, fine quality and yielding ability. More attractive than Arctic in general appearance, is Alpha, shorter, more bushy in growth, leafy, finer in the stem, but yielding less. Alpha has shown better powers of recovery after cutting than most of the other varieties.

Alfalfa

Alfalfa is the most valuable of the perennial legume crops for this area. It is deep rooted, long-lived, persistent, reasonably productive under dry conditions, and yields abundantly when moisture conditions are favourable. Every farmer who raises livestock should have a few acres, particularly for the young stock. It should be sown on good land where it can be left down for several years. Here, the highest yielder of the common alfalfas is Ladak. It possesses some resistance to alfalfa wilt and is said to be more winter hardy and drought

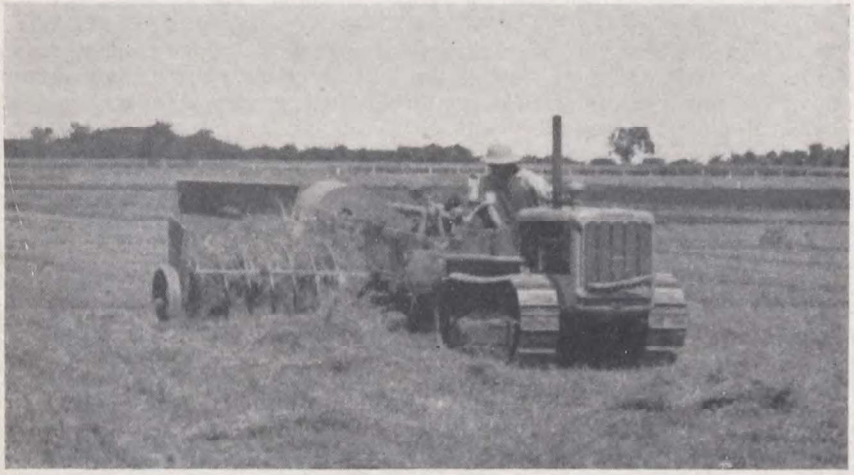


Figure 15.—Field hay baler working, Indian Head.

resistant than Grimm. It is a fine appearing alfalfa in the field, and shows definite superiority to other varieties in its ability to produce a heavy crop the first cutting of the season. The second cutting usually yields less than that of other adapted varieties such as Grimm. Grimm, the variety which for years has been recommended in Saskatchewan because of its hardiness and yielding qualities, has maintained its position among the leading varieties in the tests. Ontario Variegated is similar to Grimm in yielding ability, but sometimes shows less hardiness under severe conditions. Cossack has nothing to recommend it over Grimm and the seed has been more costly. Viking, a new variety, has given a good account of itself. During the period 1940 to 1946, it has yielded just slightly less than Ladak. It is reported to possess greater hardiness than Grimm under severe conditions, but Grimm has been its equal in this respect at Indian Head. New varieties now being tested include Rhizoma, Canauto, Ranger, Buffalo and Ferax, but they have not been grown long enough yet to make satisfactory comparisons.

An experiment is of interest that compares the effect on yield and hardiness of one, versus two, cuttings of alfalfa a year. It had been thought that where two cuttings are taken each year, the second crop is often cut so late that insufficient top growth is produced for winter protection, resulting in pronounced winter injury. Here, neither treatment has shown any winter injury, and in average yield the one cutting has proved slightly better than two cuttings. There is some sacrifice in quality of the hay where only one cutting is taken, as the crop is left until full bloom. However, it is still quite palatable and nutritious.

Alfalfa and Grass Combinations

Very good results have been obtained by the use of mixtures of grasses and alfalfa. Brome, crested wheat, slender wheat, and creeping red fescue have all been used in combination with alfalfa, at varying rates. Mixtures which include two to five pounds of alfalfa per acre have produced as high a yield as those containing larger proportions of alfalfa. The percentage of alfalfa hay in the mixtures with the lower rates of seeding is usually adequate. In years when a second cut is possible, the crop is composed mostly of alfalfa hay. Compared with grass alone, the inclusion of some alfalfa in the hay or pasture crop results in a more productive stand for a longer period of time.

Over a period of years, brome and alfalfa has been the highest yielding mixture. Brome matures over an extended period and combines well with alfalfa to produce an excellent quality hay. It is the best pasture grass for this area and combining it with alfalfa adds to its value. Field tests here have shown small differences in yields of the mixtures where rates of seeding of the alfalfa ranged from 2 pounds to 5 pounds and brome 9 pounds to 15 pounds to the acre. It would seem that alfalfa and brome grass could be mixed in any proportion desired.

Mixtures of slender wheat grass, often called western rye grass, and alfalfa have produced excellent results. Both crops work in well together for hay purposes, proceeding to maturity at about the same rates, and are ready to cut at about the same time. Slender wheat is a short-lived perennial and will not produce over as long a period as brome. The statement regarding rates of seeding for the brome and alfalfa mixtures also holds for mixtures of slender wheat grass and alfalfa.

Crested wheat grass does not appear to be quite as well adapted as brome grass or slender wheat grass for seeding with alfalfa in hay mixtures at Indian Head. It starts to grow very early in the spring and is usually too mature for hay by the time the alfalfa is ready. However, the inclusion of some crested wheat grass in the pasture mixture should make better grazing in early spring and late fall.

Perennial Grasses

The three main grasses suitable for Saskatchewan conditions are brome grass, crested wheat grass and slender wheat grass. They have not differed greatly in average yield of hay, although their position changes from year to year.

Brome grass usually produces excellent yields of hay for three or four years after it has been laid down. However, as it is strongly creeping-rooted it soon becomes sod-bound, and progressively less productive. When this takes place the best practice is to seed down a new field and break up the old one for other uses. If this is not feasible the old field may be renovated for a short period by disking, light one-waying, or shallow ploughing in the spring, when moisture conditions are likely to be good. A small amount of alfalfa sown with the brome grass tends to prevent the brome becoming sod-bound so quickly, and results in a more productive stand for hay or pasture over a longer period of time. Brome grass has some resistance to drought but not as much as crested wheat grass.

Crested wheat grass is a hardy long-lived, vigorous perennial with deep, spreading fibrous roots, which rapidly build up fibre in the soil. It usually yields more than brome grass or slender wheat grass under dry conditions. The young plants are rather tender, requiring cool weather to become established. To get a satisfactory stand shallow seeding on a firm seed-bed is essential. It may be sown during the first half of September, or just before freeze-up, or as early as possible in the spring. It starts growth very early in the spring, and again late in the fall, which tends to provide early spring and late fall pasturage. It is not productive during the heat of the summer.

Slender wheat grass is a short-lived, non-creeping-rooted perennial, which yields well for the first year or two, then quickly becomes unproductive. The quality of the hay is excellent. It does not furnish pasture over as long a period as either brome or crested wheat grass.

Another grass which has been under test is creeping red fescue which is a long-lived perennial with a creeping root system. It is a short-growing, leafy plant more suitable for pasture than hay. It is not a productive grass here, and has yielded considerably less hay than brome, crested wheat, or slender wheat grasses. In the moister areas it may be useful in a mixture to give bottom to the pasture stand.

Sunflowers

The use of sunflowers for ensilage is no longer important in Saskatchewan. However, oil from sunflower seeds has been used for many years as an edible product. Several varieties and new hybrids were tested for a short period. Mennonite was one of the most reliable in producing mature seed in this district. Several of the hybrids appeared very promising, maturing in about the same time as Mennonite and yielding more seed. For seed production, varieties such as Mammoth Russian, Hungarian White and Sunrise were too late for this district.

Giant Black Argentine Rape

Giant Black Argentine rape is an annual of the mustard family, which produces an oil widely used in the compounding of marine lubricants. It is similar to wild mustard in appearance, but seed of wild mustard is very undesirable in rape seed. Rape should not be sown where there is wild mustard. The pods shatter very readily. It may be harvested with the binder or the combine. When the binder is used the crop should be cut when the first definite signs of ripening appear. When the combine is used the crop should be left until a large percentage of the plants are ripe. From 1943 to 1946 the yields of

Argentine rape seed at Indian Head ranged from 600 to 1,200 pounds to the acre. The four-year average is 805 pounds. Solid seeding in drills has produced a higher yield than when sown in rows three feet apart.

Field Husbandry

E. V. McCurdy

Cultural Experiments

The following experiments deal principally with methods of preparing land for field crops. They contain different summerfallow and stubble treatments, the use of barnyard manure and commercial fertilizers, methods of breaking sod, experiments for wild oats control, and others. This plot work was carried out on approximately 450 one-fortieth-acre plots in the southwest field of the Experimental Farm. In 1945 the work was transferred to a field where the soil is more uniform and where shelterbelts will not affect the results of the experiments. The soil is a heavy uniform clay. Yield data were taken in 1946 from this new group of plots but as these data are not complete for all parts of the projects, very little of this information will be included in the report.

SUMMERFALLOW TREATMENTS

In this experiment ploughed fallows were compared with ploughless fallows. Two plots were ploughed in the fall and the next year all work was done with the cultivator. Two more were ploughed in the spring, this operation being completed at the latest by the middle of June, and then these plots were cultivated throughout the remainder of the season as often as was needed to control weeds. One group of the ploughless fallows was disked in the fall and the following year cultivated and the others were cultivated only in the summerfallow year. This experiment has been carried on from 1924 up to the present time and the average difference in yield between these treatments has been surprisingly small. Every effort has been made to do all work efficiently. This is important when surface cultivation replaces ploughing. A very slight increase in yield was evident where the fields had been worked in the fall previous to the summerfallow year. This method had to be watched with care in years when there was any danger of soil drifting, particularly in the case where all stubble was buried with the plough. The safest method appeared to be, to start work in the spring as soon as weed growth was pronounced and then make sure throughout the rest of the season that all weeds were killed before they had the chance to make much growth.

STUBBLE TREATMENTS

Since the large majority of farmers seed two crops after summerfallow it is essential that information be obtained on the best method of preparing stubble land for crops. Five methods have been under test, fall plough, spring plough, disk in the fall, burn and seed, burn and cultivate and then seed. These experiments were revised in 1945 and now include the use of the one-way disk, cultivator and blade weeder. When the results for the past twenty years were analysed, it was noted the fields where the stubble was burned in the spring gave slightly higher yields of wheat but from a soil drift control standpoint this method is not satisfactory. This increase was more noticeable in years when favourable moisture conditions followed immediately after seeding in a dry spring. In the past 10-year period the highest average yield has been from wheat following spring disking, the next after burn and cultivate and the lowest

after spring ploughing. Yield data from the new group of experiments in 1946 placed the use of the Noble blade in the first place and the one-way disk second. Yields after spring ploughing again were considerably below those after the other methods.

METHODS OF BREAKING BROME GRASS SOD

Three methods of breaking brome grass sod were tested for a period of twenty years. They consisted of, breaking the sod early in the spring; taking a crop then breaking 3 inches deep and backsetting 5 inches deep before freeze-up; and removing the hay crop then breaking. The wheat crop following the first method averaged 22·0 bushels to the acre, compared with an average of 14·2 for the second method and 13·3 for the third. However, the loss of the hay crop with the first method must be taken into consideration. Breaking and backsetting proved the most efficient in the eradication of brome grass.

PLACE IN THE ROTATION TO SEED FALL RYE

In the experiment to determine the best place in a rotation to seed fall rye it was noted that yields on fallow have been the highest, although in years when rainfall was normal very satisfactory results were obtained when rye was sown in disked stubble. The average yield of rye on summerfallow from 1935 to 1944 was 22·3 bushels to the acre and on stubble 14·4 bushels. In the severe winter of 1942-43, rye on summerfallow was a complete failure, whereas when sown on stubble it survived 40 to 60 per cent. Rye was also sown in the wheat crop when the wheat was 4 inches high but was unable to compete with the wheat that was well established before the rye was sown.

CULTURAL METHODS FOR SUNFLOWERS

An experiment was outlined in 1924 to test the effect on the yield of sunflowers and on the yield of subsequent crops of planting sunflowers in rows spaced 30, 36 and 42 inches apart and also the effect of thinning the plants within the rows to distances of 3, 6 and 10 inches. This experiment was discontinued in 1941. The average results for the 17-year period indicate conclusively that thinning of sunflowers to definite distances in the rows did not pay for the labour involved, that the 36-inch spacing showed a very slight advantage in yield but in most years the differences were so small that one spacing could not be considered any better than any other, also that excessive cultivation throughout the growing season did not increase yields. There was no apparent difference between the average yield of wheat following sunflowers cultivated by any of the above methods.

GREEN MANURE

In the first field of this experiment sweet clover was ploughed under as soon as the first bloom appeared. In the second, clover was cut for hay, then stacked and the field ploughed. In the third, two cuttings of hay were taken before the field was ploughed. The yields of wheat following these three methods were compared with the yield after standard summerfallow and also after a fallow that had 12 tons of manure applied before it was worked. Wheat grown on the manured fallow usually gave the highest yield and over the 10-year period averaged 31·3 bushels to the acre. The yield of wheat after the clover that was ploughed when in bloom was second but the yield after the other two methods using clover was slightly lower than after the standard fallow. After two cuttings of clover had been taken the average yield was 25·9 bushels to the acre.

FIGURE 16.—Soil water control
Left—Basin listing
Right—Ordinary cultivation Patterson farm, Indian Head.

WILD OAT ERADICATION

An extensive project comprising nineteen different rotations and cultural treatments was outlined to determine the most efficient practice for wild oat eradication. In order to make certain that wild oats were present in sufficient numbers, the ground was infested at the beginning of each experiment. These rotations compared ploughed and surface-worked fallow, spring and fall tillage, increased rates of seeding, deferred seeding, use of different cereals, use of fertilizer and also the effect of longer rotations containing grass on the decrease in the number of wild oats. From the standpoint of eradication surface-worked summerfallow and deferred seeding gave the best results. Also, when an oat crop was cut for green feed the number of wild oats in the following crops was decidedly reduced. Increased rates of seeding gave better control than light rates. The cropping practice including the use of 50 pounds of ammonium phosphate applied with wheat on summerfallow produced the highest long-time average yield of wheat, and as well wild oats were controlled quite satisfactorily. Surface work when compared with ploughing as a method of preparing stubble for seeding wheat produced a crop with fewer wild oats.

APPLYING BARNYARD MANURE FOR CORN

A project was designed to test four methods of applying barnyard manure before a corn crop, namely, on ploughed stubble early in the fall; on stubble before freeze-up and disk in the spring; on stubble in the spring and then plough; and as a top-dressing after the corn was seeded. Manure was applied at 8 and 16 tons to the acre. The heavy application of well rotted manure gave the largest increase, not only in the yield of corn but also in the following crops of wheat and oats. In some years the 16-ton application of unrotted manure applied in the spring noticeably decreased the yield of corn. Fall applications appeared to give slightly better results than spring.

FIGURE 17.—Water eroded soil, Patterson farm, Indian Head.

APPLYING BARNYARD MANURE FOR WHEAT

In this experiment, 8 tons of rotted manure were applied in three different ways—spreading manure on summerfallow land and ploughing in, on first-year stubble then ploughing, and as a top-dressing on the second-year grain. The first method has given the best average yield over the 21-year period, although the increase in yield of wheat on summerfallow has not been high. The average yield of wheat after the first method was 30·5 bushels, after the second 28·6, and after the third 27·5, and for the two plots receiving no manure 28·2. Very little difference was noted in the second crop of wheat after summerfallow on any of the plots.

COMMERCIAL FERTILIZER FOR WHEAT

A project was designed to test the value of phosphate fertilizers for wheat. The yield with these fertilizers was compared with that of both wheat on standard and on manured summerfallows. Ammonium phosphate gave a slightly greater increase in yield than superphosphate. The increase has been quite consistent on the clay soil of the Experimental Farm, but in no case large, in most years averaging from 2 to 5 bushels to the acre. The fertilizer also encouraged more rapid germination and earlier maturity. So far, with the application of 50 pounds to the acre, the rate used in this experiment, the residual effect has not been carried over to the second crop after summerfallow, nor has there been any increase in yield when the fertilizer was applied with wheat on stubble.

ROTATIONS

In 1912 a series of rotations was planned with the thought in mind of determining the most suitable crop sequence for the eastern part of the province. In 1921 some of the rotations were revised. The three-year rotation, known as "C" is a straight grain system embodying fallow, wheat, wheat, the common cropping system on many prairie farms. Marquis wheat was grown until 1929, but in 1930 Reward was introduced and used for some years to aid in wild oat control. Deferred seeding of the Reward wheat and surface cultivation assisted in the control of wild oats and other weeds. In 1935 normal cultural practices were resumed and the use of Marquis wheat was continued until the introduction of Regent and Thatcher. Weeds, particularly wild oats, have given more trouble

in this rotation than in the others and during the past two years, an increase in the amount of sow thistle has been noted. The 35-year average yield of wheat on summerfallow in this rotation is 26·0 and on stubble 14·6. The yield during the past 10-year period has averaged 25·8 on summerfallow and 11·6 on stubble. More information on the yields during the ten years under review can be noted in Table 3:

TABLE 3.—YIELDS IN THE THREE-YEAR ROTATION "C"

Summerfallow, Wheat, Wheat

Year	Wheat after Summerfallow	Wheat after Wheat
	bu.	bu.
1937	8·9	–
1938	13·9	15·5
1939	29·6	12·7
1940	22·9	Cut for hay
1941	23·6	17·0
1942	40·0	15·4
1943	24·5	16·5
1944	37·8	10·9
1945	30·0	11·6
1946	26·3	15·9
10-Year Average—1937-1946	25·8	11·6
35-Year Average—1912-1946	26·0	14·6

Rotation "R" carries a 9-year sequence and is designed to include a combination of cash crops and crops that will provide feed for livestock. The sequence is as follows: summerfallow, wheat, oats seeded down, hay, hay, hay and break, corn, wheat and oats. The yield of wheat after summerfallow has been high over the 35-year period, averaging 34·1 bushels to the acre. In that time the yield has only gone below 20 bushels to the acre on two occasions, 1931 and 1937. The yield of wheat after corn has been surprisingly high, averaging 27·2 bushels to the acre. Oats after wheat have averaged 47·6 and 43·3 bushels, the high figure is after wheat following breaking and corn. Corn has consistently provided a fair amount of feed, in very few years dropping below 4 tons to the acre and in six years exceeding 10 tons. The yields of hay have averaged slightly over one ton to the acre. On the whole, soil fertility has been maintained in this rotation, soil drifting has been kept to a minimum and weeds have been well controlled. These same statements cannot be made in connection with the straight grain growing crop sequence. More detail on this rotation can be noted in Table 4:

TABLE 4.—YIELDS IN THE NINE-YEAR ROTATION, "R"

Year	Wheat on Summer-fallow	Oats Seeded Down to Grass	Hay	Hay	Hay and Break	Corn	Wheat	Oats
	bu.	bu.	ton	ton	ton	ton	bu.	bu.
1937	10·8	–	–	0·18	0·50	0·70	–	–
1938	26·3	14·0	–	–	0·40	0·80	27·8	16·0
1939	28·3	33·2	1·60	0·75	0·50	4·47	17·8	24·0
1940	28·4	9·6	–	–	0·65	2·00	15·0	–
1941	33·8	38·6	0·97	1·30	0·68	8·04	25·6	52·9
1942	64·8	114·4	1·59	1·83	1·30	12·50	34·3	100·0
1943	38·8	50·0	0·98	0·91	1·39	9·49	27·2	53·2
1944	40·4	60·9	1·71	1·89	1·03	4·80	28·8	61·6
1945	34·0	40·0	1·04	1·00	1·20	4·80	23·5	37·0
1946	42·3	50·1	0·11	0·42	0·35	7·72	33·5	67·4
10-Year Average—1937-1946	34·8	41·1	0·80	0·83	0·75	5·53	23·3	41·2
35-Year Average—1912-1946	34·1	43·3	1·09	1·25*	1·00*	6·56	27·2	47·6

* 27-Year Average.

In the original set-up, rotation "P" was designed for a mixed farming district, and carried a variety of crops considered suitable for livestock production. Drought, however, in 1931 and 1932 seriously interfered with the establishment of grass and alfalfa crops, and this necessitated a new set-up. In 1934 the rotation was divided into a five- and three-year series. The five carries one field of alfalfa for the purpose of providing hay and pasture for livestock. A new field is seeded to alfalfa every five years and the old alfalfa field is worked into the main part of the rotation consisting of summerfallow, wheat seeded to sweet clover, sweet clover and then oats. Sweet clover has produced a crop only four years out of the last ten, mainly because of drought and thinning by the sweet clover weevil. In some years the crop was so thin and weedy that the field was ploughed and sown to oats for feed. In the first year of the three-year rotation the field is sown to wheat, this is followed by wheat seeded to sweet clover. The third year, one-half of the sweet clover is ploughed under about the middle of June and the other half is cut for hay, and as soon as the hay is removed, the field is ploughed and then cultivated throughout the balance of the season. Yields have been well maintained in this cropping system but there has been a tendency for the wheat to lodge after the heavy green manure crop had been ploughed under in the summerfallow year. Indian Head clay at the present time does not appear to need this green manure crop to maintain fertility.

Horticulture

Tree Fruits

APPLES

The testing of open-pollinated seedlings has been carried on for some years in an effort to find varieties of apples more suitable to western conditions. Out of this work, several seedlings have appeared which are of considerable merit, being both hardy and productive. Two of these have been named so far. Reward, a Moscow Pear seedling, which bears large size fruits and Renown, a seedling of Repka Kislaga, has borne good crops of crab-size fruits of high quality. Both of these varieties have been distributed for further testing and propagation. I.H.7-1-27, a seedling of Blushed Calville, has shown considerable promise over the past ten years. It is similar to its seed parent in appearance and quality but appears to be somewhat hardier. Several seedlings of Beautiful Arcade and Rosilda have shown promise for this area of Saskatchewan but further testing is necessary.

Of the F_2 Saunders hybrids, Rosilda has been the most reliable of those under test and is particularly suitable for canning purposes. 'Toshprince and Printosh are not quite as hardy as Rosilda and have never borne a heavy crop of fruit. Trail has never done well here as it appears to lack both vigour and hardiness under Indian Head conditions. A number of named sorts which have done fairly well here include Osman, Dolgo, Silvia, Florence, Robin, Tony, Bedford, Prince, Transcendent, Alberta, Columbia and Pioneer.

PLUMS

Some hundreds of plum seedlings and varieties have been grown at this station during the past ten years with particular regard to their hardiness, earliness and quality. Probably the most reliable sorts so far tested for prairie culture are selections of the Manitoba native plum which seem to be able to withstand lower temperatures both in wood and fruit bud. Of these, Assiniboine,

Mammoth, Olson, Wilson, Winnipeg and Orchard selections have proved to be the best. Dropmore Blue, although a good cropper and of good quality is somewhat too late in maturing for this area. Grenville, a Central Experimental Farm introduction, has produced large fruits of excellent quality but further evaluation of its hardiness is necessary. Of the sandcherry × plum hybrids, Opata appears to be the most promising and worthy of recommendation for widespread planting. Sapa bears high quality fruits but is not totally hardy here, while Tom Thumb does well but the fruit tends to be small, particularly in dry seasons.

A new plum plantation was set out in 1945, consisting of 232 trees of the following varieties:

Plums: Bounty, McRobert, Assiniboine, Mammoth, Mina, Cree, Mordel, Dropmore Blue, Ojibwa, Underwood, Norther, Grenville, Tecumseh, Dandy, Mandarin, Dr. Cameron, 40-3, 40-4, 0-272, M-119, M-120, M-122, M-123, C.K.C.

Sandcherry and Sandcherry Hybrids: Brooks, Oka, Champa, Tom Thumb, Opata, Sapa, Ezaptan, Mordena, Manson.

Nanking Cherries: Dura, Drilea.

Small and Bush Fruits

CURRANTS

The black currant is rather a hazardous crop to grow in this area, not only because of weather conditions but also because of the presence of the currant fruit fly. This crop has been affected for several years by this pest. Preliminary studies in the control of this insect by spraying indicate partial success using DDT, and to a lesser degree an arsenate of lead spray. Cryolite was of no value in this problem. In using the DDT spray, spraying should be started prior to June 5 followed by at least four applications at intervals to ensure coverage until the fruit is harvested. Of the varieties grown here, Saunders and Eclipse has given the best yields with Magnus and Kerry giving fair crops.

Red currants have been the most satisfactory of fruit crops, although in some years the crop would hardly rate commercially. Among the varieties under trial here, Holland, London Market and Raby Castle have been the best producers.

GOOSEBERRIES

Probably the most suitable varieties of gooseberries for this area are Charles and Davidson. These varieties have produced good crops of large fruits for some years. Pixwell and Abundance are hardy and are heavy producers but the fruit is inclined to be too small to be of commercial value here.

RASPBERRIES

Of the many varieties of raspberries which have been under test, the variety Chief has been the most reliable. This variety is relatively hardy, early maturing and ripens fruit over a longer period than other varieties under trial. Sunbeam and Viking have been fairly good croppers in most years, although Viking shows considerable injury after most winters. The variety Newburgh has not proved satisfactory in this area. Among the new varieties under test here, greatest promise has been shown by some of the Central Experimental Farm originations. Over the past few years Trent, Madawaska, Rideau and Gatineau have been the most satisfactory.

STRAWBERRIES

Of the ever-bearing type of strawberry grown here during the past ten years, the variety Gem has been outstanding. It is a vigorous plant-maker and produces sound, shapely, medium to large berries that hold their size well throughout the season. Senator Dunlap, which has long been the standard variety for the prairies is gradually being replaced by newer varieties. Under conditions here, it has a tendency to run off in size which makes it unprofitable. Meighen, originated at the Central Experimental Farm, has been outstanding among the June-bearing varieties. It has consistently done well, being a late blooming and maturing variety so that it escapes spring frost injury. Prairie Belle, developed by Mrs. W. E. Carey, Kipling, Sask., has also been outstanding in this district, being a strong grower, prolific plant-maker and a good cropper as well as being quite hardy.

During the winter of 1942-43 the strawberry plantation was severely killed, with all varieties suffering heavily. In 1945, a new plantation was set out containing the following varieties: Dakota, Sparta, Gem, Restigouche, La Have, O-293, Prairie Belle, Meighen, Laurier, Clare Florence, Senator Dunlap, Narcissa, King and Herman.

ORNAMENTALS

A number of climbing plants have been grown for several years to determine their value and adaptability as a screen and ornamental climber. Of these, the most satisfactory have been Virginia creeper, native grape, Lonicera flava, bittersweet, native hop, Clematis tangutica and Clematis ligusticifolia (Western virgins bower). In dry years, Virginia creeper is subject to attacks of leafhoppers which may do considerable damage. The native grape is also subject to these attacks but has not suffered to the same extent as Virginia creeper. The other sorts mentioned above have thus far been free from insect injury.

Many species are grown here to determine their value as hedges. Caragana arborescens is probably the most commonly grown and desirable hedge for prairie culture. It is drought resistant, hardy, stands trimming well and makes an attractive hedge. At Indian Head, however, it matures rather early and is subject to attack from the blister beetle. Others which have been successful here are Caragana pygmaea, which is a most useful dwarf hedge; Rosa spinosissima altaica; the native snowberry, Symphoricarpos racemosus; common lilac, Syringa vulgaris and Chinese lilac, Syringa villosa; Cotoneaster, acutifolia and integerrima.

The ornamental shrubs have, in many cases, shown injury from drought and extremes of temperature, but many have proved to be totally hardy. Among the taller growing, those six feet and over, that have done well are: Crataegeus, Cotoneaster acutifolia, Cornus alba sibirica, Caragana arborescens, C. frutescens, Euonymus atropurpureus, Elæagnus angustifolia, Lonicera tatarica, L. morrowi, L. amurensis, Prunus nigra, P. americana, P. virginiana, P. pennsylvanica, P. maacki, Shepherdia argentea, Syringa vulgaris, S. josikea, S. villosa, S. japonica, Viburnum lantana, V. opulus, V. lentago.

Of the dwarfer species, the following have done well: Caragana pygmaea, C. brevispina, Cotoneaster integerrima, C. diervilla, Euonymus linearis, Elæagnus argentea, Halimodendron argenteum, Juniperus sabina, Lonicera alpigena, L. involucrata, L. alberti, Prunus tomentosa, P. triloba plena, P. besseyi, P. nana, Potentilla fruticosa, Philadelphus coronarius, Rhus trilobata, Rosa spinosissima altaica, Ribes aureum, Spiraea vanhouttei, S. arguta, S. sorbifolia, S. media, S. pikoviensis, S. flexuosa, Syringa velutina, Tamarix amurensis, Thuja occidentalis Wareana, Atrophaxis buxifolia, Amorpha canescens, A. fruticosa, Acanthopanax senticosus, Prinsepia sinensis.

FIGURE 18.—Good tree growth, Indian Head.

Most of the hardier herbaceous perennials have done well at Indian Head in normal years. During the severe winter of 1942-43 a number of plants were killed while other plants of the same kind survived without injury. Among those to show casualties were aconitum, anthemis, arabis, asters, astilbe, aubretia, campanula, delphinium, dianthus, dicentra, iris, peony, pyrethrum, statice, rudbeckia and lupins. Hollyhocks are generally difficult to overwinter with any degree of success. A method used here with good results has been to sow the seed about the middle of July, carry in flats until winter and then overwinter in a cold cellar. Canterbury bells treated similarly have given good results.

Many varieties of lilies are well suited to this area of Saskatchewan. Some of the kinds found to be most reliable at Indian Head are LL. dauricum, tigrinum, tigrinum fl. pl., regale, leichtlini maximowiczi, L × Maxwell, LL. phildauricum, philada, hansoni, henryi, dauricum luteum, amabile, willmottiae, martagon, philadelphicum. Other kinds that thrive for a year or two then pass out of the picture are LL. tenuifolium, cernum, callosum, monadelphum, concolor. The best of the Central Experimental Farm originations have been Edna Kean, Brenda Watts, Muriel Condie, Lillian Cummins, Grace Marshall and Coronation. During the severe winter of 1942-43 a number of varieties were killed outright. Among these were the varieties Spitfire, Hurricane, Constables Improved and G. C. Creelman.

Good results have been obtained with gladiolus and this flower seems to be well adapted for prairie culture. All the more popular varieties have done well, and by using both early and late sorts continuous bloom may be had from the first of August until the first severe frost. Success in growing dahlias has been governed very largely by weather conditions. During hot, dry weather they suffer considerably from sunburn and grasshopper attacks. Best results have been obtained with the smaller hybrids.

Many annuals are suited to sowing directly outside, while others require a longer season than is experienced at Indian Head. Generally, they come into bloom later than those started inside. They are usually just past their best when the first frost cuts short the season. Those kinds that do well when seeded outside are: asperula, agrostemma, anoda, bartonia, clarkia, centaurea, calendula, collinisia, coreopsis, eschocholtzi, echium, eutoca, gypsophila, iberis, linum, lathyrus, lavatera, linaria, layia, reseda, malope, malva, nigella, nolana, phacelia, papaver, portulaca, sanvitalia and zinnia.

Vegetable Crops

BEANS

Several varieties of green beans have done well in this area, Stringless Green Pod, Masterpiece, Bountiful, Tendergreen. Of the wax beans, Round Pod Kidney Wax, Unrivalled Wax, Pencil Pod Black Wax and Webber Wax are the most satisfactory varieties tested so far.

BEETS

Beets have been sown on two dates, usually about May 15 and June 15, depending on weather conditions. The first-sowing beets are for bunching purposes with those from the later sowing for storage use. The best results have been obtained from various strains of Detroit Dark Red as a storage beet. For bunching, Crosby Egyptian and Ohio Canner have given good results.

CABBAGE

Best results with cabbage have been obtained by seeding indoors early and setting out the seedlings later on. The best early varieties have been Golden Acre, Baby Head and Copenhagen Market. Later varieties which have been satisfactory are Danish Ballhead and Penn State Ballhead.

CARROTS

The earliest variety under test has been Morse's Bunching. Good crops have been obtained from Chantenay and Nantes.

CAULIFLOWER

Satisfactory varieties have been Early Snowball, Extra Early Dwarf, Erfurt and Early Snowcap.

CELERY

Salt Lake (Utah), Golden Plume, Giant Pascal, Winter Queen and Cornell No. 19 have been satisfactory.

CORN

For this area, earliness in maturing is of prime importance. Of the earlier varieties the best results have been obtained with Banting, Early Golden, Golden Gem and Golden Sunshine. Dorick is a promising variety.

CUCUMBER

Pickling-type cucumbers have been earlier in maturing and consequently have given higher yields than the larger slicing types. Varieties which have done well are Early Fortune, Delcrow, Snow's Pickling, Straight Eight, Minco and National Pickling.

EGGPLANT

The best varieties tested so far have been Blackie, a Central Experimental Farm origination, and Black Bountiful.

LETTUCE

Of the various varieties of leaf lettuce grown, Grand Rapids has been most satisfactory. The New York types of head lettuce have been fairly satisfactory. Good results have been obtained with Continuity and Hanson.

MUSKMELON

Farnorth, an Indian Head origination, is the most promising variety in this area. It is early, of excellent quality, small to medium round with thick salmon flesh. Mennonite and Golden Champlain have been satisfactory.

ONION

Satisfactory varieties have been Early Yellow Globe, Giant Yellow and Prizetaker.

PARSNIP

Guernsey, Hollow Crown, Manitoba Prize and Intermediate have given good crops at this station.

PEAS

The most outstanding main crop variety of peas has been Lincoln, followed by Stratagem and Telephone. Good early varieties have been Alaska and Little Marvel.

PEPPERS

In most years, peppers have suffered severely from blossom end rot. Satisfactory yields have been obtained from Harris Earliest and Hamilton Market.

POTATOES

Varietal trials with potatoes have been carried on at Indian Head for many years. The average yield of nine varieties grown for a period of eleven years is listed in Table 5.

TABLE 5.—YIELDS OF POTATO VARIETIES AT INDIAN HEAD

11-Year Average

Variety	Yield of Marketable Tubers
	bu. per acre.
Early Ohio	229·9
Chippewa	225·9
Warba	218·3
Irish Cobbler	217·9
Columbia Russet	216·4
Katahdin	214·7
Bliss Triumph	210·4
Golden Nugget	194·1
Gold Coin	190·6

Experiments to determine the best distance of planting hills or sets have been carried on for a number of years. Where adequate moisture is available, the 12-inch spacing has produced increased yields, but in dry years, better yields have been obtained with spacings up to 20 inches. Generally speaking, the closer plantings have given larger total yields but a larger percentage of cull tubers. Considerably higher yields have been obtained when the potatoes were planted fairly early in the spring.

PUMPKIN

In this area, the trend has been toward growing the smaller types of pumpkins. Of these, good results have been obtained with Small Sugar, Winter Queen, Winter Luxury and Connecticut Field.

RADISH

The most outstanding variety has been Scarlet Globe, followed by White Icicle, French Breakfast and Saxa.

SPINACH

The variety Giant Nobel has been the most reliable of the varieties tested during the past ten years. Satisfactory results have also been obtained with King of Denmark and Long Standing Bloomsdale.

SQUASH

The Hubbard types of squash, both green and golden have been the most reliable here. The variety Kitchenette has given good yields, except when early frost prevented the squash from maturing.

TOMATOES

Abel is one of the best early varieties so far tested at this Station. Field Marshall, which is a locally-grown type of Earliana, has yielded well, with fruits somewhat larger, smoother and more meaty than Abee. Other early varieties which have done well are L-3700 (a Lethbridge seedling), Farthest North, Abel × Farthest North, Early Chatham and Earliana.

SEED PRODUCTION

The production of foundation seed has been carried on in the past three years. Varieties included in this project at present are: Corn—Golden Gem; Muskmelon—Farnorth; Pea—Alaska; Parsnip—Guernsey; Pumpkin—Connecticut Field; Spinach—Nobel.

Illustration Stations
and
District Experiment Substations

R. N. McIver

On the Illustration Stations and District Experiment Substations, farm problems are studied in their local environment representing an extension of the comprehensive work carried on at the Experimental Farms and Stations. Illustration Stations and District Experiment Substations are operated on privately-owned farms on the basis of a co-operative agreement entered into between the owner and the Experimental Farms Service. In Saskatchewan the organization comprises 41 Illustration Station and District Experiment Substation farms serving the outlying areas surrounding the Dominion Experimental Farms at Indian Head, Melfort, Swift Current and Scott. The work conducted on Illustration Stations and District Experiment Substations has been consistently

broadened in scope and has progressed from the original purpose of disseminating experimental information by field and cultural demonstration to include crop testing and experiments of a fact-finding nature.

The production of adapted varieties of cereals, and forage crops where adaptable, is promoted on Illustration Stations and District Experiment Substations in order that these farms may serve as sources of pure seed for farmers in surrounding districts. Strip farming, soil erosion control, and the introduction of improved cultural practices are important phases of the work on station farms in the province. Livestock policies which are designed to promote the development of improved herds of cattle and swine as well as flocks of sheep and poultry from which neighbouring farmers may procure breeding stock are an integral part of Illustration Station and District Experiment Substation activities. Farm management studies as well as farm home beautification are other projects designed to acquire information on the most economical methods of production and promote those features which contribute to financial effectiveness and also those which enhance the comfort and attractiveness of farm living.

The seven District Experiment Substations, three Illustration Stations and one special horticultural project station which comprise the district supervised from Indian Head are located in the southeastern section of the province. The western limit of the district lies approximately at a line running through Avonlea in the south central part and Aylesbury in the central part of the province. The northern limit of the area served lies roughly at a line drawn from Yorkton and Calder in the east through Davidson in the central part of the province. This district is characterized by a wide variety of soils and climatic conditions which give rise to considerable differences in farming types and cultural practices. The problems under study in the eastern section differ from those in the western section where soil drifting is a major problem. As a result in most cases the work on each station has as its objective the solution of specific production problems peculiar to the particular district served. Throughout this report reference is made to certain districts and where this is done it relates to the work being developed in co-operation with the farmers listed below as operators of Illustration Station and District Experiment Substation farms.

Station	*Operator*
Alameda	Young Bros.
Arcola	Alex Craib
Avonlea	J. W. Miller
Avonlea (Horticultural Project)	Jos. Dombowsky
Aylesbury	Chas. McMillan
Calder	Kost Marteniuk
Lisieux	Omer Prefontaine
Radville	Levee Bros.
Strasbourg	J. G. Hopper Ambrose Coles
Wawota	W. H. Pryce
Yorkton	James Harris

Illustration Stations

CALDER—Kost Marteniuk, Operator

This station, in the northeastern section of the district, was selected for experimental work late in 1937. The control of perennial weeds by different crop sequences was the main problem studied. The soil is a Yorkton loam which has characteristics resulting from being developed on boulder clay deposits. The surface soil is a loam with a somewhat heavier textured subsoil

and a high content of lime carbonate. The topography is gently undulating with moderate to poor drainage. This is the only station which uses horses entirely as a unit of power. As only a small percentage of the farms in this section of the province is under cultivation more attention is given to the livestock enterprise.

CANORA—Chris Hoehn, Operator

This station is in the northern part of the district and was first operated as a station in 1929. The soil is a Canora silty loam being developed on silty glacial lake deposits with a subsoil high in lime carbonate. The topography is nearly level with good drainage. The operator of this station was interested in the eradication of weeds by cultural methods and forage crops. Also, considerable attention was paid to tree and bush fruits and other horticultural work.

PELLY—W. J. Bettinson, Operator

The Pelly station is in the extreme northern part of the district. The soil type is Canora light loam with numerous gravelly spots. The subsoil is heavier in texture being developed on silty glacial lake deposits. The colour is dark grey with a high lime carbonate content. The topography is moderately level and fairly well drained but subject to spring flooding. During the 14-year period the station was under contract, a five- and a three-year rotation including a grass and clover mixture gave fairly satisfactory weed control and yields of wheat and oats were well maintained.

WAWOTA—W. H. Pryce, Operator

This station was selected in 1924 and is in the southeastern section of the district. This is one of the earliest settled parts of the province being opened in the early 1880's. Numerous native bluffs were present when the district was settled. Through a period of years these bluffs have increased in area at the expense of the native pasture and greatly reduced its carrying capacity. In 1946 one entire quarter-section was cleared with the intention of cropping this and then sowing it to a grass mixture. Most of the farmers in this section utilize all their waste or unbroken land as pasture for livestock. The soil is a mixture of Oxbow and Ryerson loam with a clay loam subsoil, very dark in colour and developed on a glacial till. The topography is rolling with fairly good drainage. This station has specialized in the production of pure seed and from this standpoint alone has made a marked contribution to the district.

YORKTON—James Harris, Operator

The Yorkton station was opened in 1935 and is situated in the northeastern part of the district. It is more or less a mixed farming area. The soil is a Canora silty clay loam very dark in colour with a clay subsoil developed on silty glacial lake deposits. It has a high content of lime carbonate. The topography is fairly level with good drainage. On this farm, four crop sequences have been observed since the station was opened. The rotations using grass and clover yielded higher and controlled weeds more efficiently than those where grain alone was produced. All farm enterprises, horticulture, bees, poultry, livestock and field crops are developed and indicate a very typical and efficient set-up for this district.

SUBSTATIONS

ALAMEDA—Young Bros., Operators

This station was selected in 1935 in the southeastern part of the district. It is on the border of the dark brown and the black soil zones. The odd bluff is present but most of the land is under cultivation. The soil is a mixture of Estevan and Oxbow loam with a clay loam subsoil, developed on boulder clay. The topography is fairly level with a few sloughs. Although soil erosion by wind was a major problem in this district when the station was opened very little erosion had occurred on this farm. By reducing the size of the fields of fallow and the careful handling of the stubble with the one-way disk, soil drifting has been completely controlled. These operators have a well balanced farm program typical of this district.

ARCOLA—Alex Craib, Operator

Work on the Arcola station in the southeastern section of the district was started in 1935. The soil is a Cudworth silty loam developed on silty glacial lake deposits. It is moderately level, fairly well drained, and has very few stones. As soil drifting had been very severe in this district, a station was selected to study methods of control. Drifting has been fairly well controlled by the use of strips and surface-worked fallow. The strips have been widened during the past two years but not to the extent of going back to quarter-sections in fallow.

AVONLEA—J. W. Miller, Operator

The soil on this farm is a Haverhill clay loam developed on boulder clay. The topography is fairly level and the drainage is good. It is relatively free of stones. Soil erosion by wind was very severe in the district and on the station. By the use of narrow strips, the one-way disk and by seeding some severely eroded parts of the farm to grass the movement of soil was brought under control.

AYLESBURY—Chas. McMillan, Operator

The Aylesbury station was selected in 1937 and is situated in the northwestern section of the district. The soil is a Weyburn loam which is developed on boulder clay. This soil type is fairly extensive throughout the dark brown soil zone. The topography on the station is fairly level with good drainage. A few stones are present. The problem of the efficient production of wheat, with highly mechanized equipment, is the main study on the station.

DAVIDSON—Reuben Lloyd, Operator

This station is situated in the northwestern section of the district. The soil type is a Weyburn loam similar to the Aylesbury station but with a slightly heavier texture. The topography is level with good drainage and no stones are present. The problems of the district are very much the same as at Aylesbury.

LISIEUX—Omer Prefontaine, Operator .. ..

The Lisieux station in the extreme southwestern section of the district was selected in 1929. The soil type is a Wood Mountain loam with a clay loam subsoil. The topography is strongly rolling with a very high ridge across the station. It is well drained but immediately south of the station is a large alkali flat. This flat produces an abundance of hay and cheap pasture. Hence the operator combines the production of grain with cattle.

Radville—Levee Bros., Operators

The Radville station has been operated since 1924 and is in the southern part of the district. The soil type is Trossachs clay loam commonly referred to as "burn-out soils". The subsoil is an impervious clay, and as a result the penetration of moisture is very restricted. The topography is fairly level and the drainage is generally poor but on this station drainage is reasonably good as a creek runs through part of the farm. A moderate amount of stone is present. In the early part of the period under review, a large dairy herd and a substantial number of hogs were kept but at present the operators are stressing wheat production.

Strasbourg—J. G. Hooper and Ambrose Coles—Operators

These two stations were selected in 1935 and are situated in the northwestern section of the district. The soil is a Weyburn loam to light loam with a clay loam subsoil. The topography is gently rolling with fairly good drainage. On one station (J. G. Hooper) a few acres are so high in alkali that the crops are slightly affected. The stations were organized to study methods of soil drifting control that might be of assistance to the farmers in this district.

Weyburn—E. Meredith, Operator

This station was selected in 1916, and was one of the original illustration stations in the province. The soil type is Weyburn clay loam with fairly level topography and good drainage. Very few stones were present. Over the period of years this station was under contract, the main phases of illustration station work stressed were the production and distribution of pure seed, the introduction of new varieties, the study of crop sequences, and the testing of forage crops that might be suitable for use on a very brown clay loam.

Willowbunch—G. Boisvert, Operator

The first contract was signed with Mr. Boisvert at Willowbunch in 1930. In 1935 the work on this station was extended to the operator's farm land not in the valley, which is much more typical of the soil in the district. The soil is a Haverhill clay loam with a rolling topography and is quite well drained. Soil drifting had been serious in this district and the study of methods of control was the main reason for selecting the station.

Horticultural Station

Avonlea—Jos. Dombowsky, Operator

Mr. Dombowsky's farm was selected for horticultural work in 1929. This farmer had been keenly interested for some years in the possibility of growing tree fruits on the prairies and had made a fair start on his own. Two acres of his farm were set aside for an orchard under the supervision of the Experimental Farm. This project has been continued. The trees in the orchard have been exposed to hail, drought, grasshoppers, beet webworm, and severe snow damage but still many varieties have made growth and are producing a fair crop. The soil is a Haverhill clay loam with a fairly alkaline subsoil.

Crop Rotations

As weed control is one of the major problems on most of the stations a number of rotations were carried out with this in mind. In order to obtain exact and continuous information, small plots were selected on most stations. In the

eastern section where a combination of good moisture conditions and fairly heavy weed infestations exists, a longer rotation containing a grass and clover mixture was used. Shorter rotations were studied in the western portion where drier conditions prevail.

TWO-YEAR ROTATION—SUMMERFALLOW, WHEAT

This rotation was carried out on the stations in the southwestern portion of the district. The first operation on the summerfallow field was usually carried out with the one-way disk in early June. The following spring it was cultivated and seeded. During the drier years this rotation gave a higher return per acre than did a longer rotation, as well as good weed control. Average yields are tabulated in Table II.

TWO-YEAR ROTATION—WHEAT, CORN

This rotation was carried on at two of the stations, namely, Alameda and Radville. It consisted of the field being disked in the spring and then seeded to wheat. The following spring it was cultivated and seeded to corn. In order to keep the weeds under control it is both harrowed and cultivated twice during the early summer. The field of wheat averaged slightly higher at both Alameda and Radville than the average yield of stubble wheat in a three-year rotation. At Alameda this rotation has been unsatisfactory from the standpoint of weed control. The infestation of weeds increased each year, especially Canada thistle. The average yield of wheat is given in Table 6 which follows.

THREE-YEAR ROTATION—SUMMERFALLOW, WHEAT, WHEAT

This rotation was carried out at four of the stations, namely, Alameda, Radville, Strasbourg and Yorkton. It is a fairly common rotation throughout this part of the province, although there is a tendency to seed less wheat on stubble. The field is summerfallowed the first year. The following spring it is cultivated and then seeded. If many weeds are present in the fall the stubble is disked. The third year it is seeded with the one-way and seldom cultivated after harvest.

FIGURE 19.—Corn Grown on the Radville Substation in 1944.

This rotation proved to be quite successful as a straight grain growing proposition. Once the field became infested with weeds, particularly perennials, it did not prove to be very effective in their eradication. However, with proper cultivation they could be held in check. Table 6 gives the wheat yields.

TABLE 6.—AVERAGE YIELD OF WHEAT IN VARIOUS ROTATIONS

Station	2-Year Rotation		3-Year Rotation	
	Wheat on Summer-fallow	Wheat after Corn	Wheat on Summer-fallow	Wheat after Wheat
	bu./acre	bu./acre	bu./acre	bu./acre
Alameda	26·0 (6)	20·1 (6)	26·0 (6)	18·7 (6)
Aylesbury	–	–	15·8 (6)	12·4 (6)
Radville	26·9 (6)	14·9 (6)	26·9 (6)	14·3 (6)
Strasbourg	–	–	22·3 (1)	8·3 (1)
Yorkton	–	–	23·0 (10)	16·3 (10)

NOTE.—Figures in brackets indicate the number of years on which the average is based.

THREE-, FOUR- AND FIVE-YEAR ROTATIONS
(Including a legume and grass mixture)

These rotations were studied on a few of the stations. A three-year rotation at Alameda, Arcola and Radville, a four-year at Calder and Yorkton, and a five-year rotation at Wawota and Yorkton. These rotations include a mixture of grass and clover. The three-year rotation consists of summerfallow, wheat, crested wheat grass and sweet clover. After the grass and sweet clover hay is cut the field is ploughed in late July. The six-year average yield was 25·0 bushels per acre for wheat and 1·27 tons of the legume and grass mixture.

The four-year rotation consisted of summerfallow, wheat, sweet clover and crested wheat grass, and barley or wheat. The first year the field was summerfallowed and then seeded to wheat, grass and clover in the second year. The third year, after the hay was cut, the field was ploughed in July and partially summerfallowed the remainder of the season. The fourth year it was sown to barley. The eight-year average yield on this rotation was 28·0 bushels of wheat, 1·5 tons of hay, and 32·5 bushels of barley per acre.

The five-year rotation consisted of summerfallow, wheat, sweet clover and crested wheat grass, wheat and then oats. The first, second and third years of this rotation are similar to those in the four-year rotation. In the fourth year wheat was sown and the fifth year oats. The yields were similar to those in the four-year rotation and the oats averaged about 40·0 bushels per acre.

In all cases the grass and clover mixture was sown after the wheat to assure shallow seeding. Weeds were satisfactorily controlled in these rotations.

SOIL FERTILITY

CHEMICAL FERTILIZERS

At the Alameda; Arcola, Aylesbury, Radville, Strasbourg and Yorkton stations tests were conducted to study the response of wheat to an ammonium phosphate fertilizer. The fertilizer was applied with wheat sown at the rate of 1½ bushels per acre on fallow in a two-year rotation. Table 7 shows the comparative yields.

TABLE 7.—COMPARATIVE YIELDS OF WHEAT IN A TWO-YEAR ROTATION WITH AND WITHOUT FERTILIZER

Station	Rate of Fertilizer	Number of Years	Average Yield with Fertilizer	Average Yield without Fertilizer	Average Increase
	lb./acre		bu./acre	bu./acre	bu./acre
Alameda	25	11	18·6	15·3	3·3
Arcola	25	6	30·2	28·1	2·1
Aylesbury	25	1	15·0	13·3	1·7
Radville	25	13	19·2	19·4	−0·2
Strasbourg	25	10	22·0	16·5	4·5
Yorkton	30	9	28·9	27·0	1·9

With the exception of Radville, all the stations showed varied increases from the use of ammonium phosphate. The average increases at Yorkton and Arcola are not great, over the good yields obtained without fertilizer.

ROOT FIBRE AND CROP RESIDUE IN SOIL IMPROVEMENT

A grass and clover mixture was used at Alameda, Arcola, Radville, Wawota and Yorkton stations. Generally, a satisfactory stand could be obtained, although during some years the sweet clover weevil did considerable damage. This mixture was only left for a short period but sufficient roots were present to leave a somewhat cloddy surface. Practically no increase in yield was obtained except at Yorkton where the eleven-year average of wheat on fallow was 23·3 bushels per acre and the eleven-year average of wheat on fallow after grass and clover was 26·0 bushels per acre.

FIGURE 20.—Note the sod effect after a grass and clover mixture has been cut and ploughed on the Radville Substation in July, 1944.

Throughout the district an increasing number of crops are being harvested with the swather and combine and as a result the stubble is longer than when it is harvested with a binder. The straw is generally spread and then worked back into the soil along with the stubble.

Cultural Methods and Practices

The stations fall into two main groups from the standpoint of weed control. In the northeastern part of the district the weeds most prevalent are Canada thistle, sow thistle and couch or (quack) grass, while in the other areas served by station farms the problem is largely one of annual weeds such as frenchweed or stinkweed, wild oats, and in the Arcola district wild mustard is a serious problem. Volunteer grain has been quite troublesome on most of the stations in recent years and generally necessitates an extra operation on the summerfallows.

A short rotation including a black summerfallow appears to be the most satisfactory method of weed control. Longer rotations which include a grass and legume mixture with partial summerfallow have held weeds in check until a complete summerfallow is used. The two-year rotation of corn and wheat has not proved to be a satisfactory substitute for summerfallow as a gradual increase in weed population was recorded during the six years that this rotation was under test.

In the northeastern section summerfallows are usually one-way disked in the fall and again in June. Further cultivations are given, once in late June and again in mid-July. In some cases an additional operation with the one-way disk just prior to harvest has been necessary to maintain control of perennial weeds followed by a further operation with the cultivator late in the fall. In the southern and western part of the district the usual practice has been to one-way disk summerfallows in early June and cultivate in early July. Where volunteer grain or wild mustard has been a problem the fields have been cultivated or one-way disked immediately before or during harvest. It is found that summerfallows in the northeastern area require at least two and frequently three operations more than do those in the southwestern section.

To obtain information on soil drifting control, the fields on the stations, except Yorkton and Wawota, were laid out in 8- or 16-rod strips running north and south, as the prevailing winds are from the northwest. In recent years the width of the strips has been increased to 32 and 40 rods. Soil drifting has not been as serious since about 1939 due mainly to increased moisture and better crop conditions. However, from observations made, it would appear that strip farming would decrease any mass movement of soil and the cumulative effect of drifting soil would be greatly decreased.

Preserving the maximum amount of trash cover on the surface of the soil definitely decreases soil drifting. This is obtained by surface tillage, particularly with implements such as the blade weeder.

Cereal Varieties and Their Distribution

A series of rod-row tests was sown on most of the stations to obtain a comparison of the new varieties with those now recommended for the various zones. The number of varieties in the test has gradually increased each year until in 1946 there were 28. These tests are planned, threshed and the results tabulated by the Cereal Division at the Experimental Farm.

Thatcher and Regent have outyielded the other named varieties of wheat, the former in the drier areas particularly, the latter under more favourable conditions. The latter also has more resistance to leaf rust. Rescue and Redman

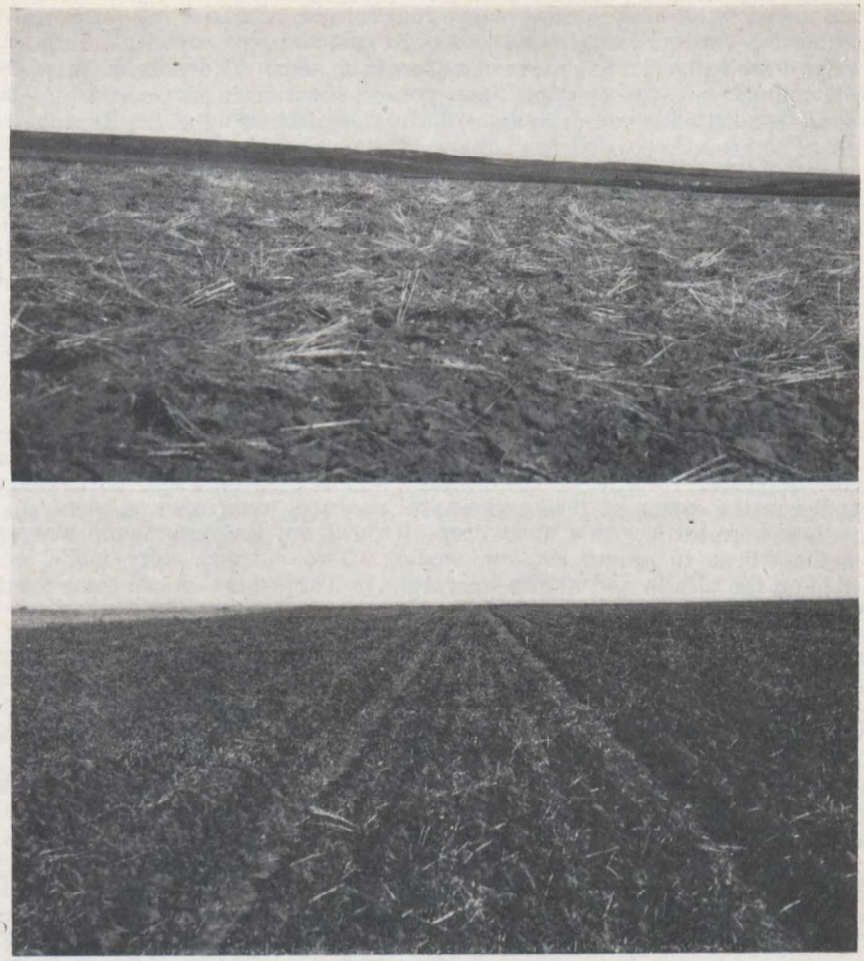


FIGURE 21.—(Upper)—Good trash cover on a summerfallow field at the Lisieux Substation in 1941.

FIGURE 22.—(Lower)—Note the lumpiness and trash on the surface after three operations with the blade weeder at Radville in 1946.

were included in the test last year but sufficient data have not been obtained to arrive at any definite conclusion about their yielding ability. However, Rescue appears to be a very promising variety in the area with severe sawfly infestation.

Exeter has replaced Vanguard and Ajax oats in the eastern section of this district, exceeding both varieties in yield. Ajax is still a satisfactory early oat for the western section.

Plush and Titan proved to be the highest yielding in the feed barley varieties. The former was best in areas with favourable moisture, while the latter yielded higher in the drier regions. Titan has stronger straw and is therefore a more suitable variety for combine harvesting. Montcalm, the new smooth-awned malting barley, has given good results, outyielding O.A.C. 21 on the eastern stations. It is stronger in the upper part of the stalk and a smaller percentage of the heads break off.

In order that each station may function as a source of pure seed of recommended varieties, small allotments of registered seed sufficient to maintain a seed plot are furnished to station operators each year. The varieties introduced in this manner are those which have proved superior in the small plot tests which are conducted in co-operation with the Cereal Division at the Experimental Farm. The grain harvested from the seed plots provides high quality seed for the main station fields and also a source from which farmers in the immediate district can procure seed of varieties adapted to local conditions of soil and climate. During the period 1937 to 1946 inclusive, station operators distributed by sale a total of 18,202 bushels of wheat, 21,390 bushels of oats, 14,865 bushels of barley, 819 bushels of flax, 123 bushels of rye, 3,250 pounds of rape, and 26,898 pounds of grass and legume seed to farmers in their immediate districts. These amounts represent 786 individual sales of seed, indicating the wide distribution achieved from the initial seed plot introductions.

Forage Crops

Grass and legumes have been under observation on seven stations for a number of years. In order to obtain more accurate information, this work was expanded in the spring of 1944 and several mixtures were sown on plots. In all cases they were sown with a nurse crop of wheat but the forage crop was sown after the wheat to assure shallow seeding. Two cuttings were made where possible on the alfalfa and alfalfa mixtures. In Table 8 are shown some average yields.

TABLE 8.—AVERAGE YIELDS OF GRASSES, LEGUMES AND THEIR MIXTURES

Forage Crop	Alameda	Arcola	Calder	Radville	Strasbourg	Wawota	Yorkton
	ton/acre	ton/acre	ton/acre	ton/acre	ton/acre	ton/acre	ton/acre
Alfalfa, 12 lb	22·2 (2)	1·93 (2)	1·46 (7)	1·27 (6) 1·22 (11)	–	–	1·69 (6)
Brome, 15 lb	1·02 (2)	–	–	–	0·57 (11)	–	–
Crested Wheat Grass, 8 lb	1·03 (2)	–	–	–	–	–	–
Sweet Clover, 16 lb	–	–	1·18 (7)	–	–	1·18 (14)	1·23 (6) 1·75 (9)
Crested Wheat Grass, 6 lb... and Sweet Clover, 10 lb	1·69 (2) 1·21 (8)	1·62 (2) 1·89 (5)	1·30 (7) –	– 1·19 (6)	– –	– 1·52 (22)	1·91 (6) 1·51 (10)
Alfalfa, 2 lb. and Brome, 10 lb	1·85 (2)	1·75 (2)	–	–	–	–	–
Alfalfa, 5 lb. and Brome, 8 lb	1·85 (2)	2·05 (2)	–	–	–	–	–
Alfalfa, 2 lb. and Crested Wheat Grass, 8 lb...	2·06 (2)	2·08 (2)	–	–	–	–	–
Alfalfa, 5 lb. and Crested Wheat Grass, 6 lb...	1·82 (2)	2·08 (2)	–	–	–	–	–

Note:—Figures in brackets indicate the number of years on which the average is based.

Farm Orchard and Horticulture

A small orchard has been started or expanded on each station for the purpose of obtaining experimental information on tree and bush fruits during the ten-year period under consideration. At Avonlea two acres were set aside for

horticultural work and this has developed into a specialized project. In the period 1937-46, considerable damage occurred during two winters. All orchards, with the exception of Alameda, suffered very severe injury during the winter of 1942-43. Most of the trees made a remarkable recovery and a large percentage had begun to produce fruit but they suffered a further setback during the winter of 1946-47 as a result of the heavy snowfall.

The Reward and Simbirsk apples gave the best results while the crabapple varieties proving most satisfactory were Anaros, Dolgo, Florence, Osman, Prince, Robin and Transcendent. The plum × sandcherry hybrids (Opata, Sapa, and the numbered varieties from Morden) yielded quite well and appeared to be sufficiently hardy to survive most winters. Some of the hardier plums such as the Assiniboine and Mammoth yielded a fair crop in most years.

A limited amount of garden seed was distributed to all operators each spring to familiarize the local farmers with the variety most suitable to their particular district. Most of the operators summerfallow half their gardens each year, while a few have restricted garden plots and use the same place continuously. As disease has not been a problem, the latter method is quite satisfactory where moisture is not a limiting factor.

Potato variety tests were conducted with six varieties on five stations during 1944-46 inclusive. The Early Ohio, Irish Cobbler, Katahdin and Warba have all proved to be satisfactory.

Livestock

The number of livestock, particularly hogs, kept on some of the stations has greatly decreased in recent years. The main reason for the decrease in livestock appears to be the shortage of farm labour, although the Radville station went out of hogs because of disease. The Aylesbury, Radville and Strasbourg stations keep very few cattle and hogs. The Arcola, Calder, Strasbourg (Coles) and Yorkton stations have about 20 to 40 head of cattle each, while the Alameda, Lisieux and Wawota stations have about 75 to 125 head. However, the stations keep enough cattle to utilize all the waste land as pasture. These operators raise one to three litters of hogs each year with the exception of Mr. Coles at Strasbourg who raises about seven or eight litters each spring and fall.

A small flock of 50 to 200 poultry is kept on each station. The average revenue from poultry has increased in recent years from $43 in 1938 to $183 in 1946.

Yield and Cost of Producing Farm Crops

This investigation into farm costs on Illustration Stations and District Experiment Substations is conducted with the general object of discovering ways and means of securing greater economy in the production of farm products. It is designed to help farmers to improve the organization of their farms through a wiser choice of farm enterprises and practices which tend to make such undertakings more profitable. The determination of the cost and the profit or loss per acre or per animal is a secondary function of the study, except in so far as such data would be helpful in ascertaining how the unit cost of a product might be lessened. The procedures followed in this study are so designed that all direct costs are charged to each enterprise concerned while general operating expenses which cannot be directly classified are allocated to all on the basis of relative capital investment. Hence, if wheat production constitutes the main source of revenue it naturally follows that the bulk of general operating expenses are levied against this crop but, where a substantial investment in livestock is maintained, that part of the farm organization receives a levy which is pro-rata to the capital invested therein. It is found that there is a close relationship between the cost of any one enterprise and the effectiveness of all other productive efforts

within the individual organizations as they occur on station farms. In effect, these cost studies are in the form of single enterprise accounts and comprise a correlated part of the complete farm business studies which are conducted on the station units concerned.

The cost of producing crops on the stations has been calculated for a period of years. All the known costs are included. The present method was adopted by the Division of Illustration Stations in 1943. Climatic conditions, soil texture, and many other factors have a distinct bearing on the cost of field work. Even on individual farms these costs tend to vary widely. The cost of field operations is presented in Table 9.

TABLE 9.—AVERAGE COST OF OPERATIONS PER ACRE, 1943-46

Item	Number of Records	Average Cost	Highest Cost	Lowest Cost
Harrow	28	0·31	0·66	0·14
Plough	22	1·72	2·72	0·86
Disk	25	0·40	0·91	0·21
One-way	39	0·62	1·06	0·38
Cultivator	51	0·46	1·07	0·21
Drill	42	0·50	0·88	0·27
Binder	36	0·75	1·19	0·38
Mower	16	0·91	1·47	0·49
Swather	8	0·28	0·37	0·24
Combine	19	1·39	2·22	0·87
Stack	16	1·85	4·22	0·50
Stook	31	0·49	1·07	0·17
Rake	16	0·60	1·13	0·28
Blade weeder	4	0·58	0·75	0·40
Rod weeder	4	0·56	0·62	0·47
Packer	10	0·39	0·55	0·21

Cost of Summerfallow.—Cost of summerfallow operations constitutes a definite debit against succeeding crops and must be taken into account when computing the charge per acre for the production of wheat or coarse grains. In the case of a rotation where two crops of grain are grown, two-thirds of summerfallow costs are charged to the first crop and one-third to the second. In longer rotations no charge for summerfallow is levied beyond the second crop year following this operation.

Complete cost records are kept on summerfallow operations on all stations in this district of supervision. Calculations of the cost of individual operations are determined as outlined and each year a separate cost is determined which is chargeable to the succeeding crop or crops. A summary of summerfallow costs for each station for the year 1946 and average costs for varying periods of years is set forth in Table 10.

The cost of summerfallow on the Calder station is much higher than at any of the other stations. This increased cost is partially due to the use of horses which are not so efficient as the tractor. Generally, at least two extra operations are required at Yorkton and Calder which accounts for the remainder of the increased costs at these stations.

The costs of summerfallow, field operations and materials form the basis for computing the cost of producing the ultimate crop. In Table 11 the cost per acre of producing a crop of wheat on fallow in 1946 is set forth.

TABLE 10.—COST PER ACRE TO SUMMERFALLOW LAND, 1946

Station	*Use of Land and Taxes	Use of Machinery	Gas, Oil, and Grease	Horse Labour	Man Labour	General Farm Expense	Management	Total Cost per Acre 1946	Average (1938-1946 inclusive)
	$	$	$	$	$	$	$	$	$
Alameda	1.11	0.53	0.55	–	0.50	0.46	1.00	4.15	3.43
Arcola	1.38	0.69	0.52	–	0.54	0.50	0.95	4.58	3.70
Aylesbury	1.17	0.69	0.47	–	0.47	0.53	0.76	4.09	3.60
Calder	0.74	0.26	–	1.69	1.35	1.08	1.14	6.26	6.12
Lisieux	0.45	0.35	0.36	–	0.32	0.35	0.67	2.50	3.41
Radville B	1.01	0.71	0.54	–	0.46	0.63	0.61	3.96	–
Radville O	1.01	0.66	0.45	–	0.45	0.63	0.61	3.81	3.09
Strasbourg (Coles)	0.74	0.90	0.41	0.30	0.77	0.38	0.67	4.17	3.98
Strasbourg (Hooper)	1.10	0.62	0.41	–	0.56	0.98	0.67	4.34	4.07
Wawota	0.75	0.64	0.68	–	0.52	0.86	1.39	4.84	3.99
Yorkton	0.82	1.28	0.99	0.59	1.45	0.98	1.61	7.72	4.84

B=Blade Weeder.
O=One-way.
* Land values used are those given by the assessment commission, Government of Saskatchewan, and are based on the long-time productivity values of the different soil types and are not necessarily present sale values.

TABLE 11.—COST PER ACRE OF PRODUCING WHEAT ON SUMMERFALLOW, 1946

Station	*Use of Land, Buildings and Taxes	Cost of Summer-fallow	Seed	Hail Insurance	Machinery Use				Hauling	Miscellaneous Labour, Man or Horse	Miscellaneous Costs			Total Cost per Acre
					Preparation and Seeding	Combine Harvesting	Binder and Thresher Harvest.	General Equipment			Interest on Net Cost	General Farm Expense	Management	
	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Alameda	1.26	3.03	1.88	–	0.72	2.24	–	0.11	0.45	–	0.09	0.15	1.00	10.93
Arcola	1.49†	3.29	1.88	0.13	1.15	–	4.42	0.10	0.60	0.50	0.18	0.24	0.95	14.93
Aylesbury	1.28†	3.37	1.25	–	0.64	1.89	–	0.25	0.26	–	0.08	0.12	0.76	9.90
Calder	1.08	6.30	1.88	–	1.66	–	4.44	0.34	0.54	1.25	0.22	0.30	1.14	19.15
Lisieux	0.53	1.70	1.56	–	0.56	1.30	–	0.13	0.26	–	0.06	0.10	0.67	6.87
Radville	1.11	3.89	1.72	–	0.79	1.60	–	0.37	0.53	–	0.07	0.11	0.61	10.80
Strasbourg (Coles)	0.85	2.04	1.88	–	1.32	1.13	–	0.13	0.40	–	0.07	0.07	0.67	8.56
Strasbourg (Hooper)	1.26	4.89	1.88	–	0.87	2.50‡	–	0.46	0.47	–	0.10	0.31	0.67	13.41
Wawota	1.02	2.29	1.88	–	0.98	–	4.15	0.37	0.44	0.75	0.18	0.17	1.39	13.62
Yorkton	0.96	4.19	1.88	–	1.73	–	4.32	0.42	0.52	0.75	0.20	0.29	1.61	16.87
Per cent of Total Cost of all Stations	8.68	28.00	14.16	–	8.35	8.53	13.86	2.15	3.59	2.61	1.00	1.49	7.58	100.00

* Land values used are those given by the assessment commission, Government of Saskatchewan, and are based on the long-time productivity values of the different soil types and are not necessarily present sale values.

† Includes Municipal Hail Insurance.

‡ Custom Work.

A review of Table 11 emphasizes the effect of medium- and below-average yields as well as crop failures. Certain costs up to and including the seeding of the crop are fixed and must be incurred. Costs of fallow, seed, preparation and seeding, general equipment, use of buildings, land use and taxes and general farm expense, when totalled, represent 62·83 per cent of the total cost of producing the crop. This fact alone seems to point out the care that must be exercised in land preparation, including choice of rotation, quality and variety of seed used.

Summary data covering yield per acre, cost per bushel, and cost per acre of producing a crop of wheat have been maintained on this group of stations for varying periods of years. These data are summarized in Table 12.

TABLE 12.—SUMMARY WHEAT YIELDS AND COST OF PRODUCTION

Station	Wheat after—	Rotation	Number of Years Grown	Yield per Acre	Cost per Bushel	Cost per Acre
				Average	Average	Average
				bu.	$	$
Alameda	Fallow	2-year	6	25·6	0·35	8·85
	Wheat	3-year	6	18·7	0·39	7·21
	Fallow	3-year	10	18·9	0·50	9·24
Arcola	Fallow	2-year	9	23·5	0·51	11·57
Aylesbury	Fallow	2-year	9	15·7	0·71	9·86
Calder	Fallow	4-year	8	31·8	0·46	13·77
*Lisieux	Fallow	2-year	12	10·8	0·76	8·02
Radville	Fallow	2-year	12	20·3	0·46	9·07
	Fallow	3-year	15	19·4	0·46	8·71
	Wheat	3-year	15	11·7	0·58	6·76
Strasbourg (Coles)	Fallow	2-year	11	17·5	0·61	10·59
Strasbourg (Hooper)	Fallow	2-year	10	19·4	0·61	11·86
Wawota	Fallow	5-year	22	19·1	0·57	10·80
	Clover	5-year	21	17·2	0·51	8·73
Yorkton	Fallow	5-year	11	26·0	0·43	12·10
	Clover	5-year	11	22·6	0·44	9·95
	Fallow	3-year	11	23·3	0·51	11·97
	Wheat	3-year	11	16·2	0·60	9·79

* 1941-1944 inclusive, records not in the average.

The long-time average yields at Lisieux cover a period of 12 years but in view of the fact that this station was not in active operation during the years 1941-44 inclusive, no data are available for this period.

Farm Organization and Business Studies

Crop rotations, soil management, and the inclusion of subsidiary enterprises or side-lines, have an important bearing on the financial effectiveness of the farm business. In 1938 preliminary studies were undertaken to determine sources of revenue on the farms operating as Illustration Stations and District Experiment Substations in southeastern Saskatchewan. The records collected have been used for the purpose of determining the relative productivity of the various farming types in terms of money income. This work has been expanded further and since 1940 a complete farm business study covering annual operations of all stations in this district is conducted. A weekly report of farm revenues and expenditures is furnished by each operator and at the end of each year an inventory record is taken listing kind, acreage and production of crops grown, capital investment in land and buildings, livestock, machinery and equipment, feeds and supplies,

accounts receivable, and liabilities such as balances owing on agreements of sale and mortgage indebtedness. Some of the more important phases of this study are outlined below.

Land Utilization

A summary of 1946 inventory records shows that the ten operators of Illustration Station and District Experiment Substation farm in this supervisory district own 10,874 acres of land of which 6,899 acres or 63·4 per cent is under cultivation and 3,975 acres of 36·6 per cent is classed as native pasture woods, roads and the area taken up by the farmstead. In 1946 these operators grew 1,990 acres of wheat, 722 acres of oats, 619 acres of barley and had 2,469 acres of land under summerfallow. Flax was grown on one station at Alameda where 205 acres were grown for seed.

The average size of the ten station farms is considerably above that of the ordinary farm in the province and, with exception of Calder, Yorkton and Wawota, these stations are located in the primarily grain producing areas of this part of the province. While some stations have large acreages of native pasture, the size of holding permits relatively extensive grain farming and at the same time on the stations at Alameda and Lisieux these same areas are put to good use as sources of native hay and pasturage for relatively extensive livestock enterprises. In districts where similar conditions prevail effective use of rough grazing land and natural hay lands can provide considerable additional revenue and the development of a more stable farm organization. Failure to include such side-lines when over 36 per cent of the land owned is not suitable for grain production is equivalent to transferring the full load of operation costs, taxes and maintenance to roughly two-thirds of the land owned. When borne solely by tillable acreage these fixed charges tend to raise the cost of producing a unit of crop.

Farm Capital

Inventory records on these station farms in 1946 show that, on the average, 62·63 per cent of the capital investment is in land and buildings, 16·31 per cent in livestock and 21·06 per cent in machinery and equipment. The average investment per acre of crop land amounts to $39.27. The individual areas served by these stations represent a wide variety of soils and climatic conditions which have an important bearing on the type of organization. In the more southerly and central sections the type of farming is such that grain production is the main activity. The objective on a grain farm is to apply as much capital as possible in the form of tillable land to a given investment in machinery and equipment. Soil type has a marked influence as indicated by the records from the Radville Substation which is located on the Trossachs soil series. These soils require heavy equipment and large power units for satisfactory tillage, hence the investment in machinery is considerably higher than for most grain farms on other soil types. The effect on investment per acre of crop land of a more diversified type of farming is brought out by the records at Lisieux, Wawota and Yorkton where the large areas of rough pasture land permit the maintenance of substantial herds of livestock. This increase in investment, however, has given relatively higher returns in terms of gross revenue per acre of crop land. In this manner the gross returns from a farm with large areas of untillable land can be maintained on an equal level with a farm of similar area but comprised almost entirely of crop land. Effective use of farm capital is an important aspect of station work and these studies are made to ascertain what relationships between the various forms of capital will give greater assurance of maintaining a high level of money income. A summary of average capital investment, acres of crop land and gross revenue per acre crop land for the Illustration Stations and District Experiment Substations is summarized in Table 13.

TABLE 13.—CAPITAL INVESTMENT AND GROSS REVENUE PER ACRE OF CROP LAND—SOUTHEASTERN SASKATCHEWAN, 1946

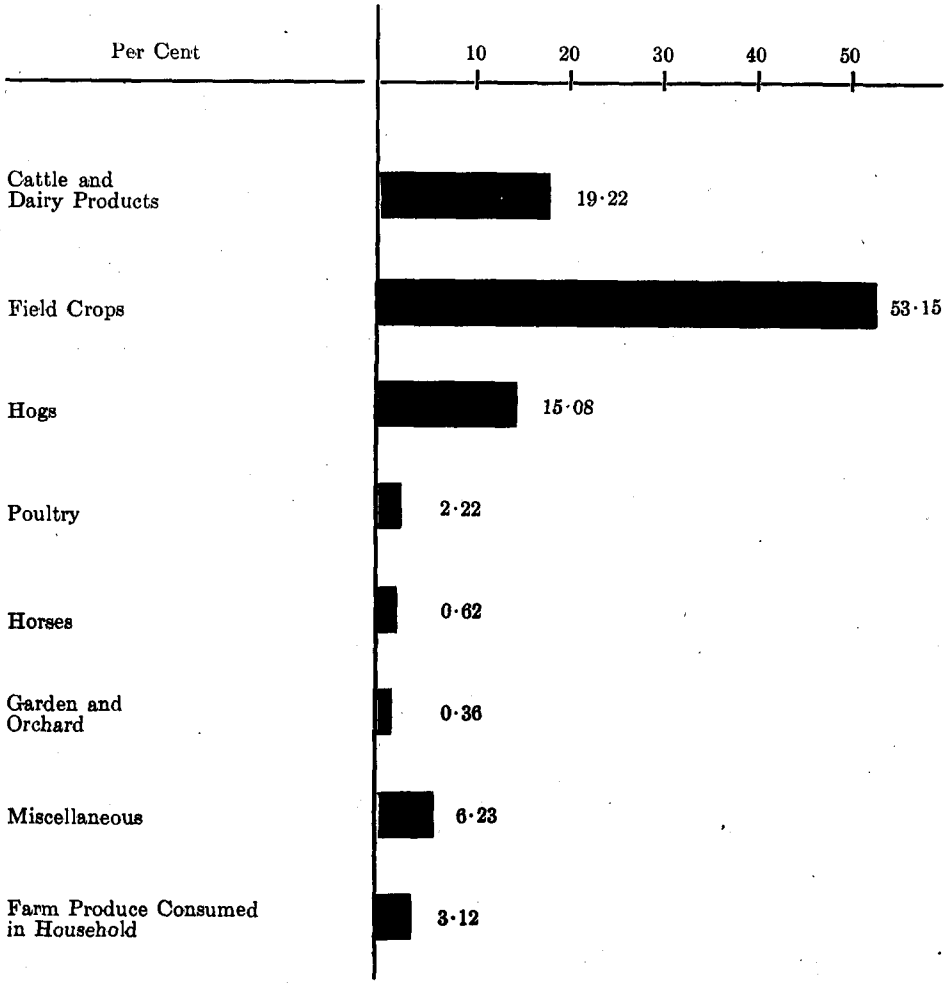
Station	Land and Buildings		Livestock		Machinery and Equipment		Total Capital	Investment per Acre	Gross Receipts per Acre Crop Land
	Amount	Per Cent of Total	Amount	Per Cent of Total	Amount	Per Cent of Total			
	$	%	$	%	$	%	$	$	$
Alameda	28,399.50	66·64	7,011.50	16·45	7,211.50	16·91	42,622.50	35.60	9.97
Arcola	14,411.50	69·45	2,411.50	11·62	3,929.50	18·93	20,752.50	33.31	12.09
Aylesbury	17,161.50	67·42	1,014.50	3·98	7,283.00	28·60	25,459.00	27.02	10.20
Calder	12,781.50	77·58	2,203.00	13·37	1,492.50	9·05	16,477.00	153.99	38.44
Lisieux	13,913.50	53·06	7,580.00	28·90	4,731.00	18·04	26,224.50	48.83	17.99
Radville	19,574.00	58·49	2,700.00	8·06	11,199.00	33·45	33,473.00	27.32	13.78
Strasbourg (Coles)	19,555.00	61·26	5,690.50	17·82	6,682.50	20·92	31,928.00	34.40	9.16
Strasbourg (Hooper)	6,840.00	61·29	410.00	3·67	3,911.00	35·04	11,161.00	26.11	16.37
Wawota	21,738.50	53·42	12,244.50	30·08	6,718.50	16·50	40,701.50	60·48	16·94
Yorkton	15,282.50	69·16	2,912.50	13·17	3,906.50	17·67	22,101.50	61.73	26.94
Total	169,657.50	–	44,178.00	–	57,065.00	–	270,900.50	–	–
Average	16,965.75	62·63	4,417.80	16·31	5,706.50	21·06	27,090.05	39.27	13.68

Sources of Revenue

A summary of business operations from the standpoint of sources of revenue is drawn up as of December 31 of each year. Average figures for the five-year period 1942 to 1946 inclusive are summarized in the following chart.

SOURCES OF REVENUE ON ILLUSTRATION STATIONS AND DISTRICT EXPERIMENT SUBSTATIONS IN SOUTHEASTERN SASKATCHEWAN

Average 1942-1946 Inclusive



Field crop sales constituted the main source of revenue during the five-year period, contributing 53·15 per cent to total receipts with cattle and dairy products, and hogs contributing 19·22 and 15·08 per cent respectively. Hog sales increased in volume from a low of 6·16 per cent in 1940 to a high of 19·40 per cent in 1944. Since 1944 there has been a fairly constant decrease to 13·48 per cent in 1945 and 11·57 per cent in 1946. Sales of cattle were at their peak in 1941 when revenue from this source comprised 26·37 per cent of gross

revenue. The low point for cattle was reached in 1944 when 16·36 per cent of gross revenue was received from this source. In this study farm produce consumed in the household is considered as a source of revenue and through the five-year period an average contribution of 3·12 per cent is recorded. Studies on labour income and labour earnings are also made to maintain an accurate check on the production potential of these station farms under different types of organization and management.

Feed and Seed Reserves

Every operator has a reserve of feed and seed sufficient to supply him with seed and carry his livestock through the winter. All the operators generally keep sufficient straw to carry them for a two-year period in case of a crop failure.

Field Days

A field day is held on each station at least every second year to familiarize the local farmers with the projects that are being carried on at the stations and the results obtained. During the past ten years a total of 79 field days was held with an average attendance of 125.

Projects

Livestock

HORSES

A-509	Breeding of Clydesdale Horses
A-298	Improving Type of Purebred Draft Horses
A-335	Exhibition Work with Horses
A-294	Periodic Costs of Rearing Horses
A-331	Cost of Keeping Work Horses
A-336	Cost of Maintaining Brood Mares

CATTLE

A-520	Breeding Shorthorn Cattle
A-521	Supplying Beef Sires at Reasonable Prices
A-526	Cost of Maintaining Breeding Cows
A-375	Cost of Raising Beef Bred Calves and Heifers
A-660	Serum Test for Contagious Abortion
A- 58	Record of Performance

SWINE

A-513	Breeding Yorkshire Swine
A-523	Selling Breeding Stock at Reasonable Prices
A-406	Control of Hairlessness in Litters
A-679	Advanced Registry Policy for Purebred Swine
A-919	Inbreeding and Prepotency Project with Swine.

POULTRY

P- 56	Pedigree Breeding for Egg Production (Barred Plymouth Rocks)
P- 79	Standard (Home Mixed) versus Commercial Mash
P-107	Methods of Feeding Layers
P-262	A Study of the Economics of Early Hatching

Cereals

I. Testing Varieties and Strains of Grains in Comparative Field Trials
Sub-project 1 Spring Wheat
" 3 Durum Wheat
" 4 Winter Wheat
" 5 Oats
" 6 Barley
" 7 Field Peas
" 8 Field Beans
" 9 Flax
" 11 Winter Rye

III. Rates and Dates of Seeding
Sub-project 49 Dates of seeding varieties of cereals

V. Production of Superior Varieties or Strains by Breeding and Selection
Sub-project 25 Spring Wheat, Durum Wheat
" 28 Winter Wheat
" 29 Oats
" 36 Barley
" 33 Flax, both brown and yellow seeded.

XI. Milling and Baking Studies
Co-operating in growing material.

XIII. Production of Elite Stock and Registered seed.

XIV. Incidental Investigations
Sub-project 62 Determination of varietal composition of farmers' samples.
103 and 104 Verification of Elite Stock seed and Registered seed for the C.S.G.A.
129 Seed Grade Test. Co-operating.

Forage Crops

Ag. 1 Indian Corn—Variety Tests for Ensilage Purposes.
Ag. 2 Indian Corn—Variety Tests for Production of Grain.
Ag. 16 Roots—Variety Tests.
Ag. 92 Triticum×Agropyron Hybridization.
Ag. 126 Alfalfa—Variety Tests for Hardiness, Yield and Suitability.
Ag. 137 Alfalfa—Factors Affecting Seed-setting.
Ag. 161 Sweet clover—Variety Tests.
Ag. 181 Soybeans—Variety Tests for Hay and Seed.
Ag. 240 Hay and Pasture Value of Oat Varieties.
Ag. 241 Pasture Value of Cereal Crops Under Different Methods of Grazing.
Ag. 246 Annual Hay Crops.
Ag. 255 Forage Crop Nursery.
Ag. 264 Perennial and Biennial Grasses and Legumes for Hay.
Ag. 267 Perennial and Biennial Grasses and Legumes for Pasture.
Ag. 267-B Tests for Grasses and Legumes Alone and in Combination, Primarily for Pasture.

Field Husbandry

F. 107 Three-year Rotation: "C", summerfallow, wheat, wheat.
F. 110 Three-year Rotation: "Pb", sweet clover, wheat, wheat.
F. 532 Five-year Combination Rotation: "Pa", summerfallow, wheat, sweet clover, oats and alfalfa left down for four years.

F. 135 Nine-year Rotation: "R", summerfallow, wheat, oats, hay, hay, hay and break, corn, wheat, oats.
F. 142 Sequence of Crops.
F. 144 (1A and 1B) Summerfallow Treatments in Two-and Three-year Rotations.
F. 146 Stubble Treatments.
F. 155 Dates of Seeding Spring Grain Crops (with and without fertilizer).
F. 169 Methods of Seeding Grasses and Legumes.
F. 194 Green Manure Crops.
F. 511 Rates of Applying Commercial Fertilizers for Wheat.
F. 513 Manure and Commercial Fertilizer Combinations for Wheat.
F. 568 A Comparison of Two High and Two Low Analysis Fertilizers on the Basis of Equal Quantities per Acre.
F. 616 Spring Treatment of Summerfallow Land.
F. 199 Cost of Producing Silage Crops.
F. 297 Cost of Producing Grain Crops.
F. 298 Cost of Producing Hay Crops.
F. 228 Meteorological Records.

HORTICULTURE

H. 815-A Tree Fruits, Variety Experiment, Apples
H. 815-B Tree Fruits, Variety Experiment, Plums
H. 793-A Bush Fruits, Variety Experiment, Currants
H. 793-B Bush Fruits, Variety Experiment, Gooseberries
H. 793-C Bush Fruits, Variety Experiment, Raspberries
H. 21 Variety Experiment, Strawberries
H. 882 Control of Lime-induced Chlorosis
H. 795 Leguminous Vegetables, Variety Experiment
H. 803 Root Vegetables, Variety Experiment
H. 804 Leafy Vegetables, Variety Experiment
H. 102 Corn, Variety Experiment
H. 805 Vine Crop Vegetables, Variety Experiment
H. 806 Solanaceous Vegetables, Variety Experiment
H. 819 Vegetables, Harvesting at Different Dates
H. 820 Vegetables, Seeding at Different Dates
H. 165 Potato, Distances of Planting
H. 261 Annual Flowers, Variety Experiment
H. 258 Annuals, Sown in Hothouse versus Sown in the Open
H. 797 Flowering Bulbs, Variety Experiment
H. 796 Bulbous Plants, Variety Experiment
H. 274 Herbaceous Perennials
H. 790 Flowering and Ornamental Shrubs, Variety Experiment
H. 307 Trees and Shrubs, Ornamental and Shelter
H. 298 Hedges, Variety Experiment
H. 295 Climbing Woody Plants

ACTIVE PROJECTS UNDER STUDY, 1937-1946

ILLUSTRATION STATIONS AND EXPERIMENT SUBSTATIONS

IS-W1.21 Two-year Rotation: Fallow, wheat.
IS-W1.22 Two-year Rotation: Fallow, coarse grain.
IS-W1.25 Two-year Rotation: Corn, wheat.
IS-W1.31 Three-year Rotation: Fallow, wheat, coarse grain.
IS-W1.32 Three-year Rotation: Fallow, wheat, wheat.

IS-W1.33	Three-year Rotation: Fallow, wheat, sweet clover or a mixture of clover and grass.
IS-W1.34	Three-year Rotation: Fallow, coarse grain, coarse grain.
IS-W1.36	Three-year Rotation: Wheat, oats, sweet clover hay.
IS-W1.44	Four year Rotation: Fallow, wheat, clover, oats or barley.
IS-W1.51	Five-year Rotation: Fallow, wheat, hay wheat, coarse grain.
IS-W1.55	Five-year Rotation: Fallow, wheat, hay, coarse grain, coarse grain.
IS-02.10	The Effect of Chemical Fertilizers on Cereals
IS-02.12	Root Fibre and Crop Residue in Soil Improvement
IS-03.01	Control of Weeds by Cultural Methods
IS-03.05	Cultural Treatments for Summerfallow
IS-03.06	Summerfallow Substitutes
IS-03.07	Soil Moisture Studies
IS-03.08	Strip Farming as a Control Measure for Soil Drifting
IS-04.02	Water Development Studies
IS-04.04	Planning New Farm Buildings
IS-04.08	Whitewashing and Painting of Farm Buildings
IS-05.01	Study of Regional Climatic Conditions as Related to Crop Production
IS-05.02	Records of Regional Precipitation
IS-06.04	Introducing Suitable Varieties of Cereals
IS-06.05	Testing Cereal Varieties
IS-06.06	Production of Registered and Pure Seed Grain
IS-06.13	Control of Wheat Stem Sawfly
IS-07.01	Testing Mixtures for Hay or Pasture
IS-07.05	Methods of Growing Grass and Legume Hays
IS-07.09	Methods of Producing Seed of Grass Plants
IS-07.13	Adaptation of Grasses and Legumes to Varying Regional Conditions
IS-08.06	Pasture Seeding and Management Studies
IS-09.01	Corn Growing for Seed and Forage
IS-10.03	Introducing Suitable Varieties of Potatoes
IS-11.02	Stimulating Interest in the Development of the Farm Garden
IS-11.03	The Establishment of a Farm Orchard
IS-11.07	Tree Fruit Variety Test
IS-11.09	Small Fruits Variety Test
IS-11.17	Farm Home Beautification
IS-11.18	Farm Shelterbelts
IS-12.02	Flax Variety Test
IS-12.19	Sunflower Variety Test (oil production)
IS-13.01	Dairy Cattle Improvement
IS-13.05	Sale of Livestock for Breeding Purposes
IS-13.06	Beef Production
IS-13.07	Swine Production
IS-14.01	Poultry Production
IS-14.04	Sale of Hatching Eggs, Pullets and Cockerels for Reproduction
IS-16.02	Records and Studies of Honey Production
IS-17.01	Yield and Cost of Producing Farm Crops
IS-17.03	Studies of Various Defects in Regional Farming (Study of Farm Productivity and Progress)
IS-17.04	Study of Farm Business
IS-17.07	Establishment of Feed and Seed Reserves
IS-19.01	Field Days
IS-19.02	Publications and Presentation of Results

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