DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

SCOTT, SASK.

REPORT OF THE SUPERINTENDENT

VICTOR MATTHEWS, B.S.A.

FOR THE YEAR 1926

Steers fed at Scott for marketing in Great Britain in 1926.

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DOMINION EXPERIMENTAL STATION, SCOTT, SASK.

REPORT OF THE SUPERINTENDENT, VICTOR MATTHEWS, B.S.A.

SEASON

The winter of 1926 was comparatively mild and the mean temperatures for January, February and March were higher than the normal means. The snowfall for the same three months was less than the fifteen-year average. The total average depth of snow on the level did not exceed 14 inches.

The crop season of 1926 opened with a backward spring—a temperature of 7.4° below zero was recorded in April. With the exception of 1920 this is the lowest temperature registered for April since this Station was established. Seeding was general by the first week in May which is about a week later than the average for the district. There was sufficient moisture to ensure germination and crop prospects were most favourable until the end of June. After July 10 by reason of drought, late-sown crops and stubbled-in crops dried out. In some cases these crops revived by the rains of the last week of August. Three degrees of frost on August 8 froze the late-sown grain crops of the district to a varying extent. Harvesting started August 8 and threshing August 20. Both operations were delayed by intermittent rains. Considerable grain sprouted while in the stook and both yields and grades were below the average for the district.

The precipitation at Scott for the year, August, 1925, to August, 1926, was 12.62 inches which was 1.01 inches below the average for the past fifteen years. The precipitation during the months of April and May was 1.63 inches more than the average for the same period. The precipitation for June and July—the two main growing months was 2.31 inches less than the average for the same period. The frost-free period, that is, the length of time between the

In order that the reader may have a general idea of the character of the less than the average for the past fifteen years.

In order that the reader may have a general idea of the character of the season, the dates of farm operations at the Experimental Station are listed in the subjoined table.

FARM OPERATIONS

Dates of Farm Operations	Begun	Finished
Work on land	April 20	Nov. 6
Seeding wheat	" 28	May 7
" oats	May 8	" 18
" barley	" 15	" 15
" corn	" 18	" 18
" sunflowers	" 12	" 19
Planting potatoes	" 19	" 19
Seeding fall rye	Sept. 8	Sept. 8
Spring ploughing	April 20	May 7
Ploughing summer-fallow	May 20	June 15
Cultivating summer-fallow	" 13	Oct. 4
Cutting hay	June 25	July 12
" fall rye	July 29	" 29
" wheat	Aug. 8	Sept. 8
" oats	" 27	" 8
" barley	" 29	" 8
Ensiling sunflowers	Sept. 10	" 24
Digging potatoes	" 18	" 18
Threshing	Aug. 20	Oct. 2
Fall ploughing	Oct. 5	" 8

	Temperature, °F.						Precipitation (inches)				Sunshine		Wind Miles	Evaporation Inches
	Mean		Maximum		Minimum		Rain	Snow	Total Precipitation		Sunshine (Hrs.)			
	1926	Average 15 years	Highest	Mean Maximum	Lowest	Mean Minimum			1926	Average 15 years	1926	Average 15 years		
January	11·70	−0·16	40·9	20·03	−30·0	3·37	.....	4·75	0·48	0·61	74·2	85·9	8647	.....
February	11·17	3·30	39·7	20·26	−32·0	2·07	.....	12·25	1·23	0·54	84·7	114·5	7473	
March	17·94	13·83	46·3	28·76	−7·4	7·12	.....	0·50	0·05	0·54	194·7	160·0	9306	
April	37·39	37·80	77·3	49·81	−7·0	24·97	0·86	0·50	0·91	0·87	235·9	214·3	9615	
May	51·48	49·27	83·1	63·81	20·1	39·15	2·97	.....	2·97	1·35	218·7	263·0	10495	5·13
June	54·35	57·53	88·9	66·83	31·0	41·87	1·39	.....	1·39	2·12	271·5	273·5	9660	2·92
July	64·98	62·37	98·9	80·14	37·0	49·81	0·75	.....	0·75	2·32	305·4	304·5	8464	7·65
August	58·38	60·33	92·6	72·29	29·0	44·46	2·52	.....	2·52	2·05	232·2	258·2	8253	3·87
September	43·04	49·84	70·1	53·62	14·9	32·47	0·55	1·87	0·74	1·41	130·2	177·4	7798	1·77
October	37·40	37·84	70·0	48·84	9·9	26·38	0·55	0·56	0·61	0·65	114·9	147·5	9397	0·83
November	14·69	22·8	55·5	22·30	−18·9	7·07	.....	8·31	0·83	0·36	50·3	102·6	7233	
December	0·11	7·59	47·0	8·45	−40·0	−8·24	.....	10·90	1·09	0·54	79·2	81·2	10752	
Totals	.....	.....	.....	.....	.....	.....	9·59	39·64	13·57	13·36	1,991·9	2,182·6	107903	22·17

CEREALS

The experimental work in cereals is under the supervision of Mr. F. M. MacIsaac, B.S.A. Mr. MacIsaac is also in charge of the forage crop investigational work carried on at this Station.

CEREAL WORK AND METHODS EMPLOYED

The chief work in cereals is to test and make selections from varieties or strains of cereal grains, peas, beans and flax in order to determine their value in the various districts served by the Station.

The different steps involved in endeavouring to attain this purpose are as follows:—

1. Testing already existing varieties or strains with a view to determining their comparative value under northwestern Saskatchewan conditions.

The rod-row system of testing lends itself admirably to this phase of the work; a large number of sorts may be tested over a small area. All new introductions are subjected to careful investigation for yield, strength of straw, non-shattering qualities and attitude toward disease. In the case of wheat milling and baking tests also play an important part in the value of a variety and in barley the malting qualities are considered. Samples of wheat after harvest are forwarded to the Cereal Division, Experimental Farm, Ottawa and to some of the leading milling companies for test purposes. The brewing qualities of barley are determined at the laboratories of the Canadian Malting Company.

2. Making head selections from the most promising varieties or strains.

By careful observation an occasional head or panicle may be noticed that seems to deviate from the normal. These heads may be selected from plots on the Station, the fields of the surrounding country or may be sent in by farmers. The seed from the individual heads is seeded separately in head-rows the following spring and during the growing season special attention is paid to the progeny of these heads. The most promising rows are harvested and sown in small increase plots the following year in the hope that some may mark the beginning of a superior strain.

3. Testing hybrids sent out by the Cereal Division, Central Experimental Farm, Ottawa.

A hybrid is the result of a cross between two different types or strains. Cross-breeding is done with a view to combining a greater number of desirable characteristics than is found in any of the existing sorts. Practically all of the work of hybridization thus far has been done at the Central Farm, Ottawa. The plan of having these crosses sent to the branch Farms has been introduced within the last two years. All crosses are undertaken with some definite purpose in mind. Careful studies are made of the progeny from each cross for a few generations at the Central Farm after which a part of the seed from the most promising families is sent to the branch Farms and Stations. Here they are grown for at least two or three years before any intensive selection work is undertaken. Finally a large number of forms may be studied, the greater percentage of which may be expected by this time to breed fairly true. The most promising types are subjected to exacting tests with the hope of finding one at least that may prove of outstanding value for the district.

TEST OF FARMER'S SELECTIONS

Each year sees a keener interest by the farmer in the question of better cereal crops; this is especially so of wheat, which fact is evidenced by the numerous selections farmers have been making from their own fields. Of the eighty-six varieties, hybrids and selections of wheats which have been tested

during the past season, twenty-one have been selections sent in by farmers at different times. This is no doubt encouraging; nevertheless, all such selections must be carefully tested and approved before any of them can be allowed to get into the hands of the public. Too often the farmer is concerned chiefly with an increase in yield paying little or no attention to strength of stray, resistance to disease or relative purity.

The greatest effect found in most selections sent in by farmers has been that of impurity. It is a common occurrence to find two or three distinct types within one so-called selection. This mixture may be due to the result of a natural cross or it may be a mechanical mixture. It sometimes happens that these mixtures appear to be very productive and are increased to the point where they are being used exclusively and with satisfaction on individual farms. The apparent productiveness of such mixtures usually may be attributed, however, to better cultural methods rather than to any special merit within the selection itself.

It is unfortunate that there are in commercial use to-day so many wheats which have originated in this above manner and which have not been tested thoroughly. Many of these, we find, have no advantage in point of yield over the variety from which the selection was made, while they have the disadvantage of being mixed. The farmer when making selections is recommended to send a sample of seed to his nearest Experimental Station where it may be compared with the leading varieties and its merits and demerits reported on before he attempts to multiply it.

CEREAL CO-OPERATORS

The farmer is informed from time to time through Experimental Farm reports and other agricultural agencies of the many varieties of wheat now in existence. He may be in the northern districts where early frosts may occur, in southeastern parts where rust may take its toll, or in the southwest portions where drought usually is the limiting factor in yield. Widely varied climatic conditions and many distinct types of soil present a different set of conditions for each district and the farmer is naturally asking himself the question "Why not give some of the other varieties a trial?" Already in northern and eastern parts of the province some growers are trying out earlier varieties while in drier areas some are considering going back to the old Red Fife. At present the farmer is confronted with the problem as to which is the best variety to grow. In an effort to solve this question the Cereal Division at the Central Experimental Farm Ottawa in 1924 adopted the system of sending five or six of the most promising varieties to farmers in different sections of the Prairie Provinces. The work has increased each year. This year it was taken up also by the branch Farms. On account of some farmers writing too late, this Station was able to supply only five farmers with seed. The plan of procedure followed in testing out the varieties on the farms is outlined in detail in a circular which is sent free on application. A form also is sent with the seed, which has to be filled in by the farmer who records his observations and gives his own opinion as to the value of the variety for his particular district. A member of the Experimental Station staff visits each co-operator during the growing season. In addition to this, soil samples are taken from each of the plots at the time of visiting. With a knowledge of the types of soil for the different districts and the yields of the several varieties tested it should be possible after a number of years to define "zones" wherein certain varieties may be fairly safely recommended.

TEST OF SEED FROM FARMERS' GRAIN-DRILLS

The past spring at seeding time seed wheat was taken from several of the farmers' grain-drills in the district and seeded in rod rows to be compared with similar varieties grown in the Variety Rod-Row Block. About half of the

varieties taken from the drills subsequently showed poor germination and lacked vigour as compared with the check plots. In almost every case two or three off-types were found in each farmer's variety.

The greatest value from an experiment of this kind is derived when the farmer visits this Station in the growing season and compares the stand, vigour and purity of his wheat with a pure variety of the same sort grown under identical conditions.

The use of pure seed is very important. Where mixed varieties are employed the off-types may ripen earlier than the main variety in which case loss is incurred from shattering. When these types ripen later, immature kernels result and these lower the grade.

SEASON

The 1926 crop season was only moderately favourable for the production of cereals. Seeding was general by the first week in May, which is about a week later than the average for the district. There was ample moisture for germination, excellent stands were secured and all crops got away to a good start. The precipitation for April and May was 3.88 inches as compared with a fifteen-year average of 2.22 inches for the same period. Although there was an abundance of moisture in the early part of the season the weather continued cold and cloudy. Crops tillered more abundantly than usual and looked healthy but were still backward by the middle of June. During the latter part of June the weather began to warm up with a corresponding falling off in precipitation until by July 10 the effect of drought was noticeable, continuing from then on until the rains of the first week in August. The precipitation for June and July —the two main growing months—was only 2.14 inches, about half of which came by the middle of June. Nevertheless, all the cereal crops at this Station stood the drought remarkably well, especially the barley, and the yields harvested were about average for the district.

TEST OF VARIETIES

The ordinary standard varieties were tested as usual in duplicate on one-fortieth-acre plots. All varieties grown on the plots were further tested in the rod-row plots. The rod-row work was increased considerably this year. Including named varieties, hybrids and selections, there were tested eighty-six of wheat, forty-one of oats, thirty of barley, twenty-four of spring rye, nine of peas and one each of emmer and speltz, making a total of 192. With the exception of a few selections from each of the different kinds of grain, all tests in the rod-row plots were carried on in quadruplicate. Head-row work was increased more than any other phase of cereal work. The chief feature of this work was the trying out of new selections and testing the purity of the different varieties. Over 1,300 plots were devoted to this work.

TREATMENT OF SEED.—The results of co-operative experiments carried on with the Dominion Rust Research Laboratory, Winnipeg, have proved that copper carbonate controls bunt or stinking smut of wheat satisfactorily. It is essential that each kernel be thoroughly coated. The dust should be used at the rate of two to three ounces per bushel. Copper carbonate is also an effective treatment for hulless oats. It does not injure the germination of the seed and effectually controls the loose smut. During the past two years all varieties of wheat, oats and barley tested in the rod-row plots were treated with copper carbonate, with the result that smut was successfully controlled in the wheat and the hulless varieties of oats and barley. In cases were the treatment was effective in the rod-rows a further trial was given this year on the fortieth-acre plots with similar results. The advantage of the copper carbonate treatment is that the seed may be treated some time before seeding and that it does not impair the germination of the seed. In the case of ordinary varieties of oats, formaldehyde is still probably the most effective treatment.

DISEASES AND INSECTS.—With the exception of the year 1916 rust has done very little damage in the Scott district. An occasional pustule may be noticed on some of the later maturing varieties but very seldom is it far enough advanced to reduce the yield. Smut, on the other hand, is fairly common, but this can be controlled in most cases by treatment of the seed. Halo Blight (bacterial disease) was the only disease found in the oat varieties. It did very little damage if any to the yield. In the case of barley, four diseases were present, but these occurred only in small amounts—False stripe (*Helminthosporium gramineum*), Spot Blotch (*Helminthosporium sativum*), Net Blotch (*Helminthosporium teres*) and Bacterial Blight (*Bacterium translucens*). These forms affected the varieties to a varying extent, but were not so severe as last year. Root-rot was found in many of the fields, and no doubt caused some damage to the yield. The attack of saw-fly caused considerable damage, breaking down in some cases as high as 10 per cent of the stems. The Fife and Durum varieties were only slightly affected. This may be partly due to their later maturity.

SPRING WHEAT

Fifteen varieties were tested on summer-fallow land. The date of seeding was April 29 and the rate 1½ bushels per acre. The weather during the latter part of July was not conducive to the proper filling of the grain. Threshed samples showed the kernels to be slightly shrunken. This was not so apparent in the later maturing varieties which benefited to some extent by the August rains. All varieties graded No. 2. Three degrees of frost on August 8 froze the late-sown crop of the district to a varying extent depending on the stage of development of the kernel and the topography of the land. As a result of the frost both yield and grade were considerably reduced. Delayed harvest and threshing operations on account of rainy weather caused the grain to sprout while in the stook, which further reduced the grade. Both yields and grades for the district were below the average.

Following are presented the 1926 results:—

WHEAT—TEST OF VARIETIES OR STRAINS

Name of Variety	Date of Ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre	Comparative Yields (Marquis =100)	Weight per measured bushel after cleaning
			inches		bushels	per cent	lb.
Garnet, Ottawa 652	Aug. 7	100	29·5	9·6	30·9	127·2	60·0
Early Triumph	" 14	107	30·0	10·0	28·4	116·9	60·5
Reward, Ottawa 928	" 9	102	31·0	9·6	28·0	115·2	61·0
Red Bobs	" 15	108	29·0	10·0	26·9	110·7	60·0
*Reliance	" 18	111	26·0	10·0	26·1	107·4	60·5
Supreme	" 17	110	28·5	10·0	25·1	103·3	61·0
Kitchener	" 26	115	28·5	10·0	24·9	102·5	61·0
Marquis 10 B	" 20	113	29·0	10·0	24·7	101·6	61·0
Marquis, Ottawa 15	" 20	113	29·5	10·0	24·3	100·0	61·5
Crown, Ottawa 353	" 10	103	27·5	10·0	23·7	97·5	58·5
Early Red Fife, Ottawa 16	" 23	116	30·0	9·6	23·1	95·1	63·0
Red Fife, Ottawa 17	" 24	117	28·0	9·8	22·7	93·4	61·5
Acme Sask 450	" 27	120	31·0	8·0	21·5	88·5	62·5
Golden Sask 731	" 19	112	29·0	10·0	20·4	84·0	61·0
Kubanka Sask 6	" 26	119	34·5	8·5	20·0	82·3	62·0

* NOTE—Single Plot Only.

It will be noted that Garnet leads in point of yield. Other early and medium early varieties have also outyielded Marquis, with the exception of Crown. The only new introduction this year was Reliance sent out by the

Cereal Division, Ottawa, and which was procured from Mandan, North Dakota. Reliance is a bearded variety resulting from a cross between Marquis and Kanred. It was rather short in the straw, slightly earlier than Marquis, and uniform in stand.

For origin and description of other varieties the reader is referred to the 1925 report.

The relative value of the yields varies annually. That is, a variety may be above Marquis in yield one year and the same variety may be below Marquis

Garnet wheat at Scott, in background, ready to cut. Marquis, in foreground, seeded at same time, still green.

another year due to changes in soil and climatic conditions. For this reason the four- and eight-year averages tabulated in the following table are a truer index of the comparative value of the different varieties.

WHEAT—FOUR- AND EIGHT-YEAR AVERAGES

Name of Variety	Yield of Grain per acre	
	Four-year Average	Eight-year Average
	bushels	bushels
Kitchener	28·1	26·2
Red Fife, Ottawa 17	25·8	24·6
Marquis, Ottawa 15	26·7	24·0
Garnet, Ottawa 652	28·5	23·1
Red Bobs	30·6	....
Early Triumph	30·2	....
Supreme	29·8	....
Acme, Sask 450	26·8	....
Marquis 10 B	26·5	....
Kubanka, Sask 6	26·1	....

OATS

Fifteen varieties of oats were tested on summer-fallow land in 1926. All plots were seeded May 8 at the rate of 2 bushels per acre, excepting the hulless varieties, which were seeded at the rate of 1¼ bushels. In so far as stand and vigour of growth were concerned all varieties made a good showing. However, on account of the oats maturing in a shorter period than wheat, they were caught in a more critical stage by the drought. The filling was checked, with the result that the percentage of light kernels was higher than usual. The August rains came too late to benefit the yields materially.

The 1926 results as presented in the following table are slightly below the average for the Station.

OATS—TEST OF VARIETIES OR STRAINS

Name of Variety	Date of Ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre	Comparative yields (Banner =100)	Weight per measured bushel after cleaning
			inches		bushels	per cent	lb.
Banner, Ottawa 49	Aug. 17	101	32·0	9·5	58·4	100·0	39·0
Banner, Sask 144	" 18	102	32·0	9·4	58·1	99·5	37·5
Gerlach, Sask	" 19	103	31·5	9·3	55·3	94·7	39·0
Legacy, Ottawa 678	" 9	93	31·5	9·7	54·7	93·7	39·0
Leader	" 18	102	33·5	9·2	54·6	93·5	36·5
Alaska	" 3	87	31·0	9·4	52·5	89·5	34·5
Victory	" 19	103	32·5	9·3	51·1	87·5	40·5
Columbian, Ottawa 78	" 20	104	32·0	9·7	50·6	86·6	41·0
O.A.C. No. 3	" 4	88	30·0	9·8	50·5	86·5	35·0
Gold Rain	" 16	100	31·5	10·0	50·1	85·8	40·0
Cole, Sask. 795	" 1	85	30·0	9·8	48·7	83·4	30·0
Longfellow, Ottawa 478	" 12	96	33·0	9·0	46·6	80·0	38·5
Prolific, Ottawa 77	" 20	104	32·0	9·6	41·6	71·2	39·0
Laurel, Ottawa 477 (hulless)	" 13	97	33·0	9·7	39·4	67·5	51·0
Liberty, Ottawa 480 (hulless)	" 11	95	37·0	9·5	38·4	65·8	49·0

Through correspondence and conversation with visitors the impression is gained that there is a feeling among the farmers toward trying out other varieties than Banner. It is also ascertained from the same sources that some farmers are already using other varieties such as Victory, Leader and Abundance. Victory is about equal to Banner in point of yield and produces a fine sample of grain. Nevertheless, at this Station, its yield is not so consistent as Banner and varies considerably from year to year. Leader is a side-oat and compares favourably with Banner in yielding qualities. It usually carries a rather high percentage of hull, is shorter and coarser in the straw and has no qualities to recommend it over Banner. Abundance is a medium-early-maturing variety, with straw slightly shorter than Banner but of good strength. Its short plump kernels are attractive in appearance. This variety, however, has been dropped from the test both at this and other Stations on account of its relatively low yield. Legacy, an early maturing variety sent out from the Central Experimental Farm, Ottawa, in 1925, has made a good showing in the two years tested.

The five- and twelve-year averages tabulated in the following table are a more authentic guide to the relative value of the varieties under test.

OATS—FIVE- AND TWELVE-YEAR AVERAGES

Name of Variety	Yield of Grain per acre	
	Five-year Average	Twelve-year Average
	bushels	bushels
Banner, Ottawa 49	62·2	66·4
Gold Rain	63·5	65·8
Victory	60·5	65·5
Gerlach, Sask	63·5	....
Leader	62·3	....
Longfellow, Ottawa 478	55·5	....
Alaska	47·2	....
Liberty, Ottawa 480 (hulless)	37·1	....

BARLEY

During the season of 1926 thirteen varieties of barley were tested on summer-fallow land. All varieties were seeded on May 12 at the rate of 2 bushels per acre, excepting the hulless varieties which were seeded at the rate of $1\frac{3}{4}$ bushels. Barley stood the drought better than any other class of cereal grains. Excellent stands were secured in all varieties and the yields harvested were above the average for the Station. Following are tabulated the 1926 results:—

BARLEY—TEST OF VARIETIES OR STRAINS

Name of variety	Date of Ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre	Comparative yields (O.A.C. 21=100)	Weight per measured bushel after cleaning
			inches		bushels	per cent	lb.
Hannachen	Aug. 15	95	25·0	9·4	43·3	131·2	54·0
Chinese, Ottawa 60	" 12	92	26·0	9·3	39·2	118·8	48·5
Gold	" 18	98	23·0	9·5	38·3	116·0	53·5
Trebi	" 10	90	25·0	9·5	37·3	113·0	48·0
Barks Excelsior	" 20	100	25·0	9·7	35·5	107·6	48·0
Swedish Chevalier	" 24	104	25·5	9·5	34·4	103·9	51·0
Bearer, Ottawa 475	" 21	101	28·5	9·7	33·7	102·1	51·0
O.A.C. 21	" 12	92	28·0	9·3	33·0	100·0	49·0
O.A.C. 21, Sask. 228	" 11	91	27·0	9·4	30·8	93·3	49·5
Himalayan, Ottawa 59 (hulless)	" 3	83	28·0	9·0	28·6	86·7	61·5
Feeder, Ottawa 561	" 3	83	30·0	9·5	27·9	84·5	49·5
Duckbill, Ottawa 57	" 23	103	25·0	10·0	26·9	81·5	52·0
Junior, Ottawa 471 (hulless)	July 31	80	28·0	8·8	22·3	67·6	59·0

It will be noted that Hannchen, a two-rowed type, leads in point of yield both in the 1926 results and the three-year average. It is of fair length and strength of straw in this district and threshes a nice sample of grain from which the awns separate fairly easily. The only new variety introduced this year was Gold, another two-rowed sort. From a one year's trial it has produced a good yield. The straw was rather short and of fairly good strength.

For origin and description of other varieties the reader is referred to the 1925 report.

A safer guide to the comparative value of the different varieties under test may be obtained from the three- and six-year averages as tabulated in the subjoined table.

BARLEY—THREE AND SIX-YEAR AVERAGES

Name of Variety	Yield of Grain per acre	
	Three-year Average	Six-year Average
	bushels	bushels
Barks Excelsior	30·8	34·7
Himalayan, Ottawa 59 (hulless)	28·7	32·0
O.A.C. 21	28·3	32·0
Chinese, Ottawa 60	29·7	31·0
Duckbill, Ottawa 57	28·6	30·9
Hannchen	37·3	....
Trebi	35·9	....
Bearer, Ottawa 475	32·6	....
O.A.C. 21, Sask 228	29·3	....
Junior, Ottawa 471 (hulless)	26·6	....
Feeder, Ottawa 561	23·5	....

PEAS

Six varieties of peas were tested on summer-fallow land during the past season. The plots were seeded on May 8 at the rate of 1½ to 2½ bushels per acre, depending upon the size of the seed sown. Uniform stands were secured in all varieties and good average yields were harvested. Results are summarized in the accompanying table:—

PEAS—TEST OF VARIETIES

Name of Variety	Date of Ripening	Number of days Maturing	Average length of vine	Average length of pod	Yield of grain per acre
			inches	inches	bushels
Chancellor, Ottawa 26	Aug. 9	88	35·0	2·0	25·8
Golden Vine, Sask. 625	" 11	90	31·0	2·0	24·7
Arthur, Ottawa 18	" 25	104	32·5	2·3	22·0
MacKay, Ottawa 25	Sept. 2	112	35·5	2·3	22·0
Cartier, Ottawa 19	Aug. 29	108	35·5	2·3	21·2
*Solo	" 31	110	36·0	2·4	18·7

*Note—Single Plot only.

FLAX

Three varieties of flax were tested in 1926 on summer-fallow land. The plots were seeded on May 26 at the rate of ½ bushel per acre. None of the varieties made a very good showing. Spring growth was very slow and no variety was far advanced when the dry weather set in. The greatest progress in growth was made after the August rains. A frost of three degrees on August 8 injured the balls to only a slight extent. However, as the flax did not ripen early, considerable of it was frozen with the more severe frosts of September. Breaking over of the stems was less severe than usual, the Premost variety was the least affected in this respect. The yields are slightly below the average with no variety outstanding over a duration of years.

Following are tabulated the 1926 results, together with the five-year average:—

FLAX—TEST OF VARIETIES

Name of Variety	Date of Ripening	Number of days Maturing	Average length of straw	Strength of straw on a scale of 10 points	Yield of Grain per acre	
					1926	Five-year Average
			inches		bushels	bushels
Premost	Oct. 1	128	17·5	10	8·2	9·8
Crown, Sask	" 1	128	16·5	10	7·9	9·4
Novelty, Ottawa 53	" 1	128	16·0	10	7·5	9·1

WHEAT AND FLAX—COMBINATION CROP

An experiment has been conducted for the past four years to determine whether flax and wheat grown in combination would produce yields of greater value than where each is grown separately. Several seedings were made each year varying the proportions of wheat and flax sown. Two seedings were made for each plot—wheat first, followed by flax. It will be noted that the yields of flax grown in combination with wheat are abnormally low. The flax does not get started as quickly in the spring as the wheat. It continues to keep considerably behind the wheat in stage of development during the growing season. As a result of the backward growth of the flax, the plants are weak and always at a disadvantage in the fight for plant-food when compared with the more vigorous wheat plants. Moreover, the wheat plants are taller and shade the flax for most of the growing season, thus further retarding its growth.

It is obvious from the following table that the net returns would be greater from wheat alone than from any of the plots sown in combination. Only once in the four years that the experiment has been under way have any of the yields of flax been significant. Following are presented the 1926 results:—

WHEAT AND FLAX—COMBINATION CROP

Kind of Grain	Rate Sown per acre		Height at Harvest in inches		Yield of Grain per acre	
	Wheat	Flax	Wheat	Flax	Wheat	Flax
	bushels	bushels			bushels	bushels
Wheat and flax	¾	¼	26	13	20·4	0·52
Wheat and flax	1	¼	27	12	22·7	0·36
Wheat and flax	1¼	¼	28	12	21·2	0·38
Wheat and flax	¼	¼	28	13	21·9	0·48
Wheat and flax	½	½	26	14	21·2	0·57
Wheat (alone)	1½	.....	28	.....	29·8	
Flax (alone)	.....	½	.....	19	.....	13·4

SPRING RYE AND EMMER

One variety each of spring rye and emmer were seeded on summer-fallow land on May 12. It will be observed that spring rye has given an average yield of 11·1 bushels per acre over emmer for a period of five years.

Following are tabulated the 1926 results together with the five-year average:—

TESTS—SPRING RYE AND EMMER

Name of Variety	Date of Ripening	Number of days Maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of Grain per acre	
					1926	Five-year Average
			inches		bushels	bushels
Spring rye (Prolific)	Aug. 24	104	40	8	30·6	32·7
Early Emmer, Ottawa 44	" 25	105	27	10	17·6	21·6

FALL GRAINS

Two varieties of fall rye and two of fall wheat were seeded in the fall of 1925.

The plots were seeded in duplicate on summer-fallow land. Both varieties of fall wheat winter-killed. In the case of the fall rye about 10 per cent of the common variety winter-killed while the Dakold came through the winter with about 100 per cent stand.

The yields per acre are as follows: Dakold, 30·4 bushels; common, 25·4 bushels.

FIELD HUSBANDRY

CROP ROTATIONS

Eight rotations are in operation and these include straight grain crops, grain with hay and pasture crops, grain with hay and sunflowers, grain with hay and summer-fallow substitutes. The total area devoted to investigational work in crop rotations is approximately 200 acres. The object of devoting such a large area to this work is to determine, if possible, under field conditions, what sequence of crops is most profitable. Small plots are employed to check the fertility of the land from each arrangement of crops, which work is undertaken in co-operation with the Chemistry Division, Experimental Farm, Ottawa. The findings to date are published in Bulletin No. 44, New Series, dealing with the "Influence of Grain-Growing on the Nitrogen and Organic Matter Content of the Western Prairie Soils of Canada." Copies of this may be secured from the Publication Branch, Department of Agriculture, Ottawa.

COST OF PRODUCTION

Records are kept each year of all items of expense and returns, based on current prices paid during each year. The cost of production is figured on the basis of an acre for each of the crops. The charges against the summer-fallow include rent, machinery and labour, and the cost of summer-fallowing is divided on the basis of two-thirds of the cost charged to the first crop, and one-third charged to the second crop after the summer-fallow. The cost of the grass and clover seed is distributed equally against each hay and pasture crop in the rotation.

The cost and return values for the season of 1926 are listed in detail for the information of the reader. During the years 1912 to 1925 inclusive, the actual time incurred for each operation was carefully noted and recorded

against each field. This year a fixed charge for each operation was used per acre in order to give all rotations the same charge per acre irrespective of the size and shape of the fields.

COST VALUES FOR THE SEASON 1926

Rent and taxes	per acre	$2 60
Manure	per ton	1 00
Ploughing	per acre	1 75
Packing	"	0 25
Harrowing	"	0 20
Cultivating	"	0 50
Disking	"	0 55
Seeding	"	0 35
Cutting	"	0 40
Machinery	"	1 35

COST VALUES FOR THE SEASON 1926

Seed wheat	per bushel	$2 00
Seed oats	"	0 85
Seed barley	"	1 20
Seed rye	"	1 00
Sunflower seed	per pound	0 09
Sweet clover seed	"	0 10
Western rye grass seed	"	0 10
Twine	"	0 16
Manual labour	per hour	0 30
Horse labour per horse	"	0 08
Threshing, wheat	per bushel	0 14
Threshing barley	"	0 12
Threshing oats	"	0 10
Threshing rye	"	0 14

RETURN VALUES FOR THE SEASON 1926

Wheat	per bushel	$1 30
Oats	"	0 51
Barley	"	0 60
Rye	"	0 90
Western rye hay	per ton	8 00
Sweet clover hay	"	8 00
Sunflower ensilage	"	3 50
Oat straw	"	2 00
Barley straw	"	2 00
Pasture, one cow or horse	per month	1 80
Pasture, one sheep	"	0 45

ROTATION "C" (THREE YEARS' DURATION)

First year—Summer-fallow.
Second year—Wheat.
Third year—Wheat.

The three-year system of cropping is followed by the majority of farmers in this district and is likely to continue as a practice for some years. One-third of the land is fallowed each year and two-thirds of the land is cropped.

This rotation was started in 1912 and consists of three 1½-acre fields. The summer-fallow field is usually ploughed for summer-fallow in June to a depth of 6 inches, packed and harrowed after ploughing and kept clear of weeds throughout the summer by cultivating with a duck-foot cultivator. From two to three cultivation are usually found necessary to keep the weeds in check. Previous to seeding on summer-fallow the land is either harrowed or cultivated, depending on the condition of the soil. The first crop stubble is spring-ploughed, packed and harrowed previous to drilling.

SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS (PER ACRE)

Crop	Yield per acre		Value of crop 1926	Cost of production 1926	Profit or loss per acre	
	1926	Average fifteen years			1926	Average fifteen years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow	.....	.....	.....	7 85	−7 85	−6 82
Wheat—Marquis	13·3	19·1	17 29	10 46	6 83	10 33
Wheat—Marquis	14·7	17·0	19 11	12 36	6 75	6 39
Average per acre	.....	.....	12 13	10 22	1 91	3 30

It will be observed that the yield of wheat following wheat this season was 1·4 bushels more than the yield on summer-fallow. On the other hand, the average yield of wheat following wheat for fifteen years is 2·1 bushels less than the yield on summer-fallow.

The cost per bushel of wheat was $1.18 for the first crop on summer-fallow and $1.02 for the second crop following summer-fallow. The higher cost of the wheat on summer-fallow is due to two factors: first, the lower yield, and second, to charging two-thirds of the cost of summer-fallowing against the crop.

ROTATION "J" (SIX YEARS' DURATION)

First year—Summer-fallow.
Second year—Wheat.
Third year—Wheat.
Fourth year—Oats seeded down.
Fifth year—Hay.
Sixth year—Hay or Pasture.

This rotation was started in 1912 on small fields and after five years' trial it was transferred to six 20-acre fields, using in all 120 acres of land. It will be noticed one-half the area is in grain each year, one-third in hay and pasture, and one-sixth in summer-fallow.

During the years 1918 to 1924 inclusive, oats were grown as a second crop after summer-fallow. In the past two years wheat was grown in the place of oats, for the reason that in ordinary farm practice a greater acreage would be in wheat on account of wheat being the major cash-crop.

The increased interest shown in rotations by people of the prairies is very marked. There has been a large demand for information on seeding to grasses and clovers and a number of farmers are now following Rotation "J" in detail. Each year as more land comes under cultivation Prairie Wool becomes scarcer and the farmer with much live stock is obliged to provide a certain amount of cultivated hay to use in conjunction with straw as a winter feed.

No difficulty has been experienced in obtaining a catch of grass during the fifteen years Rotation "J" has been in operation. The system followed in seeding down is to mix the western rye grass and sweet clover with the oats and sow the mixture with the grain-drill at the rate of 2 bushels of oats, 12 pounds of western rye grass and 6 pounds of sweet clover per acre. The drill is actually set to sow 2 bushels and 3 pecks of oats. Owing to the bulky nature of the rye grass seed, this rate of sowing is necessary in order to sow the required amount of seed per acre. The first year's crop is usually taken off for hay and the second year's crop pastured. The aftermath from the hay crop together with the stubble fields supply considerable fall pasture. Sod land to be summer-fallowed is usually ploughed the middle of June, packed and

harrowed, and given one or more cultivation later in the season to check weed growth. Both the stubble of the first and second crop are spring-ploughed, packed and harrowed before seeding.

SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS (PER ACRE)

Crop	Yield per acre		Value of crop 1926	Cost of production 1926	Profit or loss per acre	
	1926	Average fifteen years			1926	Average fifteen years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow	.....	.....	0 83	6 85	−6 02	−6 53
Wheat—Marquis	21·5	25·2	29 04	11 80	17 24	15 95
Wheat—Garnet	14·8	19·7 (9-yrs.)	21 12	12 97	8 15	6 86
Oats (1919–24)	.....	38·3 (6-yrs.)	.....	.....	.....	.....
Oats—Banner	26·2	45·9	14 26	11 55	2 71	6 75
Hay	tons 0·90	tons 0·92 (11-yrs.)	9 07	7 63	1 44	2 02
Hay or pasture	.....	.....	5 10	4 85	0 25	1 42
Average per acre			13 24	9 28	3 96	4 41

The average yields for the fifteen-year period are much higher than for the crop year 1926. The yield of wheat on summer-fallow is 8·2 bushels in excess of the yield of wheat on summer-fallow on Rotation "C" (Summer-fallow, Wheat, Wheat).

The 1926 figures for the cost per bushel of wheat on summer-fallow was 74 cents, wheat following wheat $1.01 and oats following two crops of wheat 44 cents.

ROTATION "P" (EIGHT YEARS' DURATION)

First year—Summer-fallow.
Second year—Wheat.
Third year—Wheat.
Fourth year—Summer-fallow (Manure 15 tons per acre).
Fifth year—Sunflowers.
Sixth year—Barley seeded down.
Seventh year—Hay.
Eighth year—Hay.

Rotation "P" was started in 1912 on eight fields each 1½ acres, making a total of 12 acres. Once in eight years manure is applied to each field at the rate of 15 tons per acre and ploughed under at the time of ploughing for summer-fallow. In 1920 sunflowers replaced peas in the fifth year. The field in sunflowers last year was cultivated and harrowed before it was seeded to barley, using a mixture of 2 bushels of barley, 10 pounds of western rye grass seed and 6 pounds of sweet clover per acre. Sunflowers were seeded at the rate of 12 pounds per acre and wheat at the rate of 1½ bushels per acre. Sod land to be summer-fallowed was ploughed May 18, packed and harrowed. Cultivated to destroy weeds on June 16 and again on July 25.

SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS (PER ACRE)

Crop	Yield per acre		Value of crop 1926	Cost of production 1926	Profit or loss per acre	
	1926	Average fifteen years			1926	Average fifteen years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow	.....	.....	.....	7 15	−7 15	−7 72
Wheat—Marquis	14·0	22·0	18 20	13 16	5 04	11 71
Wheat—Marquis	8·0	16·1	10 40	13 88	−3 48	4 62
Summer-fallow	.....	.....	.....	7 15	−7 15	−7 79
	tons	tons				
Sunflowers—Mam. Russian	10·49	8·89 (7-yrs.)	36 72	22 86	13 86	8 57
	bush.	bush.				
Peas (1912–1919)	.....	22·1 (8-yrs.)	.....	.....	.....	.....
Barley—Duckbill (1922 ensiled)	24·0	26·4 (14-yrs.)	15 12	14 36	0 76	2 68
	tons	tons				
Hay	0·48	1·22 (6-yrs.)	3 84	9 28	−5 44	2 32
Hay	0·75	0·93 (6-yrs.)	6 00	9 54	−3 54	1 09
Average per acre	.....	.....	11 28	12 17	−0 89	1 94

It will be seen by referring to the table that the yields of grain and hay are much lower than the average since this rotation has been in operation.

FIFTEEN-YEAR SUMMARY OF ROTATIONS

In order that the results of the rotations started in 1911 may be easily compared, the following table is included showing the average cost, the returns and profits per acre for the last fifteen years. Prior to 1920 a fixed set of values were used in calculating the rotation returns. In comparing the results of 1920 and since, values are based on current prices paid during the year.

COSTS, RETURNS AND PROFITS FOR ROTATIONS (1921–1926)

Rotation	Average cost to operate per acre for fifteen years	Average return per acre for fifteen years	Average profit per acre for fifteen years
	$ cts.	$ cts.	$ cts.
"J" (Six years' duration)	8 63	13 04	4 41
"C" (Three years' duration)	9 05	12 35	3 30
"P" (Eight years' duration)	10 80	12 74	1 94

Reference to the summary table shows that Rotation "J" has returned for the fifteen-year period an average profit of $1.11 more per acre than Rotation "C" and $2.47 more than Rotation "P".

ROTATION "B" (TWO YEARS' DURATION)

First year—Summer-fallow.
Second year—Wheat.

In 1921 this rotation was commenced to compare a crop arrangement of alternate crop and summer-fallow with two crops of grain in between each

summer-fallow year. Two fields are used. One is summer-fallowed, and the other sown with wheat.

SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS (PER ACRE)

Crop	Yield per acre		Value of crop 1926	Cost of production 1926	Profit or loss per acre	
	1926	Average six years			1926	Average six years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow	.....	.....	.....	7 85	−7 85	−8 25
Wheat—Marquis	24·9	23·9	32 37	12 36	20 01	12 17
Average per acre	.....	.....	16 19	10 11	6 08	1 96

In a dry season like 1926 the alternating of wheat and summer-fallow is a system which gives good results. The yield this year is one bushel above the six-year average. The wheat crop cost 81 cents per bushel and shows a profit of $6.08 per acre.

ROTATION "F" (THREE YEARS' DURATION)

First year—Summer-fallow.
Second year—Wheat.
Third year—Fall rye.

Three fields are used. One is summer-fallowed each year. One in wheat, the other field in fall rye. The fall rye is seeded in the wheat stubble at the time of cutting at the rate of 1½ bushels per acre. The drill is set to sow 1¼ bushels of wheat. The preparation given the seed-bed consists of preceding the drill with the disk immediately after the binder.

SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS (PER ACRE)

Crop	Yield per acre		Value of crop 1926	Cost of production 1926	Profit or loss per acre	
	1926	Average three years			1926	Average three years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow	.....	.....	.....	7 85	−7 85	−9 35
Wheat—Marquis	13·7	21·7	17 81	10 87	6 94	12 69
Fall rye—Common	29·2	20·3	26 28	11 54	14 74	4 28
Average per acre	.....	.....	14 70	10 09	4 61	2 54

It will be noted that the yield of fall rye is exceptional considering the low yield of wheat on summer-fallow. It is apparent that when fall rye is drilled in the stubble, as is the case in this rotation a fair crop may be expected.

CULTURAL EXPERIMENTS

The experiments reported under this heading have to do with the various tillage preparations for field crops and tests in fertilizing.

The soil at Scott is a sandy clay loam and the average precipitation for the fourteen-year period (1912-1925) is 13.02 inches.

COMPARISON OF METHODS OF SUMMER-FALLOWING

In curtailing the cost of production of wheat crops, one of the important problems is that of how to prepare summer-fallow for crop with the least cost. The results presented herewith cover only one year's investigation. The costs include rent of land, seed, manual and horse labour, twine and machinery.

FIELD 1 (AREA 11·5 ACRES) FALL-PLOUGHED FOR SUMMER-FALLOW

Crop 1926	Treatment of Summer-fallow	Yield per acre	Cost of Production	
			Per acre	Per bushel
		bush.	$	$
Wheat	Fall-ploughed 1924 and cultivated 1925	15·5	17·52	1·13

FIELD 2 (AREA 11·6 ACRES) CULTIVATED ONLY AND NOT PLOUGHED FOR SUMMER-FALLOW

Crop 1926	Treatment of Summer-fallow	Yield per acre	Cost of Production	
			Per acre	Per bushel
		bush.	$	$
Wheat	Cultivated only 1925	22·7	16·69	0·74

FIELD 3 (AREA 25 ACRES) ORDINARY TREATMENT

Crop 1926	Treatment of Summer-fallow	Yield per acre	Cost of Production	
			Per acre	Per bushel
		bush.	$	$
Wheat	Ploughed and cultivated 1925	21·2	18·68	0·88

In calculating the cost of the wheat crop the cost of the summer-fallow has been charged to the wheat crop. The results of one year's work indicated that fall ploughing for summer-fallow is not a practice to be recommended. It is proposed to continue the comparison of the three summer-fallow treatments for three years under field conditions before drawing conclusions.

SUBSOILING AND DEPTH OF PLOUGHING SUMMER-FALLOW

Object of Experiment.—To determine the optimum depth to plough summuer-fallow and to test the value of subsoiling.

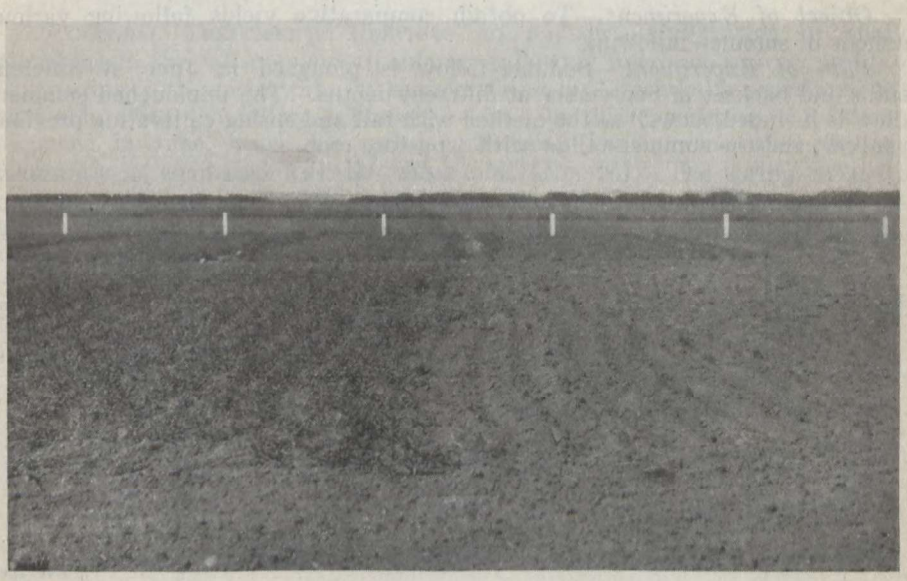
Plan of Experiment.—Summer-fallow is ploughed in June from 3 to 8 inches deep and in addition depths from 5 to 8 inches are subsoiled 4 inches below the sole of the furrow. Such additional cultivation as is necessary to control weeds is given during the season.

DEPTH OF PLOUGHING SUMMER-FALLOW

First crop after fallow

Plot No.	First crop after fallow	Plot Treatment	Yield in bushels per acre	
			Yield 1926	Average yield 12 years
1	Wheat	Fallow ploughed 3 inches deep	18·9	23·0
2	" ..	" 4 " "	16·2	24·0
3	" ..	" 5 " "	15·1	23·4
4	" ..	" 6 " "	14·7	22·8
5	" ..	" 7 " "	14·4	23·1
6	" ..	" 8 " "	13·9	22·5
7	" ..	Fallow ploughed 5 inches deep and subsoiled 4 inches below furrow	14·7	23·6
8	" ..	Fallow ploughed 6 inches deep and subsoiled 4 inches below furrow	13·3	23·7
9	" ..	Fallow ploughed 7 inches deep and subsoiled 4 inches below furrow	15·1	24·2
10	" ..	Fallow ploughed 8 inches deep and subsoiled 4 inches below furrow	13·8	22·8

Deductions.—The deepest ploughing has resulted in the lowest yield and the average yields indicate that 4-inch ploughing for summer-fallow at this Station has given the highest yield. Subsoiling has not increased the yield sufficiently to warrant the extra labour.



Left, summer-fallow after Brome grass. Right, summer-fallow after western rye grass.

DEPTH OF PLOUGHING SUMMER-FALLOW

Second crop after follow

Plot No.	Second crop after fallow	Plot Treatment	Yield in Bushels per acre	
			Yield 1926	Average yield 10 years
1	Oats	Fallow ploughed 3 inches. Stubble 3 inches	14·6	55·4
2	"	" 4 " " 4 "	14·9	58·2
3	"	" 5 " " 5 "	19·7	57·1
4	"	" 6 " " 5 "	22·1	55·7
5	"	" 7 " " 5 "	23·0	55·5
6	"	" 8 " " 5 "	37·2	55·9
7	"	Fallow ploughed 5 inches and subsoiled 4 inches. Stubble ploughed 5 inches	40·8	59·6
8	"	Fallow ploughed 6 inches and subsoiled 4 inches. Stubble ploughed 5 inches	48·9	59·1
9	"	Fallow ploughed 7 inches and subsoiled 4 inches. Stubble ploughed 5 inches	45·1	59·5
10	"	Fallow ploughed 8 inches and subsoiled 4 inches. Stubble ploughed 5 inches	39·1	9-year average 55·7

The ten-year average yield of the second crop shows that 4-inch ploughing for summer-fallow followed with 4-inch ploughing of the fallow stubble has given the highest profitable yield of second crop after fallow. Subsoiling for the second crop has not given sufficient extra yield over the 4-inch ploughing of the fallow stubble to pay for the extra labour involved.

METHOD OF SUMMER-FALLOWING

Object of Experiment.—To obtain comparative yields following various methods of summer-fallowing.

Plan of Experiment.—Summer-fallow is ploughed in June at different depths and backset in September at different depths. The unploughed summer-fallow is included, as well as the method with fall and spring cultivating previous to fallow, and the summer-fallow with a pasture crop.

SUMMER-FALLOW TREATMENT

Plot No.	First crop on fallow	Plot Treatment	Yield in bushels per acre	
			Yield 1926	Average yield 11 years
1	Wheat	Ploughed 4 inches in June	21·7	26·4
2	"	" 6 " "	18·8	24·9
3	"	" 8 " "	19·3	25·5
4	"	" 4 " " and 4 inches in September	18·3	25·4
5	"	" 6 " " " 6 " "	15·8	25·0
6	"	" 8 " " " 8 " "	14·2	24·1
7	"	" 6 " " " 4 " "	18·1	26·3
8	"	" 4 " " " 6 " "	27·0	29·6
9	"	Cultivated as necessary to control weeds. (Not ploughed)	23·8	2-year average 29·9
10	"	Ploughed 5 inches in June. Seeded with ½ bushel oats per acre and pastured	12·8	11-year average 23·4

Deductions.—The depths of ploughing summer-fallow serve as a duplicate for the experiment already discussed and the same findings hold, namely, that with the type of soil at this Station it is unnecessary to plough for summer-fallow deeper than 4 inches.

Ploughing 4 inches in June and backsetting 6 inches in September has given 3.3 bushels per acre more for an eleven-year average than was obtained by any other method of backsetting tested, and 3.2 bushels more than the highest yield obtained by ploughing once.

Plot 9 which was only cultivated with a duck-foot cultivator during the summer has given a yield of 29.9 bushels per acre for a two-year average. Although this yield is not comparable with the average for the other plots the yields for both years are higher than any of the once-ploughed plots. The pasturing of fallow has not been profitable.

CULTURAL TREATMENTS PREVIOUS TO FALLOW

Plot No.	First crop after fallow	Plot Treatment	Yield in bushels per acre	
			Yield 1926	Average yield 10 years
14	Wheat..	Cultivated in fall before summer-fallowing 6 inches in June.....	15·6	25·1
15	"	Ploughed 4 inches in fall before summer-fallowing 6 inches in June.....	21·1	26·2
16	"	Ploughed 6 inches in June.....	17·9	27·1
17	"	Cultivated in spring before ploughing 6 inches in June.....	18·3	27·4

CULTURAL TREATMENTS PREVIOUS TO FALLOW.—Cultivating or shallow ploughing in the fall previous to summer-fallowing have not proven profitable. Cultivating in the spring prior to summer-fallowing is generally considered to be advisable when the fallow is ploughed late. In this experiment the fallow is ploughed in June, hence the spring cultivating has not increased the yield materially as compared with the check plot (No. 16). The spring cultivating previous to the ploughing of summer-fallow has given for a ten-year average a higher yield than either fall ploughing or cultivating in the fall previous to summer-fallowing.

EFFECT OF SUMMER-FALLOW TREATMENT ON SECOND CROP

Plot No.	Second crop after fallow	Plot Treatment	Yield in bushels per acre	
			Yield 1926	Average yield 10 years
		Wheat stubble spring-ploughed after—		
1	Oats.....	Ploughing Summer-fallow 4 inches in June.....	42·4	62·3
2	"	" " 6 " "	26·2	63·2
3	"	" " 8 " "	39·9	64·9
4	"	Ploughing summer-fallow 4 inches in June and 4 inches in September.....	35·4	63·2
5	"	Ploughing summer-fallow 6 inches in June and 6 inches in September.....	35·6	61·2
6	"	Ploughing summer-fallow 8 inches in June and 8 inches in September.....	36·7	60·3
7	"	Ploughing summer-fallow 6 inches in June and 4 inches in September.....	34·0	60·5
8	"	Ploughing summer-fallow 4 inches in June and 6 inches in September.....	31·5	59·1
9	"	Summer-fallowing by cultivating only (Not ploughed).....	28·6	
10	"	Ploughing summer-fallow 5 inches in June—seeding to oats and pastured.....	24·9	59·0
14	"	Cultivating in fall before summer-fallowing.....	21·8	56·3
15	"	Ploughing 4 inches in fall before summer-fallowing.....	28·6	57·9
16	"	Ploughing summer-fallow 6 inches in June.....	33·6	58·3
17	"	Cultivating in spring before ploughing 6 inches in June.....	34·3	58·0

SECOND CROP AFTER FALLOW.—For a ten-year average the second crop shows the highest yield to have resulted from ploughing the summer-fallow 8 inches deep, but the difference is not sufficient to pay for the extra labour and offsets the results obtained in the first crop. In the backsetting tests, the 4-inch ploughing and backsetting the same depth in September has given the highest average yield.

DATES OF PLOUGHING SUMMER-FALLOW

Object of Experiment.—To determine the effect of the date of ploughing upon the yield of the succeeding crops.

Plan of Experiment.—Summer-fallow is ploughed May 15, June 15 and July 15 and necessary cultivation is given during the remainder of the season.

DATES OF PLOUGHING SUMMER-FALLOW

Plot No.	Crop	Plot treatment	Yield in bushels per acre	
			Yield 1926	Average yield 11 years
11	Wheat 1st crop.....	Ploughed May 15.....	25·7	30·1
12	" "	" June 15.....	22·2	27·4
13	" "	" July 15.....	15·1	24·7
11	Oats 2nd crop.....	Fallow ploughed May 15.....	37·2	60·9
12	" "	" June 15.....	29·0	56·0
13	" "	" July 15.....	29·0	56·7

Deductions.—When fallow is not worked prior to ploughing, it is well to plough as early as possible, thus avoiding a heavy growth of weeds which robs the soil of valuable moisture and reduces the yield of the following crop.

SUMMER-FALLOW SUBSTITUTES

Object of Experiment.—To determine the possibility of using intertilled crops as substitutes for summer-fallow.

Plan of Experiment.—A two-year rotation is followed, summer-fallow substitutes and wheat alternating. The wheat stubble is spring-ploughed for the fallow substitutes and the row-corps are cultivated as necessary during the summer to control weeds. In preparing for the wheat crop, the row-crop stubble is double-disked before seeding. The crops tested for fallow substitutes are wheat, oats and barley in double and triple rows also sunflowers, corn and potatoes in single rows 42 inches apart. The yields of the cereals grown in rows are shown in the succeeding table.

SUMMER-FALLOW SUBSTITUTES—FIRST YEAR

Crop	Treatment	Yield in bushels per acre	
		Yield 1926	Average yield 4 years
Oats (Double rows)	Stubble spring-ploughed	28·9	37·8
Oats (Triple rows)	" "	34·4	44·2
Barley (Double rows)	" "	10·0	17·5
Barley (Triple rows)	" "	16·5	22·3
Wheat (Double rows)	" "	7·5	13·9
Wheat (Triple rows)	" "	9·5	16·2

The foregoing table is given merely to give an idea of the yields which may be expected from these crops when grown in rows.

SUMMER-FALLOW SUBSTITUTES—WHEAT FOLLOWING ROW-CROPS

Crop	Row-crop stubble cultivated in spring before seeding	Yield in bushels per acre	
		Yield 1926	Average yield 4 years
Wheat	Following oats in double rows	12·8	26·0
"	" oats in triple rows	14·0	25·4
"	" barley in double rows	12·0	23·8
"	" barley in triple rows	10·5	24·1
"	" wheat in double rows	15·2	24·3
"	" wheat in triple rows	10·5	21·9
"	" sunflowers	14·2	3 yrs–22·1
"	" corn	15·7	4 yrs–27·4
"	" bare fallow	18·3	25·2
"	" potatoes	12·2	24·6

Deductions.—Corn seems to take less moisture from the soil than any other crop under test. In view of the fact that corn is not a dependable crop in the Scott district and that the average farmer has insufficient stock to make use of very much corn fodder or silage, probably the best summer-fallow substitute crop is oats in rows. Any summer-fallow substitute crop should be seeded early enough that it may be cut at the same time as the other cereals, otherwise the fall growth will use considerable of the moisture received from the fall rains which is needed for the succeeding crop.

Observations at the Scott Station are to the effect that when perennial weeds are present, the bare summer-fallow is the safest means of control.

STUBBLE TREATMENT FOR WHEAT AND OATS

Object of Experiment.—To compare several of the most common methods of treating stubble in preparation for seeding wheat and oats.

Plan of Experiment.—Wheat is grown on summer-fallow on all plots to provide stubble land for the various treatments as listed in the succeeding table.

STUBBLE TREATMENT FOR WHEAT

Plot No.	Crop	Plot treatment	Yield in bushels per acre	
			Yield 1926	Average yield 11 years
1	Wheat	Stubble ploughed 4 inches in autumn	7·3	17·2
2	"	Stubble disked in autumn	6·4	18·2
3	"	Stubble burned before disking in autumn	8·3	20·7
4	"	Stubble burned before ploughing 4 inches in autumn	5·2	21·2 (10 yrs.)
5	"	Stubble burned in spring—seeded at once	11·5	22·5 (11 yrs.)
6	"	Stubble ploughed 4 inches in spring	9·2	21·3
7	"	Stubble disked at cutting time—ploughed 4 inches in spring	12·4	20·2
8	"	Stubble disked at cutting time—ploughed 4 inches in fall	11·9	18·7
9	"	Stubble ploughed 4 inches in autumn	5·2	18·4
10	"	Stubble ploughed 4 inches in spring	12·6	21·5
14	"	Stubble cultivated shallow in autumn—No further cultivation	3·2	11·6 (3 yrs.)
15	"	Stubble cultivated deeply in autumn—No further cultivation	6·4	14·5 (3 yrs.)
16	"	Seeded in stubble in spring—No cultivation	3·7	9·2 (2 yrs.)

Deductions.—The stubble is valuable as it holds snow during the winter. The average yields indicate that any fall operation which destroys the stubble reduces the yield of the succeeding crop. The yields of plots 6 and 10, which were both spring-ploughed, are consistent in giving practically the same yield for an eleven-year average. Plots 9 and 10 comparing fall and spring ploughing show a difference of 3.1 bushels per acre in favour of spring ploughing. The highest yield shown in the table has resulted from burning the stubble in spring and seeding at once. It should be stated that there were no perennial weeds on this plot and that a perfect burn was effected by applying straw before burning. Plots 14-15 and 16 show deep fall cultivation of stubble to be more advisable than shallow cultivation and seeding in the stubble in spring without any preparation to be unprofitable. Incidentally, indiscriminate "stubbling in" is responsible for many unprofitable crops in this district.

STUBBLE TREATMENT FOR OATS

Plot No.	Crop	Plot treatment	Yield in bushels per acre	
			Yield 1926	Average yield 12 years
11	Oats	Stubble ploughed 4 inches in fall	22·2	46·2
12	"	Stubble ploughed 4 inches in spring	26·2	54·5
13	"	Stubble cultivated in spring—seeded at once	27·0	49·2

Deductions.—Fall ploughing is decidedly unprofitable for oats. Spring ploughing has given 8.3 bushels and spring cultivating 3 bushels per acre more than fall ploughing.

SEEDING TO WESTERN RYE AND SWEET CLOVER

Object of Experiment.—To compare several sequences of crops previous to seeding down and to determine the advisability of seeding with and without a nurse-crop.

Plan of Experiment.—Seeding is done with a nurse-crop and alone on summer-fallow, on land after a hoed crop and fallowing the first and second crops of grain after fallow.

SEEDING TO GRASS AND CLOVER

Plot No.	Crop	Plot treatment	Yield in Tons per acre	
			Yield 1926	Average yield 11 years
1	Hay	Seeded with wheat after fallow	1·4	1·6
2	"	Seeded alone after fallow	1·8	2·2
3	"	Seeded with wheat after corn	1·2	1·2
4	"	Seeded alone after corn	1·9	1·8
5	"	Seeded with second crop of wheat after fallow	1·2	1·2
6	"	Seeded alone after one crop of wheat	1·5	1·7
7	"	Seeded with oats after one crop of wheat on fallow	1·4	1·2
8	"	Seeded alone after one crop of wheat on fallow	2·1	2·1
9	"	Seeded with third crop of wheat after fallow	1·3	1·4
10	"	Seeded alone after one crop of wheat and one of oats after fallow	1·7	1·9
11	"	Seeded with 2nd crop of wheat after corn (no fallow)	0·9	1·2

Deductions.—The heaviest yields of hay were harvested after seeding grass on summer-fallow without a nurse-crop, but the increase in yield of hay has not been sufficient to warrant allowing the land to stand unproductive during the season in which the grass was seeded. Good catches of grass have usually been procured following any of the methods employed; the only limiting factor being adequate rainfall.

SEEDING TO GRASS AND CLOVER

Plot No.	Crop	Plot treatment—Second year in Hay after seeding as follows—	Yield in Tons per acre	
			Yield 1926	Average yield 11 years
1	Hay	with wheat after fallow	1·7	1·5
2	"	alone after fallow	2·3	1·4
3	"	with wheat after corn	1·7	1·4
4	"	alone after corn	2·4	1·3
5	"	with second crop of wheat after fallow	1·5	1·3
6	"	alone after one crop of wheat	2·4	1·4
7	"	with oats after one crop of wheat on fallow	1·6	1·4
8	"	alone after one crop of wheat on fallow	2·5	1·4
11	"	with second crop of wheat after corn (no fallow)	1·2	1·3

Deductions.—The crop of hay in the second year after seeding depends more upon the rainfall than upon the method employed in seeding down.

This experiment is considered to be sufficiently conclusive after obtaining the average yields shown in the accompanying tables and will be discontinued to make room for new work.

BREAKING WESTERN RYE GRASS SOD

Object of Experiment.—To determine the most satisfactory time and method of breaking western rye grass sod and to study the effects of growing wheat, oats and flax on spring-broken sod.

Plan of Experiment.—The sod is broken at different dates and given the treatments outlined in the subjoined table. The crops grown in the first year after breaking include wheat, oats and flax.

The second crop after breaking is wheat on all plots seeded on spring ploughing.

BREAKING WESTERN RYE GRASS SOD—FIRST CROP AFTER BREAKING

Plot No.	First crop after breaking	Plot treatment	Yield in Bushels per acre	
			Yield 1926	Average yield 10 years
1	Wheat	Ploughed 5 inches July 20 to 30—worked down and packed	5·2	12·9
2	"	Ploughed 5 inches October—worked down and packed	2·8	11·8
3	"	Ploughed 4 inches early July—worked down and packed. Backset in September—worked down and packsd	6·4	12·7
4	"	Ploughed 4 inches late July—worked down and packed. Backset 6 inches in September—worked down and packed	4·8	12·4
5	"	Ploughed 5 inches in spring just before seeding	6·9	11·6
6	Flax	Ploughed 5 inches in spring just before seeding	3·4	5·2
7	Oats	Ploughed 5 inches in spring just before seeding	10·8	35·5 (7 years)
8	Wheat	Ploughed previous June—worked as fallow	11·5	15·4 (10 years)

Deductions.—The highest yield of wheat for the first year after breaking was obtained by breaking in early June and treating as summer-fallow. When it is desirable to take a crop of hay the year the land is broken, very fair results may be obtained by breaking in July and backsetting in September, as indicated in plots 3 and 4. In comparing Plots 2 and 5 it will be noted that breaking in October has given approximately the same results as breaking in the spring just before seeding.

BREAKING WESTERN RYE SOD—SECOND CROP AFTER BREAKING

Plot No.	Second crop after breaking	Plot treatment	Yield in Bushels per acre	
		Stubble spring ploughed after Breaking as follows—	Yield 1926	Average yield 4 years
1	Wheat	Ploughed 5 inches July 20 to 30—worked down and packed	8·9	17·0
2	"	Ploughed 5 inches October—worked down and packed	8·4	16·9
3	"	Ploughed 4 inches early July—worked down and packed. Backset in September—worked down and packed	8·6	18·4
4	"	Ploughed 4 inches July—worked down and packed. Backset 6 inches in September—worked down and packed	11·9	18·0
5	"	Ploughed 5 inches in spring just before seeding	6·2	14·9
6	"	Ploughed 5 inches in spring just before seeding flax	8·5	16·9
7	"	Ploughed 5 inches in spring just before seeding oats	8·9	17·6
8	"	Ploughed previous June—worked as fallow	7·3	18·7

Deductions.—The highest yield of wheat as second crop after breaking for a four-year average has again been from the plot broken in early June and treated as summer-fallow. The backsetting plots show yields almost as high. The plot broken in the spring and sown to wheat has given a lower yield in the second year by 2 bushels per acre than the October breaking and 3.8 bushels per acre less than the plot broken in June and treated as summer-fallow. Flax and oats grown on spring breaking have not reduced the yield of wheat as second crop to as great an extent as wheat grown on spring breaking. With a ten-year average yield for the first crop on breaking and a four-year average for the second crop agreeing in the most important points, it is considered that this experiment is sufficiently conclusive to be discontinued.

APPLYING BARNYARD MANURE

Object of Experiment.—To determine the value of barnyard manure for wheat, oats and barley and to compare different times and methods of applying.

Plan of Experiment.—Fresh and rotted manure are applied on different plots and at different times of the year at the rate of 12 tons per acre. For the most part the manure is applied to affect the second crop after fallow but tables are included showing the yields of the first crop on fallow, as this crop derives considerable benefit from the manure applied two years previously. There is a charge of $12 per acre made for cost of applying the manure which is divided between the two crop-years and the third column in the table shows the value of the crop after the $6 per acre has been deducted. The return value of wheat is figured at $1.30 per bushel, oats 51 cents per bushel and barley at 60 cents per bushel.

Prior to 1925 all plots except No. 7 were fall-ploughed, but beginning with 1925 all plots except No. 6 were spring-ploughed.

MANURE FOR WHEAT—FIRST CROP AFTER APPLYING

Rotation—Year 1, Summer-fallow. Year 2, Wheat. Year 3, Wheat

Plot No.	Second crop after fallow	Plot treatment	Yield per acre		Value of crop per acre less cost of manure
			Yield 1926	Average yield 11 years	Average value 11 years
			bush.	bush.	$ cts.
1	Wheat	Fresh manure in winter on first year stubble	12·4	19·3	19 09
3	"	Rotted manure after seeding second crop on spring ploughing	8·3	20·1	20 13
5	"	No manure—Spring ploughed	7·4	19·1	24 83
6	"	Rotted manure before ploughing first year stubble in fall	9·2	24·8	26 24
7	"	Rotted manure before ploughing first year stubble in spring	16·0	27·4	29 62

Manure for Wheat.—Applying manure previous to spring ploughing has given 2.6 bushels per acre more than the fall application for the eleven-year average. This entire increase may be due to the different times of ploughing, as spring ploughing invariably gives a higher yield at this Station. Applying just before fall ploughing has increased the average yield by 5.7 bushels as compared with the check plot (No. 5). As for net returns the applying before spring ploughing has netted $4.79 per acre more than the check plot receiving no

manure and, applying before fall ploughing has netted $1.41 per acre more than the check. This is clear profit since the cost of applying the manure was previously deducted. None of the other listed methods of applying manure for wheat have proven profitable.

MANURE FOR WHEAT—SECOND CROP AFTER APPLYING

Plot No.	First crop after fallow	Plot treatment	Yield per acre		Value of crop per acre less cost of manure
			Yield 1926	Average yield 12 years	Average value 12 years
			bush.	bush.	$ cts.
1	Wheat	Fresh manure in winter on first year stubble	14·2	22·0	22 60
3	"	Rotted manure after seeding second crop on spring ploughing	15·6	24·0	25 20
5	"	No manure—Spring ploughed	8·7	21·1	27 43
6	"	Rotted manure before ploughing first year stubble in fall	13·0	24·3	25 59
7	"	Rotted manure before ploughing first year stubble in spring	18·3	26·0	27 80

Deductions.—The manure is applied to affect the second crop but it will be noted that the effect of the manure is shown in the first crop on fallow which is two years after application. The highest increase in yield is 4.9 bushels per acre in the case of the spring application of rotted manure before ploughing. When the average net values are compared for the crops grown in the first year after fallow it will be noted that the check plot, which received no manure and gave the lowest yield, made the highest net returns with the exception of Plot 7. This indicates that more than half of the value of the manure is used by the first crop grown after applying, in which case a fair profit was realized from Plots 6 and 7.

To summarize: the rotation followed is, first year summer-fallow; second year wheat and third year wheat. The manure is actually applied to the third year of the rotation, or to affect the second crop of wheat after fallow. The average returns for both years are given in the summary table in order to note the total effect of the manure on both wheat crops of the rotation.

SUMMARY TABLE—MANURE FOR WHEAT

Plot No.	Treatment	Net value of first crop on fallow 12 years	Net value of second crop on fallow 11 years	Average value of crop per acre for total period less cost of manure
		$ cts.	$ cts.	$ cts.
1	Fresh manure in winter on first year stubble	22 60	19 09	20 85
3	Rotted manure after seeding second crop after fallow	25 20	20 13	22 67
5	No manure	27 43	24 83	26 13
6	Rotted manure before fall ploughing first year stubble	25 59	26 24	25 92
7	Rotted manure before spring-ploughing first year stubble	27 80	29 62	28 71

The average net values for the total period since the land was broken from prairie show the spring-ploughed plot to be the only one returning a higher profit than the check plot which has received no manure.

Previous to 1925 all plots except No. 7 were fall ploughed. Spring ploughing consistently gives higher yields at this Station. This would indicate that nothing has been gained by applying barnyard manure at a cost of $1 per ton in this experiment.

MANURE FOR BARLEY—FIRST CROP AFTER APPLYING

Rotation—Year 1, Summer-fallow; Year 2, Wheat; Year 3, Barley

Plot No.	Second crop on fallow	Plot treatment	Yield per acre		Value of crop per acre less cost of manure
			Yield 1926	Average yield 11 years	Average value 11 years
			bush.	bush.	$ cts.
1	Barley	Fresh manure in winter on first year stubble	16·8	27·4	10 46
3	"	Rotted manure after seeding second crop on spring ploughing	8·6	23·6	8 16
5	"	No manure—Spring-ploughed	7·4	22·1	13 26
6	"	Rotted manure before ploughing first year stubble in fall	9·7	30·4	12 24
7	"	Rotted manure before ploughing first year stubble in spring	8·8	31·3	12 78

Manure for Barley.—The highest yield of barley has again resulted from ploughing manure under in the spring and the next highest from ploughing under in the fall. Fresh manure applied on stubble has given three bushels less per acre than rotted manure ploughed under in the fall.

It will be noticed that check plot (No. 5) has given the most profitable net returns.

Incidently, prior to 1925 all plots except No. 7 were fall ploughed, but beginning with 1925 all plots except No. 6 were spring ploughed.

MANURE FOR BARLEY—SECOND CROP AFTER APPLYING

Plot No.	First crop on fallow	Plot treatment	Yield per acre		Value of crop per acre less cost of manure
			Yield 1926	Average yield 12 years	Average value 12 years
			bush.	bush.	$ cts.
1	Wheat	Fresh manure in winter on first year stubble	11·9	22·3	22 99
3	"	Rotted manure after seeding second crop on spring ploughing	17·1	23·6	24 68
5	"	No manure—Spring-ploughed	13·8	21·9	28 47
6	"	Rotted manure before ploughing first year stubble in fall	19·9	24·8	26 24
7	"	Rotted manure before ploughing first year stubble in spring	22·5	26·4	23 25

Deductions.—Wheat grown on fallow two years after manure was applied shows an increase in average yield of 4·5 bushels for rotted manure ploughed under in spring, 2·9 bushels when ploughed under in the fall, 1·7 bushels following top dressing, and only 0·4 bushels resulting from applying fresh manure on stubble in winter. It has been observed that weeds and volunteer oats were usually present in crops following the application of fresh manure.

It will be noticed that check plot (No. 5) has given the most profitable net returns.

MANURE FOR OATS—FIRST CROP AFTER APPLYING

Rotation—Year 1, Summer-fallow; Year 2, Wheat; Year 3, Oats

Plot No.	Second crop after fallow	Plot treatment	Yield per acre		Value of crop per acre less cost of manure
			Yield 1926	Average yield 10 years	Average value 10 years
			bush.	bush.	$ cts.
1	Oats	Fresh manure in winter on first year stubble	39·5	63·5	26 38
3	"	Rotted manure after seeding second crop on spring ploughing	27·5	57·7	26 43
5	"	No manure—Spring-ploughed	35·3	53·9	27 49
6	"	Rotted manure before ploughing first year stubble in fall	29·3	62·6	25·92
7	"	Rotted manure before ploughing first year stubble in spring	35·6	67·2	28 27

NOTE.—Prior to 1925 all plots except No. 7 were fall-ploughed, but beginning with 1925 all plots except No. 6 were spring-ploughed.

Manure for Oats.—In the first crop after applying manure for oats or the second crop after fallow, the rotted manure ploughed under in the spring has given 13·3 bushels per acre more than the check plot which received no manure and 8·7 bushels increased yield was harvested after ploughing rotted manure under in the fall. Fresh manure applied on the stubble in the winter has given the second highest yield but the viable seeds of weeds and grain which fresh manure usually contains are very objectionable. After a charge of $6 per acre is made for half the cost of applying the manure the spring-ploughed plot is the only one which shows a profit as compared with the check plot which received no manure.

MANURE FOR OATS—SECOND CROP AFTER APPLYING

Plot No.	First crop on fallow	Plot treatment	Yield per acre		Value of crop per acre less cost of manure
			Yield 1926	Average yield 12 years	Average value 12 years
			bush.	bush.	$ cts.
1	Wheat	Fresh manure in winter on first year stubble	22·4	24·9	26·37
3	"	Rotted manure after seeding second crop on spring ploughing	15·6	24·6	25 98
5	"	No manure—Spring-ploughed	20·0	20·6	26·78
6	"	Rotted manure before ploughing first year stubble in fall	16·6	23·5	24·55
7	"	Rotted manure before ploughing first year stubble in spring	20·2	24·3	25·59

Deductions.—The first crop on fallow shows an increased yield in every case where manure was applied two years previously. The highest increase was from plot 1 which received the fresh manure and the second highest following top dressing with rotted manure, after seeding the second crop on fallow.

GREEN CROPS PLOUGHED DOWN

Object of Experiment.—To determine the advisability of growing green crops on summer-fallow to be ploughed down.

Plan of Experiment.—Sweet clover and peas are grown on separate plots and ploughed down in July and compared with plots ploughed for summer-fallow in June in the usual way and with ploughing rotted manure under in June. No average yield is shown following the ploughing down of sweet clover as this crop was only recently added to the experiment.

GREEN CROPS PLOUGHED DOWN

Plot No.	First crop after treatment	Plot treatment	Yield in bushels per acre	
			Yield 1926	Average yield 12 years
1	Wheat	Sweet clover ploughed under in July	15·6	.....
2	"	Peas ploughed under in early bloom	17·1	21·3
3	"	Peas ploughed under when in late bloom	14·7	21·0
4	"	Fallow ploughed in June—cultivated	12·8	19·8
5	"	Barnyard manure 12 tons per acre before ploughing for summer-fallow	20·6	26·6
6	"	Fallow ploughed in June—cultivated	13·8	22·3

Deductions.—The twelve-year average yields indicate that the rotted manure ploughed under is far more valuable than green crops. The ploughing down of green crops has not increased the yield sufficiently to pay for the seed required for the green crops. In addition to the cost of the seed there is the extra labour of ploughing and seeding.

GREEN CROPS PLOUGHED DOWN—SECOND CROP FOLLOWING TREATMENT

Plot No.	Second crop after treatment	Plot treatment	Yield in bushels per acre	
		Spring-ploughed after growing wheat on fallow and treated as follows—	Yield 1926	Average yield 11 years
1	Oats	Sweet clover ploughed under in July	26·7	.....
2	"	Peas ploughed under in early bloom	20·5	49·6
3	"	Peas ploughed under when in late bloom	21·4	47·4
4	"	Fallow ploughed in June—cultivated	29·9	47·1
5	"	Barnyard manure 12 tons per acre before ploughing for summer-fallow	25·4	50·8 10-yr. average
6	"	Fallow ploughed in June—cultivated	28·3	45·3

Deductions.—A slight increase will be noted in the average yields resulting from ploughing peas under in early bloom as compared with bare summer-fallow, but the barnyard manure has again given the highest average yield. The sweet clover plot has made a good showing in the second crop after fallow but was not high in yield in the first crop.

SOIL PACKING

Object of Experiment.—To determine the value of soil-packing and the value of the culti-packer as compared with the common packer.

Plan of Experiment.—Summer-fallow, spring ploughing, and fall ploughing are packed at different times with the two different types of packers and the yields are compared with a plot which receives an extra stroke of the harrow in place of packing. Duplicate yields are shown where available.

PACKING OF SUMMER-FALLOW

Plot No.	Crop	Plot Treatment	Yield in bushels per acre	
			Yield 1926	Average yield 4 years
2	Wheat	Extra stroke of harrow after ploughing	13·3	24·7
3	"	Culti-packed after ploughing	13·8	25·8
4	"	Surface packed after ploughing	13·0	26·9
5–18	"	Extra stroke of harrow in spring before seeding	13·2	27·7
6–19	"	Culti-packed in spring before seeding	14·3	27·5
7–20	"	Surface-packed in spring before seeding	16·7	28·9
8–21	"	Harrowed after seeding	16·2	28·4
9–22	"	Culti-packed after seeding	11·5	26·4
10–23	"	Surface-packed after seeding	11·5	26·1
11–24	"	Harrowed before and after seeding	11·9	26·3
12–25	"	Culti-packed before and after seeding	9·6	25·1
13–26	"	Surface-packed before and after seeding	9·9	25·8
15	"	Harrowed after ploughing and after seeding	18·5	28·4
16	"	Culti-packed after ploughing and after seeding	15·1	28·6
17	"	Surface-packed after ploughing and after seeding	15·1	26·6

Deductions.—The average yields for four years fail to show sufficient differences to warrant the packing of summer-fallow.

PACKING OF SPRING PLOUGHING

Plot No.	Crop	Plot Treatment	Yield in bushels per acre	
			Yield 1926	Average yield 5 years
2–11	Wheat	Spring ploughing harrowed before and after seeding	12·2	20·6
3–12	"	Spring ploughing culti-packed before and after seeding	16·7	23·0
4–13	"	Spring ploughing surface-packed before and after seeding	10·8	20·6
5	"	Spring ploughing harrowed (extra stroke)	12·8	21·3
6	"	Spring ploughing culti-packed	11·5	22·0
7	"	Spring ploughing surface-packed	9·8	22·6
8	"	Spring ploughing harrowed after seeding	10·5	22·0
9	"	Spring ploughing culti-packed after seeding	10·7	23·0
10	"	Spring ploughing surface-packed after seeding	10·3	21·2

Deductions.—Packing spring ploughing before and after seeding has not been profitable. The surface packer used immediately after spring ploughing has increased the average yield by 1·3 bushels per acre as compared with the harrowed plot. In packing after seeding the culti-packer shows an increased yield of one bushel per acre over the check plot which only received one extra stroke of the harrow.

PACKING FALL PLOUGHING

Plot No.	Crop	Plot Treatment	Yield in bushels per acre	
			Yield 1926	Average yield 4 years
15	Wheat	Fall ploughing harrowed after ploughing	5·7	21·8
16	"	Fall ploughing culti-packed after ploughing	7·3	25·8
17	"	Fall ploughing surface-packed after ploughing	7·3	24·1
18	"	Fall ploughing harrowed before seeding	7·5	26·0
19	"	Fall ploughing culti-packed before seeding	10·3	21·9
20	"	Fall ploughing surface-packed before seeding	10·7	24·5
21	"	Fall ploughing harrowed after seeding	10·5	22·4
22	"	Fall ploughing culti-packed after seeding	10·7	23·5
23	"	Fall ploughing surface-packed after seeding	6·4	20·3
24	"	Fall ploughing harrowed before and after seeding	9·2	21·5
25	"	Fall ploughing culti-packed before and after seeding	6·4	22·3
26	"	Fall ploughing surface-packed before and after seeding	3·4	22·4

Deductions.—Culti-packing at the time of ploughing in fall shows an increase of 4 bushels per acre over the check plot (No. 15) and the surface packing shows 2·3 bushels per acre increase. The packing of fall ploughing in the spring has not given a consistent increase in yield. The highest yield it will be noted was secured from plot 18 which was ploughed in the fall and harrowed just before seeding in the spring, but was not packed.

FORAGE CROPS

The chief lines of experimental work conducted with forage crops consists of testing for hardiness, yield, drought-resistance and purity to type. The object of the work is to discover the best adapted and most productive kinds of forage crops under northwestern Saskatchewan conditions. It is unfortunate that the short season and changing climatic conditions from year to year limit the number of crops that can be grown. The work under forage crops is treated under three headings: Intertilled crops; annual hay crops; and perennial and biennial hay crops.

On account of the various kinds of forage crops differing so widely in percentage of moisture, when cured for feed purposes it is essential to have another measure than green weight as a basis of comparison. The absolute dry matter or water-free matter is used for this purpose. The 1926 results of the various projects are presented in tabular form, together with the dry-matter yields per acre to enable the reader to compare the relative merits of each variety.

The 1926 crop season was in many respects disappointing. There was considerable winter-killing in the clovers. A comparatively cool wet spring retarded the growth of all crops, which was more noticeable in some of the less hardy spring-grown crops. By the middle of June the weather began to warm up and a period of drought followed during the latter part of July. A frost of 3 degrees on August 8 froze the corn, Sudan grass and millet and gave these crops a serious set back.

INTERTILLED CROPS

CORN

Twenty-four varieties or strains of corn were seeded on summer-fallow land on May 26. All varieties were seeded with a corn-planter in rows 3 feet part. The varieties were seeded in quadruplicate plots and the plants thinned after emergence to 12 inches apart in the row.

The past season proved particularly disastrous for corn. The cool wet weather during the spring retarded germination. Stands were produced ranging from 30 to 50 per cent, except in the case of the Dent varieties, where the average was about 80 per cent. The much higher germination of the Dent varieties favours their hardiness over the other sorts. Corn is greatly influenced by the character of the season, and the unfavourable weather made impossible variety comparisons.

SUNFLOWERS

Ten varieties or strains of sunflowers were tested on summer-fallow land in 1926. The seed was sown on May 15 in rows 3 feet apart. After emergence the plants were thinned to a distance of 12 inches apart in the rows. All varieties were tested in triplicate and the yields presented in the following table are the average of three plots.

SUNFLOWERS—TEST OF VARIETIES

Variety	Source	Average height of plants in inches	Stage of maturity at harvest	Type of growth	Yield per acre green weight	Per cent dry matter	Yield per acre dry matter
					Tons		Tons
Mammoth Russian	K. McDonald...	59	Heads just formed.	Single stalk.....	14·60	16·86	2·46
Russian Giant.....	Dak. Imp. Seed Co.....	58	75% in bloom..	Single stalk.....	13·30	18·46	2·46
Mammoth Russian	C.P.R.....	53	100% in bloom..	Single stalk 2% branching.	12·40	18·56	2·30
Manteca.....	C.P.R.....	52	95% in bloom..	Single stalk 2% branching.	13·05	16·56	2·16
Manchurian.....	A. E. McKenzie	52	98% in bloom..	Single stalk 30% branching	11·00	18·28	2·01
Ottawa 76.....	C.E.F.....	53	100% in bloom..	Single stalk 1% branching.	11·25	17·31	1·95
Mixed.....	C.P.R.....	49	100% in bloom..	Single stalk.....	10·40	17·03	1·77
Black.....	C.P.R.....	49	100% in bloom..	Single stalk.....	10·95	15·77	1·73
Manchurian.....	C.P.R.....	49	100% in bloom..	Single stalk.....	9·55	17·58	1·68
Mennonite.....	Rosthern.....	36	100% in bloom..	Single stalk 2% branching.	7·40	18·89	1·40

All varieties tested showed varying degrees of impurity as to type of growth, uneveness in height and time of maturity. There is room for considerable improvement in this crop and because of its increasing importance some work has already been started by the Forage Crop Division at Ottawa. Several distinct types were isolated and in-breeding was undertaken as a method of improvement.

The results from in-breeding show a marked increase in the uniformity of the strains used. Unlike corn, a number of the in-bred sunflower strains did not lose their former vigour. The progeny of the most desirable in-bred strains has not been tested for sufficient length of time to make any definite deductions. The results so far are encouraging and the future of this work is promising.

COMPARISON OF CORN, SUNFLOWERS, AND OATS

Due chiefly to soil-drifting, weeds, and the risk in straight grain-growing, there is a gradual change taking place toward a more diversified system of farming. This change in the system of farming has made considerable progress in some districts, while in others it has hardly started. Such a movement toward a more diversified system of farming carries with it an increase in live stock. Where live stock is kept to any extent, particularly dairy cattle, silage is needed as part of the winter feed. Dairy cattle require succulent feeds for most of the year.

The question of a suitable silage crop is attracting attention among stockmen at the present time. The three kinds of silage crops that may be used with varying success are corn, oats, and sunflowers.

From records kept at the Scott Experimental Station for a period of fifteen years, the average date of the last spring frost was June 7 and the average date of the first fall frost was September 11, leaving only 88 frost-free days. Frosts have occurred in this period as late as June 24 and as early as August 8. The late spring and early fall frosts frequently do considerable damage to corn. The chief failings of corn as a silage crop are its susceptibility to frost-injury and the fact that it produces comparatively low yields in cool seasons. Even under the most favourable conditions relatively low yields were harvested; whereas under less favourable climatic conditions, such as 1924, the crop was not worth harvesting except to obtain comparative yields of the various varieties. Our present results warrant further testing and selection with this crop, and considerable improvement is necessary before corn can be depended upon as a silage crop.

Oats have certain good points as a silage crop. This crop produces a silage of good quality. No special machinery is needed to grow and harvest the crop. The green oat sheaves are handled much more easily than either corn or sunflowers in the field. However, in a dry season when silage is most needed, oats lack the ability to produce a high succulent tonnage.

It is quite true that sunflowers make heavier demands on moisture than corn, and that yields from the succeeding crop are not as high as those from corn. On the other hand, sunflowers have stood the drought better than corn at this Station. Their growth may be very slow in the severest part of the drought period, but they have the ability to revive with the August rains and have always produced a fair crop in the driest years. While both the palatability and feeding value of sunflower silage are usually below that of oats and corn, it is nevertheless a nutritious feed and is eaten with relish by stock. The fact that sunflowers are able to withstand 6 to 8 degrees of frost without serious damage to the crop and to produce a larger green weight tonnage than either oats or corn, makes them the most dependable silage crop of the three. The past season furnished a good example of the comparative ability of sunflowers to produce a crop of silage under adverse climatic conditions. Yields over 14 tons green weight per acre were produced while the highest yield from oats was 4·77 tons per acre, and corn was a complete failure.

FIELD ROOTS

Thirty-nine varieties of field roots were tested in 1926 consisting of the following kinds: ten of fall turnips, seventeen of swedes, nine of mangels and three of sugar beets. All varieties were seeded the last week in May in triplicate on $\frac{1}{300}$ acre plots. The seed was sown on summer-fallow land at the ordinary rate in rows 36 inches apart. After emergence they were thinned to 12 inches apart in the rows. All roots were harvested the last week in September. Notes taken at the time of harvest on trueness to type, quality and general suit-

ability of variety are given in the remarks column of the tables following. These notes give information regarding type, smoothness, ease of harvesting and are of practical value to the grower in selecting a variety. As commercial names are not a true indication of the type or shape of a variety, work is under way to classify all roots according to shape, and in future the shape will likely be more of a guide to the grower than the name of a variety.

Germination was rather slow but good stands were secured in varieties of swedes and fall turnips. As usual there was very poor germination in both mangels and sugar beets.

Very good yields of swedes were produced considering the unfavourable season. In the case of fall turnips and mangels, the yields were low.

SWEDES—TEST OF VARIETIES

Variety	Source	Green weight per acre	Per cent dry matter	Dry weight per acre	Remarks
		Tons		Tons	
Ditmars	McNutt	17·90	10·08	1·80	Size medium and fairly uniform. Rooty to prongy. Rather hard to harvest.
Bangholm	Gen. Swedish Co.	17·50	11·37	2·00	Fairly large and uniform as to size. Fairly free from roots. Flesh yellowish.
Bangholm	Ewing	16·30	9·92	1·62	Fairly large. Irregular in size. Prongy. Rather hard to harvest. Flesh buff-yellow.
Purple Top	Harris & McFayden	15·95	10·47	1·67	Size irregular. Rather rooty. Flesh buff-yellow.
Magnum Bonum	Ewing	15·50	10·31	1·60	Fairly large but irregular in size. Very rooty. Flesh yellowish.
Olsgaard Bangholm	Hjalmar Hartmann.	15·05	11·17	1·68	Rather large and fairly uniform in size. Mostly free from roots. Fairly easy to harvest.
Improved Yellow	Gen. Swedish Co.	15·00	11·87	1·78	Rather large. Fairly uniform. Somewhat rough. Fairly easy to harvest.
Canadian Gem	Steele Briggs	14·95	11·33	1·69	Rather large. Fairly uniform. Fairly easy to harvest. Flesh yellowish.
Monarch	A. E. McKenzie	14·75	11·02	1·63	Size medium and uniform. Rather rooty.
Superlative	A. E. McKenzie	14·50	10·82	1·57	Size medium. Very variable Rooty. Rather hard to harvest. Flesh yellowish.
Bangholm	Exp. Farm Nappan.	14·45	11·91	1·72	Size medium. Fairly uniform. Somewhat rooty. Flesh buff-yellow.
Shepards Golden Globe.	Hjalmar Hartmann.	14·45	11·48	1·66	Size medium and fairly uniform. Prongy. Rather rough.
Bangholm	A. E. McKenzie	13·75	11·72	1·61	Size medium and variable. Rooty. Rather hard to harvest. Flesh buff-yellow.
Bangholm	Exp. Farm Kentville	13·65	12·38	1·69	Medium in size. Fairly free from roots. Easy to harvest. Flesh buff-yellow.
Bangholm	Exp. Farm Charlottetown.	13·55	11·21	1·52	Uniform in size. Fairly free from roots. Easy to harvest. Flesh buff-yellow.
Northwestern	A. E. McKenzie	13·55	10·66	1·44	Size fairly large. Type mixed. Rooty. Flesh yellowish.
Kangaroo	A. E. McKenzie	12·95	11·21	1·45	Size medium. Not uniform. Flesh buff-yellow. Somewhat rough. Rooty.

FALL TURNIPS—TEST OF VARIETIES

Variety	Source	Green weight per acre	Per cent dry matter	Dry weight per acre	Remarks
		Tons		Tons	
Purple Top Mammoth.	Suttons	9·95	6·29	0·63	Fairly large. Variable in size. Smooth.
Red Paragon	Suttons	9·65	6·76	0·65	Large. Variable in size. Fairly free from roots.
Purple Top Mammoth or Improved Greystone	Steele Briggs	7·40	4·69	0·35	Size rather small. Somewhat rooty.
Early Six Weeks	Suttons	6·85	5·86	0·40	Fairly uniform in size and smooth.
Hardy Green Round	Suttons	6·80	5·16	0·35	Medium sized. Fairly smooth.
Devonshire	Steele Briggs	6·80	4·57	0·31	Roots small. Somewhat rooty.
White Globe	Ewing	6·15	5·12	0·31	Rather small. Fairly uniform, Rooty.
Pomerian White Globe.	Steele Briggs	6·10	4·80	0·29	Medium sized. Fairly smooth,
Purple Top Aberdeen.	Suttons	5·90	5·62	0·33	Size variable. Somewhat rooty.
Green Top Yellow Aberdeen.	Ewing	5·50	6·41	0·35	Roots small. Fairly uniform. Rooty.

MANGELS—TEST OF VARIETIES

Variety	Source	Green weight per acre	Per cent dry matter	Dry weight per acre	Remarks
		Tons		Tons	
Elvethan Mammoth	Hjalmar Hartmann.	5·18	12·85	0·67	85% Half long. Rather rough. Somewhat prongy.
Giant Rose	A. E. McKenzie	4·86	11·91	0·58	90% Half long. Fairly uniform. Somewhat rooty.
Yellow Intermediate	C.E.F., Ottawa	4·75	14·14	0·67	80% Intermediate. Roots fairly smooth.
Yellow Leviathan	Rennie	4·22	11·87	0·50	85% Half long. Roots smooth. Fairly uniform.
Giant Long Red	A. E. McKenzie	4·06	9·53	0·39	85% Long. Roots smooth. Size rather large.
Taaroje Barres	Hjalmar Hartmann.	3·68	11·48	0·42	90% Intermediate. Roots uniform and fairly smooth.
Giant Yellow Globe	A. E. McKenzie	3·26	11·76	0·38	80% Globe. Fairly uniform. Roots smooth.
Yellow Eckandrofer.	Gen. Swedish Co.	3·20	10·82	0·35	90% Intermediate. Fairly smooth.
Barres Oval	Gen. Swedish Co.	2·08	11·64	0·24	70% Intermediate. Roots smooth.

ANNUAL HAY CROPS

The term annual hay crop commonly indicates any crop intended for hay that can be sown and harvested within the same season. Annual hay crops play an important part in the production of live stock and are used to replace biennial or perennial crops that fail under severe climatic conditions. Due chiefly to the increasing scarcity of prairie haylands, the increase in live stock, and the uncertainty of grass and clover crops under adverse climatic conditions, the need for suitable annual hay crops is demanding more attention each year.

The various experiments under way to obtain information on these crops consist of comparing different kinds of annual hay crops; growing oats and peas

in combination; varieties of oats cut at different stages of maturity; varieties of peas and varieties of oats seeded at different dates.

In order to make yields more comparable, all plots were harvested as nearly as possible at the same stage of maturity. In addition two moisture and dry-matter determinations were made from each of the various crops at the time of cutting.

KINDS OF ANNUAL HAY CROPS

Seven different kinds of annual hay crops were tested in duplicate plots this year. All varieties were sown during the last week in May on summer-fallow land. The results are submitted in the following table together with a three-year average.

COMPARISON OF CROPS FOR ANNUAL HAY

Crops	Yield per Acre			
	1926 Results		Three-year average	
	Green weight	Dry weight	Green weight	Dry weight
	tons	tons	tons	tons
Oats	3·35	1·47	4·77	1·72
Oats and peas	3·08	1·26	4·45	1·49
Spring rye (Prolific)	2·73	0·86	3·54	1·27
Hungarian millet	2·98	1·04	3·11	1·06
Hubam (sweet clover)	2·84	0·68	3·04	0·76
Sudan grass	0·93	0·26	0·87	0·24
Siberian millet	3·88	1·09	.....	.....

Oats alone have slightly outyielded a mixture of oats and peas. Chemical analysis shows that hay of higher feeding value is obtained from a combination of both crops. Considering the cost of the seed of peas and the difficulty of harvesting and curing peas in bad weather, it is doubtful whether a mixture of peas and oats can be safely recommended unless higher yields are obtained.

Spring rye attracts attention as an annual hay crop chiefly on account of its earliness and dependability under unfavourable seasonal conditions. However, it is inferior to oats in point of yield and due to the woody nature of its growth is not eaten readily by live stock.

Millets require ample moisture and heat for best results. A late cold spring, summer drought and early frosts made conditions more unfavourable than usual for this crop. The climate of northwestern Saskatchewan is not conducive to maximum returns from millets.

Sudan grass like the millets needs considerable heat and moisture for best returns. The conditions at this Station appear even less favourable for this crop than the millet. It has to date been a low yielder and an uncertain crop.

Hubam (sweet clover) as an annual hay crop gives fair returns. Its growth is rather slow in the spring which puts it at a disadvantage on weedy land. For the best quality of hay, the crop should be cut just before coming into bloom.

VARIETIES OF OATS FOR HAY

Oats continue to be the most commonly grown cereal crop for hay production. They are used in all stages, from green cut oats which have scarcely reached the blossoming stage to ripe sheaves. On account of their popularity as a hay crop, an experiment was started at this Station in 1922 with a view to determine the best stage of maturity to cut oats for hay and to ascertain

the highest yielding variety. Moisture and dry-matter determinations are made from each plot at the time of cutting. In order that the experiment may be of further value, chemical analyses are under way to determine the food value of each variety when cut at different stages of maturity.

Nine varieties of oats were tested on summer-fallow land. The seed was sown the last week in May at the rate of 2 bushels per acre. All varieties were seeded in duplicate on one-fortieth-acre plots. The plot is divided into three parts of one-one hundred and twentieth-acre and cut at three different stages—first at time of bloom; second when kernels are in late milk stage; third when kernels are ripe.

The 1926 results together with a three-year average are submitted in the following table.

VARIETIES OF OATS CUT IN DIFFERENT STAGES OF MATURITY

Variety	Stage cut	Yield per Acre			
		1926 Results		Three-year average	
		Green Weight	Dry Weight	Green Weigth	Dry Weight
		tons	tons	tons	tons
Alaska	Bloom	3·36	0·92	3·12	0·88
Daubeney	"	2·79	0·86	3·00	0·97
Liberty	"	3·03	0·82	3·73	0·96
Gold Rain	"	3·66	0·99	4·52	1·23
Banner	"	3·27	0·99	4·02	1·12
Victory	"	3·36	0·90	4·04	1·17
Leader	"	3·21	0·86	4·22	1·15
*Longfellow	"	3·30	0·89	5·16	1·41
*Columbian	"	3·36	0·93	5·09	1·39
Alaska	Late milk to early dough	2·85	1·19	3·04	1·25
Daubeney	" "	2·64	1·23	3·20	1·41
Liberty	" "	2·82	1·10	3·32	1·32
Gold Rain	" "	3·45	1·50	4·89	1·85
Banner	" "	2·88	1·25	3·85	1·46
Victory	" "	3·15	1·44	3·89	1·61
Leader	" "	3·00	1·34	3·92	1·58
*Longfellow	" "	2·58	0·90	4·47	1·71
*Columbian	" "	2·55	1·12	3·68	1·64
Alaska	Ripe	1·80	0·95	2·24	1·23
Daubeney	"	1·56	1·15	2·05	1·25
Liberty	"	2·37	1·03	2·80	1·31
Gold Rain	"	2·88	1·41	3·73	1·84
Banner	"	2·46	1·36	3·40	1·77
Victory	"	2·13	1·25	3·30	1·70
Leader	"	2·07	1·36	3·03	1·61
*Longfellow	"	2·76	1·42	2·85	1·50
*Columbian	"	2·10	1·26	2·94	1·84
*Gold Rain	Aftermath	.....	.....	1·62	0·51
*Banner	"	.....	.....	1·68	0·49
*Victory	"	.....	.....	1·25	0·39
*Leader	"	.....	.....	1·40	0·41
†Alaska	"	.....	.....	1·62	0·55
†Liberty	"	.....	.....	1·32	0·37
†Longfellow	"	.....	.....	1·23	0·36
†Columbian	"	.....	.....	1·14	0·28
†Daubeney	"	.....	.....	0·90	0·32

*Two-year average. †One-year average.

The two varieties Longfellow and Columbian were introduced into the test in 1925 and for this reason only a two-year average is shown.

It will be observed from a study of the table that the results favour the medium late maturing varieties over the earlier sorts for hay production. This holds true in the three-year average for each of the different stages cut. The table further shows that the second stage (late milk to early dough) gives the

largest amount of hay with similar results in the case of dry matter yields. Gold Rain leads all other varieties in point of yield in the three-year average. This variety matured a day or so earlier than Banner and produced a uniform stand of fine-quality straw.

It will be noted that a three-year average is not shown for aftermath. The yields from this cutting are considerably influenced by the character of the season. In 1924 only the late maturing varieties produced yields worth cutting. In 1925 aftermath from all varieties was cut, while this year none of the aftermaths were worth cutting.

VARIETIES OF PEAS FOR HAY

Five varieties of peas were sown on summer-fallow land on May 27. Rates of seeding varied from 1½ to 2½ bushels per acre depending upon the size of the seed sown. Each variety was cut as soon as the majority of plants had reached the pod stage. Moisture and dry matter determinations were made from each variety at the time of cutting.

It will be noted in the following table that the MacKay variety has given the highest yield for this year, both in green weight and dry matter. The late maturity and rather vigorous growth of this variety favour it for hay production especially in combination with oats. In the three-year average the yields are slightly higher for the later maturing varieties.

The 1926 results together with a three-year average are presented in the following table.

VARIETIES OF PEAS FOR HAY

Variety	Average length of vine	Average length of pod	Yield per Acre			
			1926 Results		Three-year Average	
			Green weight	Dry weight	Green weight	Dry weight
	inches	inches	tons	tons	tons	tons
Chancellor 0·26	29·5	1·65	6·10	0·93	5·05	1·02
Golden Vine Sask., 625	32·5	1·72	5·60	1·19	4·99	1·19
Solo	32·0	2·00	5·20	1·10	5·29	1·15
Arthur 0·18	27·0	2·10	4·90	1·15	5·41	1·22
MacKay 0·25	38·0	2·25	6·32	1·45	.....	.....

DATES OF SEEDING OATS FOR HAY

Since oats for hay are generally seeded after the major spring operations are over, an experiment has been conducted for several years to determine the latest date oats may be seeded with the assurance of reasonable returns. The first seeding is made about May 24 and continued for five successive seedings at ten-day intervals. This year Alaska, an early variety, was added to the test for the reason that the last seedings of Banner have generally been frozen before reaching the milk stage. It will be noted that all seedings of Alaska reached the milk stage while the two last seedings of Banner were frozen before reaching this stage. From a study of the following table the seeding on June 24 gave the best results for Alaska. June 15 appears to be the most suitable date for Banner, for the reason that the two later seedings of Banner were frozen, thus reducing the quality of the feed. The yields from any of the seedings are considerably influenced by the summer rains, particularly the amount and time of occurrence.

The 1926 results are summarized in the following table.

DATES OF SEEDING OATS FOR HAY

Date of Seeding	Stage of Maturity when cut		Yield per acre			
			Alaska		Banner	
	Alaska	Banner	Green weight	Dry weight	Green weight	Dry weight
			tons	tons	tons	tons
May 25....	Late milk to early dough	Late milk to early dough	2·80	1·21	2·90	1·18
June 4.....	" " ..	" " ..	2·64	1·10	3·00	1·25
June 14.....	" " ..	" " ..	2·88	1·26	3·70	1·68
June 24.....	Late milk.....	Frozen bloom stage.....	3·00	1·29	3·50	1·74
July 3.....	Slightly frozen early milk.	Frozen just headed.....	2·64	1·05	3·80	1·51

PERENNIAL AND BIENNIAL HAY CROPS

The winter of 1925-26 was comparatively mild. Winter-killing occurred to a considerable extent in the clovers, while the alfalfa came through the winter with good stands. With the exception of Arctic all varieties of sweet clover were slow in starting growth in the spring. Grasses made a better showing than usual in the early part of the spring, but were later retarded by the continued cool spring weather.

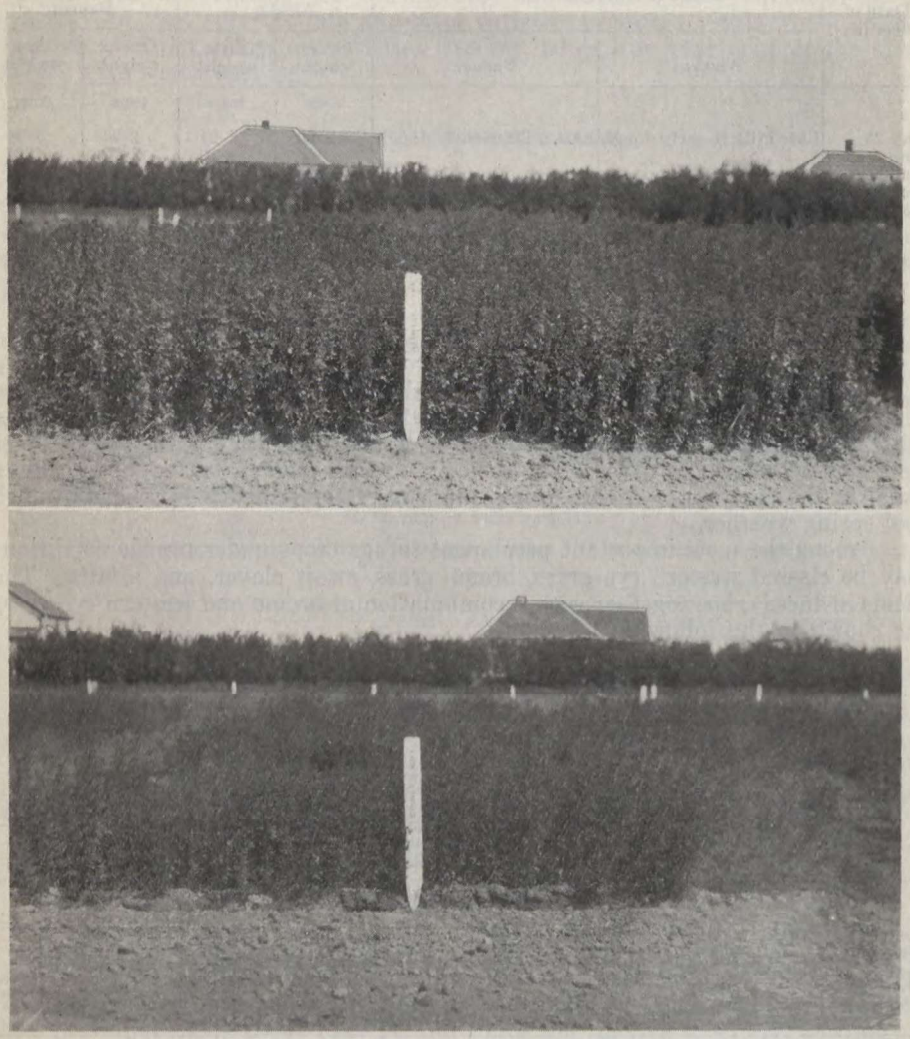
Among the most important permanent forage crops under prairie conditions may be classed western rye grass, brome grass, sweet clover, and alfalfa. The yields of these crops together with a combination of brome and western rye grass are shown in the following table.

PERENNIAL AND BIENNIAL HAY CROPS

Crop	Rate of Seeding per acre	Yield per Acre					
		Yield Green weight per acre 1925	Yield Dry weight per acre 1925	Yield Green weight per acre 1926	Yield Dry weight per acre 1926	Average for two crops	
						Green weight	Dry weight
	lb.	tons	tons	tons	tons	tons	tons
Western rye grass.....	14	4·12	1·44	2·36	1·06	3·24	1·25
Brome grass.....	14	2·72	1·04	3·00	1·24	2·86	1·14
Western rye and brome grass	7 and 7	5·28	1·73	2·42	1·04	3·85	1·39
Sweet clover.....	15	.....	.....	7·92	1·31	.....	.....
Alfalfa.....	15	.....	.....	3·80	1·10	.....	.....

When seeding western rye or brome alone or a combination of both, the seed was sown on summer-fallow land. The land was left in hay two years before the sod was ploughed up. The seeding for the grasses in the above table was made in 1924, and two crops were taken off in the years shown. It will be observed that a combination of both grasses gave the highest yield in 1925 with brome the lowest, while in 1926 brome leads with western rye lowest. The relative position which western rye grass or brome holds with regard to yield varies from year to year depending upon the character of the season. Results at this Station indicate, that in years when the precipitation was over the

average for the growing season, western rye grass gave the highest yield, while in very dry seasons its position was reversed. The reader is referred to the table under the heading " Grasses and Clover Mixtures." The table in question is a summary of several years' work and is a more authentic indication of the comparative values of these grasses.



Arctic sweet clover (above) has proved the only hardy strain at Scott. Common sweet clover is shown below.

Some of the experiments started at this Station since 1917 to test the value of sweet clover include: Seeding in rows at different distances apart; rates of seeding; sowing in combination with grasses; seeding with and without a nurse-crop; and seeding different varieties and strains to test for hardiness.

In the experiment "seeding in rows at different distances apart," there was no significant difference in yields favouring one distance over the other. On

account of the rank growth of sweet clover when seeded in rows, the plots sown with the ordinary grain-drill in rows 6 inches apart gave a finer quality of hay.

It is practically impossible to draw any conclusions dealing with the experiment on rates of seeding. The common variety of sweet clover was used which is not hardy at this Station. Winter-killing has reduced the stands in some years to the extent of 40 to 60 per cent and in others the crop was not worth cutting. In some instances winter-killing was greater in the heavier seedings than in the lighter. Under such conditions a comparison is impossible.

Sowing in combination with grasses is dealt with under the heading "Mixtures of Western Rye Grass and Sweet Clover."

Results from seedings with and without a nurse-crop indicate that higher yields of sweet clover were received where the seeding was done without a nurse-crop. On the other hand, when both the yields of the nurse-crop and sweet clover are considered the results favour seeding with a nurse-crop. Both oats and barley were used as a nurse-crop and it was found that ¾-bushel of either grain resulted in the highest yield of sweet clover.

The testing of varieties or strains of sweet clover for hardiness has received considerable attention at this Station. Tests were made with varieties sent out by commercial seed houses and agricultural colleges. With the exception of the Arctic variety, none of the other varieties have proven hardy under northwestern Saskatchewan conditions. Arctic is not only hardier at this Station but it also makes a quicker growth in the spring than any of the other varieties tested. Some of the plots of this variety have been allowed to go to seed during the last few years. The home-grown Arctic seed appears to be slightly hardier than commercial Arctic seed.

Tests with alfalfa have been conducted since 1914 with varying results. From six seedings made in the years 1917 to 1922 inclusive only two sowings produced crops. All seedings were made on bare summer-fallow. Experimental results to date indicate that alfalfa is not a dependable crop for this district. The chief limiting factor in the production of alfalfa under conditions which prevail at this Station is its inability to withstand the severe climatic conditions. In future experimental work with alfalfa it is proposed to select and self for hardiness.

MIXTURES OF WESTERN RYE GRASS AND SWEET CLOVER

Sweet clover and western rye grass gave satisfactory results when grown in combination. One objection to this method of seeding is that the sweet clover matures earlier than the rye grass and becomes coarse when left until rye grass is ready for cutting. On the other hand, sweet clover cures more easily when mixed with rye grass than when grown alone. The mixture improves the feeding value of the hay. A good aftermath, principally of sweet clover, is always secured from the first crop after seeding even in dry years. Sweet clover does not appear in the second crop except in cases where the seed failed to germinate in the first year.

An experiment was started in 1922 with a view to determining what proportions of western rye and sweet clover should be used in order to return the

highest yields. The various mixtures with results to date are summarized in the following table:—

GRASSES AND CLOVER MIXTURES.—YIELD IN TONS PER ACRE GREEN WEIGHT

Mixtures	1921 Seeding		1922 Seeding		1923 Seeding		1924 Seeding		1925 Seeding	Average for nine crops
	1922 Crop	1923 Crop	1923 Crop	1924 Crop	1924 Crop	1925 Crop	1925 Crop	1926 Crop	1926 Crop	
W. rye grass, 14 lb.	1·36	2·02	3·28	1·60	2·34	5·20	4·12	2·36	4·20	2·94
Brome grass, 14 lb.	1·20	2·00	2·60	2·80	2·04	5·64	2·72	3·00	4·74	2·97
W. rye grass and brome grass, 7 lb. and 7 lb.	2·14	2·20	3·60	2·68	2·24	4·88	5·28	2·42	4·10	3·28
W. rye grass, 8 lb; sweet clover, 4 lb.	1·72	1·92	3·76	2·28	2·68	4·72	4·88	2·58	5·04	3·29
W. rye grass, 8 lb.; sweet clover, 6 lb.	1·78	1·94	3·70	2·34	2·52	4·70	5·40	2·94	5·20	3·39
W. rye grass, 8 lb.; sweet clover, 8 lb.	2·30	2·08	3·64	2·14	2·68	5·00	5·56	2·90	4·80	3·46
W. rye grass, 8 lb.; sweet clover, 10 lb.	2·44	1·98	3·40	2·32	2·82	5·04	5·60	3·10	4·60	3·48
W. rye grass, 8 lb.; sweet clover, 12 lbs.	3·08	1·90	3·56	2·16	2·32	4·32	5·44	3·26	4·80	3·43
W. rye grass, 4 lb.; sweet clover, 8 lb.	2·12	2·08	3·90	1·92	1·70	3·24	5·04	2·76	5·50	3·14
W. rye grass, 6 lb.; sweet clover, 8 lb.	2·16	2·10	3·80	1·88	1·72	3·24	4·94	2·00	4·92	2·97
W. rye grass, 10 lb.; sweet clover, 8 lb.	1·92	2·24	3·70	1·88	1·64	3·14	5·14	2·50	5·20	3·04
W. rye grass, 12 lb.; sweet clover, 8 lb.	Ploughed up		3·74	1·68	1·74	3·60	.....	.....	.....	2·69 (4 crops)
Brome, 8 lb.; sweet clover, 6 lb.	2·44	2·04	.....	.....	.....	.....	.....	2·84	5·80	3·28 (4 crops)
Brome, 8 lb; sweet clover, 8 lb...	2·00	2·10	.....	.....	.....	.....	.....	.....	.....	2·05 (2 crops)
Brome, 10 lb.; sweet clover, 10	1·94	1·90	.....	.....	.....	.....	.....	.....	.....	1·92 (2 crop)

STRAINS—WESTERN RYE GRASS

Western rye grass is one of the most important grasses adapted to prairie conditions on account of hardiness and drought resistance. It is favoured at this Station over brome for the reason of its ease of eradication. One ploughing has always been found sufficient to destroy the roots of rye grass in the breaking year, while the plants of brome grass frequently persist after both breaking and back-setting.

One of the chief difficulties in the improvement of forage crops is the fact that they are practically all open-fertilized either by wind or insects. By reason of rye grass being normally self-fertilized it lends itself to the selection and breeding of strains, which have become fairly well fixed as to type. Fifty-four of the leading strains at the Central Farm, Ottawa, were sent out by the Forage Division last spring for test purposes.

Of the thirty-one strains which produced a crop this year, the results from only seven are recorded. Due to drought and the fact that the remainder of the strains were producing their third crop, the yields are low. Each strain was sown in plots consisting of 6 rows 36 inches apart. Three rows of the plot were cut for hay and the remaining three left for seed. By this method each strain is tested for seed production as well as hay. Notes were taken at the time of harvesting on habit of growth, percentage of leaf, and colour of foliage in the different strains tested.

A short description is supplied opposite each strain in the table. Following are submitted the 1926 results together with a two-year average for both hay and seed production.

WESTERN RYE GRASS—TEST OF STRAINS FOR YIELD AND PURITY—1924 SEEDING

Strains	Yield per acre						Remarks
	1926 Results			Two-year Average			
	Green weight	Dry weight	Seed	Green Weight	Dry Weight	Seed	
	Tons	Tons	lb.	Tons	Tons	lb.	
Strain No. 15.....	3·53	1·63	323	3·68	1·62	557	Plants erect. Quite leafy especially at bottom. Colour—stem, parrot-green; leaf, spinach-green.
Strain No. 17.....	3·06	1·52	310	3·15	1·45	450	Plants fairly upright slightly spreading. Quite leafy. Colour—stem, deep dull yellow-green; leaf, cedar-green.
Strain No. 5.....	3·06	1·42	465	3·10	1·37	566	Plants fairly erect, slightly spreading at top. Quite leafy. Colour—stem, light elm-green; leaf, cress-green.
Strain No. 92.....	2·64	1·35	310	2·68	1·29	434	Plants fairly erect somewhat spreading at top. Leafy well up on stem. Colour—stem, cress-green; leaf, forest-green.
Strain No. 81.....	3·10	1·48	434	2·65	1·21	457	Plants upright and fairly leafy. Colour—stem, light elm-green; leaf, bice green.
Strain No. 83.....	2·50	1·25	279	2·25	1·10	334	Plants upright and fairly leafy. Colour—stem, light elm-green; leaf, bice green.
Strain No. 31.....	2·40	1·13	264	1·98	0·89	249	Stems very erect; leafiness medium. Colour—stem, forest-green; leaf, cedar-green.

ANIMAL HUSBANDRY

The experimental work in Animal Husbandry is under the supervision of Mr. E. Van Nice, B.S.A., Assistant to the Superintendent, who has compiled the data given under this heading.

HORSES

The horses at this Station at the end of December consisted of 17 pure-bred Percherons and 9 grade work-horses. Three pure-bred foals were raised during the summer of 1926. One was sired by Silver Jobka—8104—, and the other two by Justice—10963—. The plan of feeding half a teaspoonful of potassium iodide three times per month to the mares in foal, starting fairly early in pregnancy, has been followed for several years and no joint-ill has been evident since this practice was started.

The Station was again a member of the Scott Percheron Horse Breeders' Association for 1926 and the assistant to the superintendent was secretary-treasurer of the association.

The stallion used during the breeding season was an imported horse, Koimao—3757—94335, which held an A.A. special first-class certificate and was sired by Falot (65806).

A grade Clydesdale team was shown at the Wilkie Fair which won first in its class, and in addition won the horse pulling contest.

CATTLE

The pure-bred Shorthorns at this Station are of the milking strain and at the end of December 1926 totalled 34 head. The herd is accredited under the Dominion Government Regulations.

During the year there has been a keen demand for Shorthorn breeding stock of the milking strain, particularly bull calves.

Shorthorn herd sire Brandon Morello—173903—Weight at three years of age, 1,970 pounds.

The herd sire is Brandon Morello—173903— sired by Brandon Bandoleer —144190—. The dam of the former is Brandon Janet 5—162536—; milk record 10,029 pounds; grand dam, Ottawa Janet 4—95004; milk record 12,652 pounds.

The Shorthorn herd was started in 1921. No cows with outstanding milk records were procured but by the use of good sires and careful selection of females some progress is noticeable.

None of the cows have been forced for milk production. During the winter months the cows in milk were fed a ration of 20 pounds of sunflower silage, 10 pounds prairie hay and approximately 10 pounds of chop—containing 5 parts oat chop, 1 part bran and 1 part oilcake meal. In the summer the milking cows on pasture were fed about 5 pounds of oat chop per day.

FIVE LACTATION RECORDS MADE AT SCOTT BY PURE-BRED SHORTHORNS

Name and Number of Cow	Days milking	Pounds of milk	Pounds of butterfat	Fat Test
Jess Mayflower 2—147124	365	7,716	324	4·2
Indian Head Pride 2—129321	307	6·441	251	3·9
Prairie Red Rose 16—176899	344	6,210	254	4·1
Pride of Qu'Appelle 7—120129	303	5,506	236	4·3
Butterfly Countess—124581	326	5,283	158	3·0

CALF-FEEDING EXPERIMENT

Object of Experiment.—To compare the value of a home-mixed calf meal with a commercial meal.

Plan of Experiment.—Six young calves were divided into two equal lots according to size, weight and conformation. Whole milk was fed for four weeks after which skim-milk gradually replaced the whole milk. One-sixteenth of one pound of the calf meal was added and gradually increased until one pound was fed at the age of 20 weeks with 12 pounds of skim-milk.

The commercial meal is known as Royal Purple. The home-prepared meal was made up of 2 parts ground oats, 2 parts corn meal, and 1 part ground flax seed. The commercial meal was fed according to instructions of the manufacturers and the home-mixed meal was steeped in hot water before it was added to the milk. The concentrates fed in addition to the calf meal consisted of 2 parts whole oats, 3 parts bran and 1 part oilcake meal.

HOME-MADE VS. COMMERCIAL CALF MEAL

——		Royal Purple	Home-mixed meal
Number of calves		3	3
First gross weight	lb.	675	675
First average weight	"	225	225
Final gross weight	"	1,150	1,160
Final average weight	"	383	386
Total gain in 91 days	"	475	485
Average gain per head	"	158	161
218 lb. oats at 34 cents per bush. plus $1.50 for crushing	$	2 34	2 34
225 lb. bran at $1.15 per hundred	$	2 59	2 59
109 lb. oil-cake at $3 per hundred	$	3 27	3 27
136·5 lb. Royal Purple Calf meal at $5.75 per hundred	$	7 85	
136·5 lb. home mixed meal at $2.41 per hundred	$	.....	3 28
2,964 lb. skim-milk at 25 cents per hundred	$	7 31	7 31
Total cost of feed including milk	$	23 36	18 79
Total quantity of concentrates (not including calf meal)	lb.	689	689
Concentrates per 100 pounds gain	"	145	142
Calf meal per 100 pounds gain	"	28·7	28·1
Cost of all feed per 100 pounds gain	$	4 91	3 88

Deductions.—The home-mixed meal produced slightly higher gains than the commercial meal and the cost was less per 100 pounds of gain.

The home-mixed meal is easily prepared and is effective in promoting growth.

STEER-FEEDING EXPERIMENT

The 1925-26 experimental feeding work with steeers consisted of a comparison of roughages—Prairie Wool, western rye grass hay and oat sheaves fed in conjunction with oat straw as compared to feeding steers on oat straw as the sole roughage.

The roughages fed were as follows:—

Lot 1.—Straw and Prairie Wool.
Lot 2.—Straw and western rye grass hay.
Lot 3.—Straw and oat sheaves.
Lot 4.—Straw.

The steers were uniform as to colour, size and breeding—red two-year-olds of Shorthorn breeding. They were housed in a cheaply constructed shed sheeted with a single ply of lumber. The amount of meal fed to each lot was

the same and consisted of a mixture of oats and barley with 3.9 per cent oilcake meal. The steers had access to water and were supplied with salt in separate salt-boxes located at one end of each feed trough.

STEER-FEEDING—FEED, TOTAL QUANTITY FED AND PRICE

—	Lot 1 — Prairie Hay	Lot 2 — Western Rye Hay	Lot 3 — Oat Sheaves	Lot 4 — Oat Straw
	$	$	$	$
3233 lb. oat chop at 1c per lb. plus $1.50 per ton for crushing	34·75	34 75	34 75	34 75
2,759 lb. barley chop at 1c. per lb. plus $1.50 per ton for crushing	29 65	29 65	29 65	29 65
231 lb. oilcake meal at $60 per ton	6 93	6 93	6 93	6 93
40 lb. salt at $32 per ton	0 64	0 64	0 64	0 64
5,628 lb. oat sheaves at $7 per ton	.....	.....	19 69	.....
5,628 lb. prairie hay at $8 per ton	26 28	.....	.....	.....
5,628 lb. western rye hay at $8 per ton	.....	26 28	.....	.....
Oat straw at $2 per ton	6 40	6 98	8 08	13 76

STEER-FEEDING—AVERAGE DAILY RATION FOR FEEDING PERIOD

Feeds	Lot 1	Lot 2	Lot 3	Lot 4
	lb.	lb.	lb.	lb.
Oat straw	10·8	11·8	13·7	23·4
Prairie hay	9·5	.....	.....	.....
Western rye hay	.....	9·5	.....	.....
Oat sheaves	.....	.....	9·5	.....
Chop	10·5	10·5	10·5	10·5

The quality of the oat straw and oat sheaves was good. The prairie wool could not be classed as No. 1, as it contained considerable sage and old bottom hay. The western rye hay was overripe when cut but of fair quality.

STEER-FEEDING STATEMENT

—		Lot 1 — Prairie Hay	Lot 2 — Western Rye Hay	Lot 3 — Oat Sheaves	Lot 4 — Oat Straw
Number of steers in lot		4	4	4	4
Initial gross weight November 30	lb.	4,290	4,260	4,285	4,250
Initial average weight November 30	"	1,072	1,065	1,071	1,062
Final gross weight April 26	"	5,540	5,440	5,455	5,400
Final average weight April 26	"	1,385	1,360	1,363	1,350
Total gain per head in 147 days	"	313	295	292	288
Average daily gain per head	"	2·12	2·00	1·98	1·95
Feed required per 100 pounds gain—					
Straw	"	512	591	690	1,197
Prairie hay	"	450	.....	.....	.....
Western rye hay	"	.....	477	.....	.....
Oat sheaves	"	.....	.....	481	.....
Grain	"	479	508	512	521
Oilcake meal	"	18	20	20	20
Cost of feed per 100 pounds gain	$	8 56	8 83	8 53	7 44
Total cost of feed per head	$	26 16	26 05	24 93	21 43
Initial cost of steers per head at $5.83 per cwt	$	62 49	62 08	62 43	61 91
Initial cost plus cost of feed per head	$	88 65	88 13	87 36	83 34
Market value per head f.o.b. Scott at $6.50 per cwt	$	90 02	88 40	88 59	87 75
Profit per lot	$	5 48	1 08	4 92	17 64
Profit per head	$	37	0 27	1 23	4 41

Deductions.—The highest returns were obtained from the steers receiving oat straw as a roughage, thus substantiating the results of previous feeding trials.

The addition of 10 pounds of prairie hay, rye grass hay and oat sheaves to a ration of oat straw, grain and oilcake meal, produced slightly more gains but increased the feed cost of 100 pounds gain by $1.12, $1.39 and $1.09 respectively.

Figuring prairie wool at $8 per ton (actual purchase price f.o.b. Scott) the relative value of western rye hay was $5.66 per ton and oat sheaves $5.03 per ton. On the same basis, the oat straw fed to Lot 4 had in this experiment a relative value of $3.77 per ton.

Both the 1925 steer-feeding experiment and the previous year's test show that steers can be profitably fed on oat straw provided a good grain ration is used. In both years the steers fed oat straw as the sole roughage gave the highest net profit. An important fact for the farmer who has an abundance of good oat straw is that oat straw is adequate roughage provided a good grain ration is used and that he does not need prairie wool, western rye hay or oat sheaves to feed in conjunction with the oat straw.

SHEEP

Three grade flocks of sheep—Shropshire, Cheviot and Rambouillet, are maintained at this Station at the present time. The experimental work consists of grading up a flock of each breed from grade ewes by the use of pure-bred sires. Each of the three flocks is reduced each year to 25 grade ewes. A pure-bred ram of each respective breed is used and in addition a few pure-bred Shropshire and Cheviot ewes are kept to form foundations for pure-bred flocks.

The Shropshire Ram used for the past two years was Prince Astor —33481— Sired by an imported Ram, Buttar 131 —29270— (018332R). The Cheviot Ram was Summerland Marshall —1938— sired by an imported Ram, Stormproof —1427—. The Rambouillet Ram was Lethbridge 168 —1958— sired by Glenside 8 —366—.

The wether lambs and inferior females are sold on the market each autumn and the surplus breeding ewes are sold to farmers in the district.

The wool-clip for 1926 averaged 8.6 pounds per head from the Shropshires, 7.5 pounds from the Cheviots and 8.7 pounds from the Rambouillets. Each fleece was tagged at the time of shearing and the wool was shipped to the Canadian Co-Operative Wool Growers and graded separately. The grading according to breeds is shown in the subjoined table.

Grades of Wool	Per cent of wool of each grade		
	Shropshire	Cheviot	Rambouillet
Fine staple	.....	.....	3·3
Fine medium staple	3·2	6·6	33·0
Medium staple	55·8	23·3	57·1
Medium clothing	3·0	.....	3·3
Low medium staple	38·0	56·6	3·3
Low staple	.....	13·5	.....

It will be noted that the Rambouillet is superior in quality of fleece and that the Cheviot produces over 50 per cent of low medium and low staple wool.

The 1926 wether lambs were shipped to a packing-plant at Edmonton in October. The grades used by the packer for the lambs off car were, Number 1, Medium, Fair, and Plain. The grading on foot was as follows: Shropshires 60 per cent, No. 1, 40 per cent Medium; Cheviots 61.1 per cent No. 1 and 38.9 per cent Medium; and Rambouillets 65 per cent No. 1 and 35 per cent Medium. The grading was based almost entirely upon finish. One cent per pound more was paid for No. 1 lambs than for mediums.

The dressing percentages were as follows: Shropshires 41 per cent, Cheviots 41 per cent and Rambouillets 45 per cent.

The Rambouillets made a good showing in this test in grading on foot and in dressing percentage, but from the packers' point of view the Rambouillets did not meet with as much favour as either the Cheviots or Shropshires. The reason given for this is that the Rambouillets are not as plump in appearance particularly in the leg of mutton. When on the rail the long slender quarter of the Rambouillets was quite noticeable in comparison with the shorter and well rounded hind quarters of the Shropshires and Cheviots.

The Rambouillets seem to be a little slower to mature but with equal finish sell for the same price as either of the other breeds.

PREVENTION OF GOITRE IN LAMBS

Goitre is often the cause of serious losses in the lamb crop particularly on the prairies where there is sometimes not a very wide choice of feeds.

The experimental investigations conducted at this Station previous to 1925 show 100 per cent control was effected by the feeding of one per cent potassium iodide in the salt to pregnant ewes.

During the winter of 1925-26 an experiment was conducted with a view to finding the minimum quantity of potassium iodide effective. One lot of ewes was given salt containing one pound of potassium iodide to 100 pounds salt, another lot received one ounce of potassium iodide to 100 pounds of salt, and a third lot was used as a check and received salt but no potassium iodide.

In the lot which received one pound potassium iodide in 100 pounds of salt no lambs were affected with goitre and in the lot receiving one ounce in 100 pounds of salt 25 per cent of the lambs were affected with goitre at birth, 50 per cent of which died. In the check lot, which had never been fed potassium iodide at any time, 51 per cent of the lambs were affected with goitre, 27 per cent of which died.

It is evident from this year's results that one ounce of potassium iodide is not sufficient to control goitre.

Method of Preparation.—Before mixing, the potassium iodide should be dissolved in just sufficient water to moisten all of the salt. This will ensure a thorough distribution when well mixed with the salt. If too much water is used any liquid which is lost means a loss of potassium iodide. When the crystals of potassium iodide are mixed with the salt without dissolving with water, it is impossible to make such that each ewe is getting her portion of the iodide. One pint of water is sufficient for 25 pounds of dry salt irrespective of the quantity of potassium iodide used.

LAMB-FEEDING EXPERIMENT

Object.—To determine the value of sunflower silage for fattening lambs.

Plan of Experiment.—Thirty lambs were divided into two equal lots on November 18, 1925. A good ration of grain was fed and oat straw was kept before the lambs in racks. One lot was fed sunflower silage in addition to the other feeds, while the check lot received no silage.

LAMB-FEEDING—AVERAGE DAILY RATION PER HEAD FOR PERIOD

—		Silage Lot	No Silage Lot
Concentrates	lb.	1·5	1·5
Straw	"	2·0	2·6
Silage	"	1·6	.....

It will be noted that the lambs receiving 1.6 of silage consumed $\frac{3}{5}$ pounds less straw.

LAMB-FEEDING—SILAGE VS. NO SILAGE

—		Silage Lot	No Silage Lot
Number of lambs in lot		15	15
First gross weight November 18	lb.	1,140·0	1,149·0
First average weight	"	76·0	76·6
Final gross weight February 18	"	1,514·0	1,410·0
Final average weight	"	100·9	94·0
Total gain per lot in 92 days	"	374·0	261·0
Total gain per head in 92 days	"	24·9	17·4
Average daily gain per head	"	0·27	0·18
Total concentrates consumed	"	2,081·5	2·081·5
Total silage consumed	"	2,222·0	.....
Total cost of feed (including silage and straw)	$	30 84	28 53
Concentrates per 100 lb. gain	lb.	556	797
Cost of concentrates and straw per 100 lb. gain	$	7 08	10 93
Extra gain produced by silage	lb.	113	.....
Returns from silage per ton	$	10 59	.....

FEED COSTS AND TOTAL AMOUNT OF FEED

—		Silage Lot	No Silage Lot
1,155 lbs. of oats fed at 1c per lb	$	11 55	11 55
662 " barley fed at 1·2c per lb	$	7 94	7 94
150·5 " bran fed at 1·15c per lb	$	1 73	1 73
114 " oilcake at 3·1c per lb	$	3 53	3 53
2,760 " oat straw at $2 per ton	$	2 76	.....
3,788 " oat straw at $2 per ton	$	.....	3 78
2,222 " sunflower silage fed at $3 per ton	$	3 33	.....

Deductions.—In this experiment sunflower silage returned a value of **$10.59** per ton when fed to fattening lambs. The two years' trials show an average value of **$11.28** per ton. This value is derived by calculating the actual cost of the gains in the No-Silage Lot and the extra gains produced by the use of Silage.

The average of two trials shows the quantity of concentrates required for 100 pounds gain to be 651 pounds for the silage lot and 908 pounds for the No-silage lot, that is, the use of silage resulted in a saving of 259 pounds of concentrates for 100 pounds gain.

The average of two trials shows an increase in daily gains of 44.4 per cent. due to silage. Valuing the grain at 1 cent per pound and the oilcake meal at $50 per ton, the silage had a relative value in the two trials of $9.45 per ton.

SWINE

Yorkshires make up the greater part of the swine herd at this Station. A small Bershire herd is maintained at present but very little interest is taken in this breed by farmers visiting the Station and the demand for Berkshire breeding stock is very small.

During the past twelve months 10 Yorkshire boars and nineteen young brood sows were sold to farmers in the territory served by this Station. In addition an unrelated pair of Yorkshire pigs was donated at weaning time to the Saskatchewan Swine Breeders' Association as a prize for the Boys' and Girls' Swine Judging Competition.

The swine on experimental feeding during the summer were all pure-bred Yorkshires. All experimental feeders, within the required weights, when sold on the market graded 100 per cent selects.

Two Yorkshire sires were used during the year—Brandon Stewart—81676—sired by Sunnyside Jude 31—77030—and Ottawa Alexander 138—102759—sired by an imported boar Dalmeny A.R.—88840—(40991).

The Berkshire sire used for the past two years was Ottawa Model 101—65162—sired by Willow Lodge Baron 2—57271. A young Berkshire boar, Lacombe Model—69683—was obtained from the Lacombe Experimental Station for use during 1927. This pig was sired by Stanford Lord—64632—and is a promising individual.

SOFT PORK INVESTIGATION

Object of Experiment.—To determine the effects of light and heavy feeding upon the firmness of pork.

Plan of Experiment.—Twenty-eight Yorkshire pigs were divided into four lots of seven each as evenly as possible according to size and age. The quantity of meal fed was 3 per cent of the live weight per day to Lot 1, and 4 per cent to Lot 2. Lot 3 was fed a full ration in a trough three times per day and Lot 4 was self-fed.

Buttermilk and oilcake meal were included in the proportions shown in Table 1. The oilcake was mixed with the meal and the buttermilk was fed separately in a trough.

SOFT PORK FEEDS.—PROPORTIONS AND QUANTITY FED

Lot	No. of pigs	Days in Exp.	Meal Mixture Fed	Quantity of Meal Fed in Proportion to Live Weight	Other Feeds
			1st 50 days		
1	7	119 June 10 to Oct. 7	Oat chop, 2 parts. Shorts, 2 parts. Barley chop, 1 part. Bran 8%. Oilcake meal 4%.		Buttermilk 87% of weight of meal.
			51 to 119 days Oat chop, 2 parts. Barley chop, 2 parts. Shorts, 1 part. Bran 8%. Oilcake meal 4%.	3 per cent to 98th day then full ration.	
2	7	119 June 10 to Oct. 7	Same as Lot 1.....	4 per cent to 98th day then full ration.	Buttermilk 73% of weight of meal.
3	7	119 June 10 to Oct. 7	Same as Lot 1.....	Full feed in trough during entire period.	Buttermilk 67% of weight of meal.
4	7	119 June 10 to Oct. 7	Same as Lot 1.....	Full feed Self-feeder during entire period.	Butter milk 61% of weight of meal.

The pigs were farrowed in March and the average age at the beginning of the experiment was 2½ months. They were sheltered in a piggery with no access to pasture. All grain was ground. In the case of the trough-fed lots, the grain was given three times per day mixed with water.

When the pigs were ready for market they were shipped to a packing-plant in Edmonton. Every pig, within the required weights, graded "select". There were two in the self-feeder lot which were over weight before the majority from the other lots were ready to ship and there was one shop hog in each lot which from a late litter.

The identity of each hog was maintained through the process of slaughtering and when the carcasses were thoroughly cooled the Superintendent of the plant examined each carcass on the rail for softness. Only two carcasses from this experiment were pronounced to be slightly soft. One was from Lot 3 which received full ration from the trough and the other was from Lot 2 which received a daily ration equal to 4 per cent of the live weight. The latter pig was found in a shallow trench on its back about six weeks before marketing which caused it to appear unthrifty for a few days but was not off feed. The other pig received no injury as far as is known.

It is interesting to note that one pig in the experiment comparing buttermilk and tankage, graded slightly soft. The pig in question had an umbilical rupture from weaning time but the rupture was practically outgrown at time of marketing.

SOFT PORK INVESTIGATION

——		Lot 1 3% Hand fed	Lot 2 4% Hand fed	Lot 3 Full Ration Hand fed	Lot 4 Self-feeder
Number of pigs in each lot		7	7	7	7
Initial weight of each lot	lb.	354	350	347	347
Initial average weight	"	50	50	49·5	49·5
Final weight of each lot	"	1,355	1,457	1,511	1,561
Final average weight per pig	"	193	208	215	223
Total gain per lot during test (119 days)	"	1,001	1,107	1,164	1,214
Average gain per pig	"	143	158	166	173
Average daily gain per pig	"	1·20	1·32	1·39	1·45
Oat chop consumed at 1c. per pound plus $1.50 per ton for for crushing	"	1,176	1,366	1,514	1,647
Barley chop at 1·2c. per pound plus $1.50 per ton for crushing	"	1,055	1,207	1,330	1,396
Shorts at $1.20 per hundred	"	709	842	941	1,079
Bran at $1.15 per hundred	"	294	340	379	419
Oil-cake meal at $2.90 per hundred	"	135	154	175	177
Buttermilk at 28c. per hundred	"	2,922	2,922	2,922	2,922
Total quantity of meal consumed	"	3,369	3,909	4,339	4,718
Total cost of feed (including milk)	$	50·06	55·71	62·10	66·52
Meal required per 100 pounds gain	lb.	335	353	372	388
Cost of all feed per 100 pounds gain	$	5·00	5·03	5·33	5·47
Returns per head at 12c per pound less cost of feed	$	16·08	17·01	17·03	17·26

Deductions.—With the feeds used in this experiment, the results of this single test indicate that neither the quantity of feed or method of feeding was conducive to softness in pork.

In this experiment the method of feeding or quantity of feed fed had no influence on the type of pig at market weight. All pigs in the various lots which were within the required weights graded "selects".

The pigs on the self-feeder made the most gains and returned the highest net profit.

The pigs on full ration (hand fed) made 15.8 per cent more daily gains than the pigs on the limited ration but required 40 pounds more meal and 40 pounds less buttermilk for 100 pounds gain. The pigs on the self-feeder made 4.3 per cent more daily gains than the pigs on the full ration (hand fed) but required 16 pounds more meal and 10 pounds less buttermilk for 100 pounds gain.

BUTTERMILK VS. TANKAGE

Objects of Experiment.—To compare the value of buttermilk and tankage for growing pigs when fed from weaning until marketed. To determine the value of tankage as a substitute for buttermilk after buttermilk is fed for four months.

Plan of Experiment.—Twenty-eight Yorkshire pigs were divided as evenly as possible into four lots of seven each. All lots were fed the same grain ration, which included 4 per cent oilcake meal. In addition Lot 1 received buttermilk and Lot 2 received tankage from weaning until marketed. Lots 3 and 4 received buttermilk after weaning for four months, which was the 43rd day of the experiment. After the 43rd-day period, Lot 3 was fed tankage until marketed and lot 4 no tankage or buttermilk after this time.

BUTTERMILK AND TANKAGE FOR PIGS—PROPORTIONS AND QUANTITY FED

Lot	No. of pigs	Days in Exp.	Meal ration fed—4% of live weight per day	Other feeds
1 1	7	118 June 11 to Oct. 7	*1st 50 days* Oat chop, 2 parts. Shorts, 2 parts. Barley chop, 1 part. Bran 8%. Oilcake meal 4%.	Buttermilk.
			51 to 118 days Oat chop, 2 parts. Barley chop, 2 parts. Shorts, 1 part. Bran 8%. Oilcake meal 4%.	Buttermilk.
2	7	118	Same as Lot 1	7 per cent tankage.
3	7	118	Same as Lot 1	Buttermilk first 43 days, then replaced with 7% tankage.
4	7	118	Same as Lot 1	Buttermilk first 43 days only.

The pigs were farrowed in March and the average age at the beginning of the experiment was 2½ months. They were sheltered in a piggery with no access to pasture. All grain was ground and fed three times per day in a trough with water.

—		Lot 1	Lot 2	Lot 3	Lot 4
		Buttermilk	Tankage	First period 43 days Buttermilk. 2nd period 75 days Tankage	First Period 43 days Buttermilk. 2nd period 75 days No-Tankage
Number of pigs in each lot		7	7	7	7
Initial weight of each lot	lb.	352	348	347	355
Initial average weight	"	50·2	49·7	49·5	50·7
Final weight of each lot	"	1,410	1,259	1,376	1,348
Final average weight per pig	"	201	179	196	192
Total gain per lot during test (118 days)	"	1,058	911	1,029	993
Average gain per pig	"	151	130	147	141
Average daily gain per pig	"	1·27	1·10	1·24	1·19
Oat chop consumed at 1c. per pound plus $1.50 per ton for crushing	"	1,366	1,366	1,366	1,366
Barley chop at 1·2c. per pound plus $1.50 per ton for crushing	"	1,159	1,159	1,159	1,159
Shorts at $1.20 per hundred	"	842	842	842	842
Bran at $1.15 per hundred	"	331	331	331	331
Oilcake meal at $2.90 per hundred	"	154	154	154	154
Buttermilk at 28c. per hundred	"	3,652	.....	1,260	1,260
Tankage at $2.50 per hundred	"	.....	269	211	
Total quantity of meal consumded	"	3,852	4,121	4,063	3,852
Total cost of feed (including milk)	$	58·02	54·52	56·59	51·32
Meal required per 100 lb. gain	lb.	364	452	394	387
Cost of all feed per 100 lb. gain	$	5·48	5·98	5·49	5·16
Returns per head at 12c. per lb. less cost of feed	$	15·88	13·79	15·51	15·77

Deductions.—Lot 1 which received buttermilk for the full period made the most gains and returned the highest net profit.

Lot 2 which received tankage for the full period made the lowest gains and returned the least net profit.

Comparing lots 1 and 2, when the grain is valued at 1 cent per pound and the oilcake meal and tankage at $50 per ton, the buttermilk had in this experiment a relative value of 39 cents per hundred.

Lot 3 which received tankage after the 43rd-day period made greater gains than lot 4 but required more feed for 100 pounds gain. When the grain is valued at 1 cent per pound, oilcake meal at $50 per ton, and the buttermilk at 25 cents per hundred, the tankage fed during the latter part of the period (75 days) had a relative value of $15.24 per ton. It should be mentioned that the relative value of tankage fed to lot 2 was only $16 per ton.

POULTRY

The only kind of poultry kept at this Station at present is a laying strain of Barred Plymouth Rocks. This breed is one of the heaviest layers as shown by the Records of the Canadian Egg-Laying Contests.

There is a large demand each year for cockerels of this breed and the surplus stock at this Station is usually sold before the first of December.

The plan followed to keep the poultry on fresh soil free from infection is to provide runs of good size on the south of the houses one year and grow a crop on the north side, and the following year run the poultry on the north side and grow a crop on the south.

INCUBATION AND BROODING

The incubators in use at present are one hot-air Prairie State 240-egg size and four hot-water machines; two 250-egg Buckeyes; one 135-egg Queen; and one 100-egg Tamlin—a total capacity of 975 eggs.

It has been found, on account of the rather high altitude and dry atmosphere of northwestern Saskatchewan, that it is beneficial to make provision for more moisture in the incubators than the manufacturers have provided for. This is done by suspending a moist pad above the egg-tray. Full details of this plan may be obtained by writing the Publications Branch, Department of Agriculture, Ottawa, for free Circular No. 42.

Hard coal brooder stoves are used for brooding. Each stove is up to 500-chick capacity and burns 100 pounds of hard coal per week during average weather in late March or early April.

FEEDING OF YOUNG CHICKS

The practice followed at this Station is to take the chicks from the incubator on the twenty-second day; and no feed is given for 48 hours after taking from the incubator. The first feed given is equal parts of finely cracked wheat, corn, and hulless oats, fed dry on a clean smooth floor or a piece of paper. The chicks are fed five times per day and at each feed the quantity given is 1 ounce for 50 chicks. After the end of the first week a dry mash is used to replace one of the five feeds per day. This mash is started gradually by leaving it before the chicks on a paper for only a few minutes the first day and longer each day until they are getting all that they will eat from a hopper. Then the cracked grain is fed twice a day in the litter.

When sprouting oats for the adult stock, a tray of oats is allowed to grow two or three inches high and these sprouts are cut off and chopped fine before feeding to the chick. As soon as the weather permits the chicks to get outside, the green feed is discontinued. If milk is available it is given in a small drinking fountain but care is taken not to change frequently from milk to water. At this Station no change is made from milk to water or vice versa inside of two weeks.

WINTER FEEDING OF PULLETS FOR EGG PRODUCTION

The method of winter-feeding pullets which has given good results at this Station is as follows:—

Dry Mash—Equal parts by weight of shorts, bran, barley chop, beef scrap and hulless oat chop, or common oat chop sifted. To each 100 pounds of the mixture a quarter of a pound of salt and 2½ pounds of pulverized charcoal is added. The dry mash is kept before the birds in a self-feeder. It should be stated that when milk is available the beef scrap may be omitted.

Scratch Grain—Four parts wheat or wheat screenings to 1 part oats and 1 part barley. About 16 pounds of scratch grain per 100 birds is fed in the litter in the evening some of which is usually left in the litter to be scratched for the next day.

Green Feed—A mangel or cabbage is hung on the wall during moderate weather but is not used when it freezes in the house. During cold weather sprouted oats are fed in the morning at the rate of 8 to 10 pounds per 100 birds.

Wet Mash—During extremely cold weather some of the dry mash is mixed with sufficient warm water to moisten, and this is fed warm in a trough at noon but only a quantity which is consumed in about five minutes.

FATTENING EXPERIMENT

Object of Experiment.—To compare gains made in crates with those made in a pen and to compare hulless oats, shorts and potatoes for economy of gains.

Plan of Experiment.—Twenty cockerels were divided into four lots with 8 in one pen and 4 in each of three sections of a fattening crate. The type of crate used is illustrated in Exhibition Circular No. 70, copies of which may be obtained from the Publications Branch, Department of Agriculture, Ottawa.

It was unfortunate that there was no milk available to mix in the feed. With the feed used fair gains were made, and the quality of the flesh was superior to that of other birds not on experimental feeding nor special feed but in good condition when killed.

FATTENING EXPERIMENT

—		Crate Hulless Oats	Crate Shorts	Crate Potatoes	Pen Hulless Oats
Number of cockerels in lot		4	4	4	8
Initial gross weight	lb.	19·5	19·5	19·5	37·5
Initial average weight	"	4·8	4·8	4·8	4·7
Final gross weight	"	23·2	24·2	23·5	45·7
Final average weight	"	5·8	6·0	5·8	5·7
Total gain during test (20 days)	"	3·7	4·7	4·0	8·2
Average gain per bird	"	0·9	1·2	1·0	1·0
Average daily gain per bird	"	·046	·058	·050	·051
Hulless oat chop consumed at 1·5c. per lb	"	21	10	13·5	36·7
Beef scrap consumed at 4·7c. per lb	"	2·5	2·5	3·0	4·7
Shorts consumed at 1·2c. per lb	"	.....	10	.....	
Boiled potatoes consumed at 2c. per lb	"	.....	.....	13·5	
Total quantity of feed consumed (weighed dry)	"	23·5	22·5	30·0	41·4
Feed consumed per pound gain	"	6·35	4·78	7·50	5·04
Total cost of feed	cts.	43·2	38·7	37·0	76·0
Cost of feed per pound gain	"	11·6	8·22	9·25	9·26

NOTES.—The lot which received shorts made the most economical gains.

Boiled potatoes were the least valuable of the feeds tested.

The lot in the pen gained $\frac{1}{10}$ pound more per bird than the lot in the crate getting the same feed, but the attention of the reader is drawn to the fact that this is the result of but one test.

EXTENSION AND PUBLICITY

One of our chief lines of endeavour is that of conveying the results of our experimental work to the people of northwestern Saskatchewan. This is accomplished in several ways—by means of annual reports, articles in the Press, through the medium of an exhibit made up at the Station and sent to the summer fairs, by visitors who come to the Station and have the results of experiment explained to them, and through correspondents writing for information.

A weekly news-letter, mimeographed in the Station office, was sent to approximately fifty newspapers in the territory served by this Station. Special mention should be made of the co-operation of the editors in forming a connecting link between the people on the land and the Experimental Station.

The Station exhibit, which is set up in a special experimental farm tent, was sent to several of the local agricultural fairs—Unity, Macklin, Chauvin and Round Hill. Attendants were in charge to discuss the various lines of experimental work. This phase of publicity work gives the farmers remote from the Station an opportunity of discussing their problems with members of the Station staff. At the Saskatoon Exhibition the Assistant Superintendent was with the Experimental Farms exhibit to discuss experimental work having a special local application.

The increase in the number of visitors to the Station was an opportunity for the staff to broadcast the results of the work. Special field days were arranged by the Agricultural Secretaries from Evesham, Kelfield, Biggar, Paynton, Vera, Macklin, Ruddell and Willow Heights School District. The annual grain growers' rally and picnic was held on July 7. The old-timers of the district commemorated the twentieth anniversary of the settlement of the district on the same date. The attendance for the day was over five thousand.

The staff at the Station were much encouraged in their work this year by the constantly increasing number of enquiries and requests for assistance from farmers.

Members of the Station staff were called on throughout the year to judge at several local fairs as well as to address a number of meetings.

HORTICULTURE AND APICULTURE

Space in this year's report will not allow of a discussion of the work in these departments. In next year's report will be found a summary of the experiments conducted in 1926 and 1927.

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