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 1927

Earliness of Garnet wheat shown on left as compared with Marquis on right. Sown on same day.

Printed by Authority of the Hon. W. R. Motherwell, Minister of Agriculture,
Ottawa, 1928

TABLE OF CONTENTS

DOMINION EXPERIMENTAL STATION, SCOTT, SASK.

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

SEASON

The winter of 1927 was severe. The mean temperature for the month of January was —0.77 and the month of February —1.12 degrees. Snowfall was about average for this Station, but high winds caused considerable snow-drifting, particularly during the month of March.

The crop season of 1927 commenced with a backward spring, seeding was not general until May 9, which is about ten days later than the average for this district. May was cool and cloudy with a precipitation of 2.54 inches as compared to the sixteen-year average of 1.43 inches. The total hours of sunshine recorded for the month of May was the lowest for that month since this Station has been in operation. Weather remained cool during June with a precipitation of 2.12 inches. July was an ideal growing month with a rainfall of 3.10 inches. The precipitation at Scott for the year, August, 1926 to August, 1927, was 15.68 inches which is 1.92 inches above the average for the past sixteen years. A frost on August 8 for the second year in succession did considerable damage throughout the district. The frost-free period, that is, the length of time between the last frost in the spring and the first frost in the fall, was twenty-eight days less than the sixteen-year average for this Station. Rust was noticeable shortly after the crops headed and caused more damage in this district than in any year since 1916. Incidentally, the wind velocity for July was the lowest for that month since wind records have been kept at this Station.

Owing to adverse weather conditions, threshing was prolonged in the district until after snowfall. This was not due so much to the amount of precipitation as to the lack of drying weather.

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:—

FARM OPERATIONS

Dates of Farm Operations	Begun	Finished
Work on land	April 25	Nov. 4
Seeding wheat	May 6	May 25
" oats	" 5	June 2
" barley	" 18	May 18
" sunflowers	" 18	" 28
Planting potatoes	" 21	" 25
Seeding fall rye	Sept. 9	Sept. 9
Spring ploughing	April 25	May 28
Ploughing summer-fallow	May 25	June 9
Cultivating summer-fallow	June 16	Aug. 23
Cutting hay	July 18	Sept. 27
" fall rye	Aug. 10	Aug. 10
" wheat	" 23	Sept. 15
" oats	" 16	" 15
" barley	" 23	Aug. 23
Ensiling sunflowers	Sept. 16	Sept. 23
Digging potatoes	" 23	" 24
Threshing	Aug. 31	Oct. 29
Fall ploughing	Oct. 20	" 31

	Temperature, °F.						Precipitation (inches)							
	Mean		Maximum		Minimum		Rain	Snow	Total Precipitation		Sunshine (hours)		Wind Miles	Evaporation Inches
	1927	Average 16 years	Highest	Mean Maximum	Lowest	Mean Minimum			1927	Average 16 years	1927	Average 16 years		
January	—0·77	—0·20	38·1	8·73	—45·0	—10·27	.....	1·12	0·11	0·58	110·6	87·4	9686	.....
February	—1·12	3·03	37·1	8·31	—36·0	10·55	.....	0·75	0·08	0·51	152·9	116·9	8453	.....
March	18·58	14·13	45·0	29·29	—15·5	7·87	.....	5·12	0·51	0·53	144·0	159·0	12067	.....
April	33·97	37·56	74·0	43·85	1·0	24·08	0·62	8·00	1·42	0·90	198·2	213·3	11617	.....
May	45·66	49·04	73·0	55·42	24·2	35·90	2·39	1·50	2·54	1·43	191·8	258·5	9606	2·87
June	57·60	57·54	84·5	70·00	32·1	45·20	2·14	.....	2·14	2·12	269·5	273·2	8416	3·71
July	61·35	62·30	88·0	72·89	38·3	49·82	3·10	.....	3·10	2·37	306·1	304·6	7645	3·46
August	59·15	60·25	84·5	73·46	32·1	44·84	1·18	.....	1·18	1·99	276·7	259·3	6053	3·97
September	50·89	49·90	89·0	62·82	23·1	38·96	2·46	.....	2·46	1·47	156·0	176·1	9120	2·74
October	41·90	38·09	78·0	53·45	15·5	30·36	0·74	.....	0·74	0·65	119·9	145·7	8257	.....
November	7·96	21·86	50·7	17·25	—29·0	—1·33	.....	5·94	0·59	0·37	63·5	100·2	8736	.....
December	—9·23	6·55	41·2	—0·29	—40·1	—18·16	.....	0·19	0·02	0·51	75·9	80·8	8809	.....
Totals	.....	.....	.....	.....	.....	.....	12·63	22·62	14·89	13·43	2065·1	2175·0	108465	16·75

ANIMAL HUSBANDRY[1]

HORSES

At the end of the calendar year eight grade work-horses and eighteen pure-bred Percherons were on hand at this Station. One pure-bred Percheron foal was raised this year. This foal was sired by a horse holding an A.A. special first-class certificate —Koimao, Imp., —(3757)—94335, sired by Falot (65806). Five mares were bred in 1927 to the Percheron stallion, Presto —(8084)—125771, a class A stallion sired by Orphan Boy (8082)—87684.

CATTLE

The pure-bred Shorthorn herd at this Station totalled thirty-two head at the end of December, 1927. The chief work consists of selecting for higher milk production and at the same time maintaining a desirable beef type. Nine bull calves were sold during the year to farmers living in the territory served by this Station. All female calves were kept in order to determine their milk records during the first lactation period. The bull used during the greater part of the season was Brandon Morello —173903— sired by Brandon Bandoleer —144190—. The dam of Brandon Morello is Brandon Janet 5 —162536—; milk record 10,029 pounds; grand dam, Ottawa Janet 4 —95004—; milk record 12,652 pounds.

On October 21, 1927, a Shorthorn bull, Red Marquis —156496— was purchased from Alexander Maclaren of Buckingham, P.Q. This bull was sired by Thanet Marquis (Imp)—a bull with a number of high milk producing females to his credit including White Molly—a half-sister to Red Marquis, with a milk record of 18,346 pounds testing 4.4 per cent. The dam of Red Marquis is Rosebud 12 (Imp); milk record 11,629 pounds testing 3.64 per cent in 339 days. She is also the dam of Lady Rose; milk record 11,500 pounds testing 4.15 per cent in 305 days. This outstanding dual purpose sire should in time leave stock with higher milk records than the present herd.

MILK RECORDS COMPLETED DURING 1927

Name and Number of Cow	Lactation period	Pounds of milk	Per cent fat	Days milking
Pride of Qu'Appelle 7	7th	6666·8	4·3	329
Jess Mayflower 2	5th	5387·6	4·2	354
Rose Tree 7	5th	5335·9	3·5	321
Prairie Red Rose 16	5th	5319·2	4·1	305
Scott Pride 2	1st	5258·4	.....	408
Indian Head Pride 3	3rd	4590·3	4·6	303
Scott Red Rose	3rd	4393·5	3·4	289
Jessie Qu'Appelle	3rd	4378·6	3·8	266
Butterfly Countess	7th	4006·4	3·0	325

STEER-FEEDING EXPERIMENT

During the winter of 1926-27, 20 grade Angus steers were fed in five lots of 4 each for the purpose of testing the value of different roughages including prarie hay, western rye hay, oat sheaves and silage fed in conjunction with oat straw. The fifth lot received oat straw as the sole roughage. All lots were given a similar grain ration consisting of oat and barley chop with approximately 5 per cent oilcake meal added to the mixture.

[1] Work in Animal Husbandry, Poultry and Bees is under the supervision of Mr. E. Van Nice, B.S.A., Assistant to the Superintendent.

FEED, TOTAL QUANTITY FED AND PRICE

	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
	Prairie hay	Western rye hay	Oat sheaves	Sunflower silage	Oat straw
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
2,165 lb. oat chop at 1c. per lb. plus $1.50 per ton for crushing	23 27	23 27	23 27	23 27	23 27
1,623 lb. barley chop at 1c. per lb. plus $1.50 per ton for crushing	17 45	17 45	17 45	17 45	17 45
198 lb. oilcake meal at $2.65 per cwt.	5 25	5 25	5 25	5 25	5 25
5,696 lb. silage at $3.00 per ton	.....	.....	.....	8 54	.....
4,000 lb. prairie wool at $8 per ton	16 00	.....	.....	.....	.....
4,000 lb. western rye hay at $8 per ton	.....	16 00	.....	.....	.....
4,000 lb. oat sheaves at $8.50 per ton	.....	.....	17 00	.....	.....
Salt at $1.50 per cwt.	0 27	0 42	0 29	0 35	0 35
Oat straw at $2 per ton	4 71	4 75	5 25	5 30	8 44

AVERAGE DAILY RATION FOR FEEDING PERIOD

Feeds	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
	lb.	lb.	lb.	lb.	lb.
Silage	.....	.....	.....	14·24	.....
Oat straw	11·78	11·89	13·12	13·24	21·09
Prairie hay	10·00	.....	.....	.....	.....
Western rye hay	.....	10·00	.....	.....	.....
Oat sheaves	.....	.....	10·00	.....	.....
Meal mixture	9·97	9·97	9·97	9·97	9·97
Salt	0·18	0·28	0·19	0·23	0·23

The quality of the prairie hay, western rye hay and sunflower silage was good. The oat sheaves were fair and the oat straw was poor. It should be stated that it was necessary to feed considerable oat straw grown in 1925.

STEER-FEEDING STATEMENT

		Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
		Prairie hay	Western rye hay	Oat sheaves	Sunflower silage	Oat straw
Number of steers in lot		4	4	4	4	4
Initial gross weight December 4	lb.	3,980	3,950	3,945	3,950	3,955
" average weight December 4	"	995	988	986	988	989
Final gross weight March 14	"	4,580	4,480	4,375	4,470	4,235
" average weight March 14	"	1,145	1,120	1,094	1,118	1,059
Total grain per head in 100 days	"	150	132	108	130	70
Average daily gain per head	"	1·50	1·32	1·08	1·30	0·70
Feed required per 100 pounds gain:—						
Straw	"	785	895	1,220	1,018	3,010
Prairie hay	"	666	.....	.....	.....	.....
Western rye hay	"	.....	756	.....	.....	.....
Oat sheaves	"	.....	.....	930	.....	.....
Silage	"	.....	.....	.....	1,095	.....
Meal mixture (grain)	"	631	714	880	728	1,352
Oilcake meal	"	33	37	46	38	71
Salt	"	3·4	5·3	4·3	4·4	4·4
Total cost of feed per 100 pounds gain	$	11 16	12 67	15 93	11 57	19 56
" " per head	$	16 71	16 78	17 12	15 04	13 69
Initial cost of steers per head at $6.15 per cwt. delivered	$	61 19	60 73	60 64	60 73	60 81
Initial cost plus cost of feed per head	$	77 90	77 51	77 76	75 77	74 49
Actual market value f.o.b. Scott as based upon valuations at Winnipeg $5.71 per cwt.	$	65 38	63 95	62 45	63 81	60 45
Loss per head	$	12 52	13 56	15 31	11 96	14 04

As in previous tests the daily gains are higher on prairie hay than western rye hay. The daily gains on sunflower silage is approximately the same as on western rye hay. The cost of 100 pounds gains is less for silage when silage is charged at $3 per ton as compared to western rye hay at $8 per ton. The daily gain on oat sheaves is low and the cost of 100 pounds gain is high by reason of charging $8.50 per ton (the actual purchase price) for this roughage. The daily gain is low on oat straw. This straw as already mentioned was poor in quality. It should be stated that in previous tests when good oat straw was fed in conjunction with a liberal grain ration, straw was adequate roughage and returned more profit than prairie hay, western rye hay and oat sheaves, consequently to further check the relative values of these roughages a repetition of this experiment is in course of operation at the time of writing this report.

The steers on experimental feeding were included in an experimental shipment of cattle to Glasgow. The appraised valuation is low on account of the fact that the steers were shipped when prices were at a low level in Canada. Had the steers not been required for an experimental shipment for export they would not ordinarily have been sold until work on the land started. Incidentally, the week ending March 10, good steers weighing 1,000 to 1,200 pounds on the Edmonton market were averaging 6½ cents per pound with the tops bringing 7 cents. The week ending April 28 the same class of steer on the Edmonton market was averaging 8¾ cents per pound with the tops bringing 9½ cents. Thus there was a spread of 2¼ cents between March 10 and April 28, sufficient to make winter steer-feeding a profitable undertaking.

SHEEP

The work with sheep during 1927 has been a continuation of the grading-up of the Shropshire, Cheviot and Rambouillet flocks by use of pure-bred sires, testing different quantities of potassium iodide fed to ewes for goitre control in lambs, and ascertaining the value of sunflower silage for winter feeding of lambs.

The Shropshire ram used for the 1927 lamb crop was Indian Head —320—55085—, sired by an imported ram, Buttar 328—38070 (018644R). The Cheviot ram was Summerland Marshal —1938—, sired by an imported ram, Stormproof —1427—. The Rambouillet ram was Lethbridge 168—1958—, sired by Glenside 8—366—.

Each of the grade flocks is reduced annually to twenty-fives ewes and in addition about thirty lambs are held for feeding experiments and from these the young breeding stock is selected. There are also a few pure-bred Shropshire and Cheviot ewes on hand to form foundations for pure-bred flocks.

The average wool-clip for 1927 was 8·1 pounds from Shropshire, 7·4 pounds from Cheviots, and 8·9 pounds from Rambouillets. Each fleece was tagged at the time of shearing and the tags were returned from the Co-operative Wool Growers' Association with the grade of the wool marked. The accompanying table shows the percentage of wool in each grade and the price received per pound at Weston, Ont.

Wool-Grading and Price

Grades of Wool	Price received	Per cent of wool in each grade		
		Shropshire	Cheviot	Rambouillet
	cts.			
Fine staple	30	.....	.....	2·5
Fine medium staple	29	3·4	0·4	42·5
" clothing	27½	.....	.....	5·0
Medium staple	27	40·1	.....	47·5
Medium clothing	25	3·3	.....	.....
Low medium staple	26	46·6	64·5	2·5
Low staple	24	6·6	29·1	.....

The superior quality of fleece in the Rambouillet and the inferior quality of the Cheviot are very apparent from the table. The Shropshire in quality of fleece is between the two.

The wether lambs and cull ewe lambs were shipped to the Swift Canadian plant at Edmonton the end of November. They were graded as feeders with no apparent breed difference in degree of fleshing.

PREVENTION OF GOITRE IN LAMBS

One per cent potassium iodide in the salt fed to ewes during the gestation period has at this Station resulted in a perfect control of goitre. In the fall of 1925 an experiment was started to determine the optimum quantity to feed. One lot was given one ounce of potassium iodide per 100 pounds of salt while a second lot was given one per cent potassium iodide and a third lot was used as a check and received no potassium iodide. There was no goitre in the 1927 lamb crop even in the check lot getting no potassium iodide. In 1926 no lambs were affected with goitre in the lot receiving 1 per cent of potassium iodide. Twenty-five per cent of the lambs from the lot getting one ounce in 100 pounds of salt were affected with goitre and 51 per cent of the lambs from the check lot receiving no potassium iodide in the salt were affected with goitre.

The winter of 1926 the ewes were fed oat straw as the sole roughage. In 1927 after all available oat straw was used western rye and sweet clover hay was fed. This roughage may account for the lack of evidence of goitre in the lamb crop.

LAMB FEEDING EXPERIMENT

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

Plan of Experiment.—Two lots of lambs are kept under identical conditions and fed a similar ration, excepting that one lot received sunflower silage in addition to the straw and meal mixture.

SUNFLOWER SILAGE FOR LAMBS

—		Silage lot	No Silage lot
Number of lambs in lot		15	15
First gross weight	lb.	1,090	1,103
First average weight	"	72·7	73·5
Final gross weight	"	1,406	1,384
Final average weight	"	93·7	92·3
Total gain per lot in 93 days	"	316	281
Total gain per head in 93 days	"	21·1	18·7
Average daily gain per head	"	0·33	0·20
Total concentrates consumed	"	2,038	2,038
Total silage consumed	"	2,182	.....
Total cost of feed (including silage, hay and straw)	$	29 11	26 13
Concentrates consumed per 100 pounds gain	lb.	645	725
Cost of concentrates and straw per 100 pounds gain	$	22 30	22 59
Extra gain produced by silage	lb.	35	.....
Returns from silage per ton	$	2 46	.....

This is the third winter this experiment has been conducted. The return for silage during the first winter was $11.97 per ton and for the second test $10.59 per ton. In these cases the roughage fed was oat straw; but in the third test where the silage only gave a return of $2.46 some low grade western rye hay and sweet clover was fed on account of a shortage of straw. This may be the reason for the silage giving such a low return as compared with the other

two winters. This experiment is in course of operation during the winter of 1927-28 and straw is used as roughage in addition to the sunflower silage.

FEED COSTS AND TOTAL AMOUNT FED

—		Silage lot	No Silage lot
1,687 lb. oats at 1c. per lb	$	16.87	16.87
235 lb. barley at 1c. per lb	$	2.35	2.35
58 lb. oilcake at $2.65 per cwt	$	1.54	1.54
58 lb. bran at $1.15 per cwt	$	0.67	0.67
2,182 lb. silage at $3 per ton	$	3.27	.....
878 lb. oat straw at $2 per ton (1st 30 days)	$	0.88	.....
1,170 lb. " " (1st 30 days)	$	.....	1.17
1,417 lb. low grade western rye hay at $5 per ton	$	3.54	3.54

AVERAGE DAILY RATION PER HEAD FOR PERIOD

—		Silage lot	No Silage lot
Concentrates	lb.	1·4	1·4
Straw (first 30 days of experiment)	"	1·9	2·5
Hay (last 63 days of experiment)	"	1·4	1·4
Silage	"	1·5	.....

SWINE

For a number of years two breeds of swine—Yorkshire and Berkshire—were kept at this Station. The Berkshires were disposed of during the past summer because of the lack of popularity of the breed in the district on account of the greater difficulty with which the select bacon type is maintained. From observation at this Station the only advantage the Berkshire has over the Yorkshire is the greater resistance to skin diseases and sun-burning.

At the beginning of December, eighty-eight Yorkshires were on hand consisting of twenty brood sows, two boars and sixty-six fall pigs.

During the winter gestation period potassium iodide is fed to the brood sows as a preventive against hairlessness in pigs. The method employed is to dissolve 1 ounce of potassium iodide in 1 gallon of water and give 1 tablespoonful of the solution to each sow daily. A number of pure-bred boar pigs are sold at weaning time each year to farmers in the territory served by the Scott Station and brood sows are sold in the fall after feeding experiments are concluded.

The Yorkshire sires used in the fall of 1927 were Ottawa Alexander 138 —102759—, sired by an imported boar Dalmeny A.R. —88840— (40991) and Ottawa Alexander 257A —128186—, sired by Pine Grove Glory 9 —107847—.

MANGE IN SWINE

In the past two years mange was contracted by breeding outside sows—even after taking the precautionary measure to isolate a boar and treat him after the breeding season before returning him to the herd. Therefore, the practice of breeding outside sows is discontinued.

The Health of Animals' Branch have found sarcoptic mange existing in several herds of swine throughout the district. The symptoms of the disease and the treatment found effective at this Station are as follows:—

Symptoms.—Unthriftiness and dryness of skin, with or without scabby appearance, continuous rubbing or scratching. In advanced cases rubbing is continued until blood is started. Not usually noticed in winter.

Preparation of Material for Treatment.—One gallon of raw linseed oil is heated by suspending in hot water. Eight ounces of oil of tar is added and 2 pounds of sulphur is stirred slowly into the hot oil.

Application.—The preparation is applied warm by hand to all parts of the body by using a rag. The rag is merely moistened with the mixture to avoid blistering. Four treatments are given at ten-day intervals. Between the third and fourth treatment the litter is thoroughly cleaned from the pens and buildings and the posts near buildings, walls and floors are sprayed with white wash containing a reliable disinfectant. It is not necessary to whitewash the walls over 6 feet from the floor.

A very satisfactory way of holding the pig while being treated is to place a small rope in the mouth behind the upper tusks and tie to a post. This allows room to work and is more convenient than trying to treat in a crate.

CURING OF PORK

Object of Experiment.—To ascertain the value of Old Hickory smoked salt for curing pork.

Plan of Experiment.—Two hogs were killed for this test. The Old Hickory smoked salt was used for brine cure for half of one hog and for dry salting for half of the other hog and the common salt was used in the same way. The meat was handled according to instructions outlined by the Smoked Salt Company.

Results.—The hogs were killed in July. The meat was well cured but that cured with the smoked salt had a good smoke flavour and differed in this regard, and in the colour of the meat, from the ordinary salt cure. This single test indicates that curing meat with Old Hickory Salt is an excellent way of curing and smoking meat in one operation.

WINTER FEEDING EXPERIMENTS

In the fall of 1926 the pigs used for winter feeding were born the latter part of August and early September. The shelter provided during the experimental feeding was with one exception the piggery which is a well constructed building ceiled on the inside with ship-lap.

The meal was fed dry twice per day and the quantity fed daily was 4 per cent of the live weight. The protein supplements used were 5 per cent tankage and 5 per cent oilcake meal. No green feed or legume hay was fed. A mineral mixture was supplied in a separate trough which consisted of 5 pounds of air-slaked lime, 1 pound of sulphur, 20 pounds of salt and 74 pounds of soft coal which had been finely broken. The pigs were sold on May 28 and averaged 194 pounds each. The feeding experiments conducted from December 27 to April 18 are reported below.

OAT CHOP AND SHORTS VS. OAT CHOP

Object of Experiment.—To compare the relative value of oat chop and shorts mixture with oat chop for winter feeding inside.

Plan of Experiment.—Two lots of pigs were confined to the piggery. One lot received oat chop with 10 per cent bran, 5 per cent tankage and 5 per cent oilcake meal and 25 per cent shorts. The other lot received a similar ration excepting that the shorts were replaced with oat chop.

OAT CHOP AND SHORTS VS. OAT CHOP

—		Oat chop and shorts	Oat chop
Number of pigs in each lot		5	5
Initial weight of each lot	lb.	308	302
Initial average weight	"	61·6	60·4
Final weight of each lot	"	644	663
Final average weight	"	128·8	132·6
Total gain per lot during test (112 days)	"	336	361
Average gain per pig	"	67·2	72·2
Average daily gain per pig	"	0·60	0·645
Oat chop consumed at 1c. per lb. plus $1.50 per ton for crushing	"	1,073	1,545
Shorts consumed at $1.50 per cwt	"	357	
Tankage consumed at $2.25 per cwt	"	89	97
Oilcake meal at $2.65 per cwt	"	89	97
Bran at $1.20 per cwt	"	178	193
Mineral mixture at 72c. per cwt	"	157	147
Total quantity of meal consumed	"	1,786	1,932
Total cost of feed including minerals	$	24·52	24·73
Meal required per 100 lb. gain	lb.	531·6	535
Cost of all feed per 100 lb. gain	$	7.29	6·85
Returns at estimated value of 10c. per lb. less cost of feed	$	7·98	8·31

Results.—The lot getting shorts became rather unthrifty and would not eat meal equivalent to 4 per cent of their weight per day during the latter part of the winter which accounts for a lower gain and lower returns. This single test indicates that oat chop is a more satisfactory ration for winter feeding when the pigs are confined to a building than a mixture of oat chop and shorts. The test is again repeated this winter to confirm results.

COD LIVER OIL FOR WINTER FEEDING

Object of Experiment.—To determine the value of Cod Liver Oil for fall pigs fed during the winter.

Plan of Experiment.—A similar ration was fed to two lots of pigs confined to the piggery excepting that one lot received one-half ounce of Cod Liver Oil per pig per day in the feed.

COD LIVER OIL VS. NO COD LIVER OIL

—		Cod Liver Oil	No Cod Liver Oil
Number of pigs in each lot		5	5
Initial weight of each lot	lb.	303	302
Initial average weight	"	60·6	60·4
Final weight of each lot	"	752	663
Final average weight	"	150·4	132·6
Total gain per lot during test (112 days)	"	449	361
Average gain per pig	"	89·8	72·2
Average daily gain per pig	"	0·801	0·645
Oat chop consumed at 1c. per lb. plus $1.50 per ton for crushing	"	1,545	1,545
Tankage at $2.25 per cwt	"	97	97
Oilcake meal at $2.65 per cwt	"	97	97
Bran at $1.20 per cwt	"	193	193
Mineral mixture at 72c. per cwt	"	244	147
Cod Liver Oil at 23c. per lb	"	15	
Total quantity of meal consumed	"	1,932	1,932
Total cost of feed, minerals and oil	$	28·89	24·73
Meal required per 100 lb. gain	lb.	430	535
Cost of all feed, minerals and oil per 100 lb. gain	$	6·43	6·85
Returns per pig at estimated value of 10c. per lb. less cost of feed	$	9·26	8·32

58170—2½

In this single test greater gains resulted from using Cod Liver Oil. The returns over cost of all feeds, including the oil shows approximately $1 more per pig. The test is again repeated this winter to check results.

WINTER HOUSING

Straw Shed vs. Piggery

Object of Experiment.—To compare the relative value of a straw shed with the piggery for winter shelter for growing pigs.

Plan of Experiment.—One lot of pigs was confined to the piggery, the other lot was provided with a straw shed and fed in the open in moderate weather and in a portable cabin during severe weather. The ration fed was similar for both lots.

STRAW SHED VS. PIGGERY

—		Straw shed	Piggery
Number of pigs in each lot		5	5
Initial weight of each lot	lb.	303	308
Initial average weight	"	60·6	61·6
Final weight of each lot	"	792	644
Final average weight	"	158·4	128·8
Total gain per lot during period (112 days)	"	489	336
Average gain per pig	"	97·8	67·2
Average daily gain per pig	"	0·87	0·60
Oat chop consumed at 1c. per lb. plus $1.50 per ton for crushing	"	1,169	1,073
Shorts consumed at $1.50 per cwt	"	378	357
Tankage at $2.25 per cwt	"	96	89
Oilcake meal at $2.65 per cwt	"	96	89
Bran at $1.20 per cwt	"	193	178
Mineral mixture at 72c. per cwt	"	108	157
Total quantity of meal consumed	"	1,932	1,786
Total cost of feed and minerals	$	26 03	24 52
Meal required per 100 lb. gain	lb.	395	531 6
Cost of all feed per 100 lb. gain	$	5 32	7 29
Returns per pig at estimated value of 10c. per lb. less cost of feed	$	10 63	7 98

The lot confined to the piggery showed a lack of thrift during the latter part of the winter and would not eat as much grain as the lot outside. It was thought unwise to hold the outside lot back by keeping the quantity of feed equal in each lot. Therefore the regular ration of 4 per cent of the live weight per day was continued to the outside lot. The outside lot made greater gains at a lower cost and returned $2.59 more per pig over the cost of feed.

The experiment already discussed indicated that the shorts mixture was rather too strong for inside feeding, but the same mixture gave good results in this experiment for outside feeding.

SUMMER FEEDING EXPERIMENTS

The pigs used for the summer feeding experiments were born late in February and early March. The shelters used during the experiments were the piggery and sheep-barn. There are small runs on the south of each building. The meal was fed dry and for the most part three times per day in a trough, except where self-feeders are indicated. The protein supplement was buttermilk when available and tankage during the latter part of the experiment. No soiling crop or pasture was used. The trough-fed hogs were fed 4 per cent of their live weight per day.

The sample of feed as analyzed by the Dominion Chemist, Central Experimental Farm, Ottawa, shows the following analysis:—

—	Barley Chop	Oat Chop	Digester Tankage (Swifts)
	%	%	%
Moisture	13·69	12·30	8·25
Protein	12·06	10·89	43·42
Fat	1·67	3·83	11·17
Carbohydrates	66·94	58·26	
Fibre	3·55	11·38	
Ash	2·09	3·34	*33·86
	100·00	100·00	

*Contained 30·78 per cent bone phosphate.

His comments were " The barley chop is somewhat better than the average, i.e., a little higher in protein and slightly lower in fibre. The oat chop is *not* of first class quality. It is about one per cent low in protein and about one-half of one per cent too high in fibre.

Our provisional classification of packing house feeds would place this digester tankage with the " meat and bone " products. It is free from sand or other extraneous matter and apparently is sweet and wholesome ".

MODERATE VS. RICH BARLEY MIXTURE FOR SUMMER FEEDING

Object of Experiment.—To determine the best proportion of barley chop to feed with oat chop to growing pigs.

Plan of Experiment.—Fourteen pigs were divided into two equal lots and fed by use of self-feeders. Lot 1 was given what is considered in this experiment a moderate mixture and lot 2 a rich mixture. The mixtures fed were as follows and the proportions are by weight:—

Lot 1—Moderate Mixture—

Until 100 pounds in weight—Oat chop only.
From 100 to 150 pounds—Oat chop 3 parts. Barley chop 1 part.
From 150 pounds to finish—Oat chop 1 part. Barley chop 1 part.

Lot 2—Rich Mixture—

Until 80 pounds in weight—Oat chop 3 parts. Barley chop 1 part.
From 80 to 125 pounds—Oat chop 2 parts. Barley chop 1 part.
From 125 to 150 pounds—Oat chop 1 part. Barley chop 1 part.
From 150 pounds to finish—Oat chop 1 part. Barley chop 2 parts.

MODERATE VS. RICH BARLEY MIXTURE

—		Lot 1 Moderate barley mixture	Lot 2 Rich barley mixture
Number of pigs in each lot		7	7
Initial weight of each lot	lb.	328	287
Initial average weight	"	46·8	41
Final weight of each lot	"	1,198	1,393
Final average weight per pig	"	171·1	199
Total gain per lot during test (160 days)	"	870	1,106
Average gain per pig	"	124·3	158
Average daily gain per pig	"	0·776	0·987
Oat chop consumed at 1c. per lb. plus $1.50 per ton for crushing	"	3,035	2,111
Barley chop consumed at 1c. per lb. plus $1.50 per ton for crushing	"	1,281	2,212
Buttermilk consumed at 28c. per cwt	"	792	792
Tankage consumed at $2.25 per cwt	"	153	167
Total quantity of meal consumed	"	4,469	4,490
Meal required per 100 lh. gain	"	513·7	405·9
Total cost of all feeds consumed	$	52 06	52 42
Cost of feeds per 100 lb. gain	$	5 98	4 73
Returns per head at 10c. per lb. less cost of feed	$	9 68	12 41

This single test indicates the richer mixture of barley to be conducive to more rapid gains and also more profitable than the moderate mixture, but further tests are necessary before any conclusions can be drawn.

OAT AND BARLEY CHOP VS. OAT CHOP AND SHORTS VS. CHOP ALONE

Object of Experiment.—To ascertain the relative value of barley chop and shorts and the value of oat chop alone.

Plan of Experiment.—Fifteen Berkshires were divided into three equal lots and each lot was fed one of the respective mixtures in a trough three times per day. The quantity of meal to each lot was 4 per cent of the live weight per day.

Proportion of Feeds for Lots 1 and 2

To 100 pounds in weight—Oat chop 3 parts. Barley chop or shorts 1 part.
From 100 to 150 pounds—Oat chop 2 parts. Barley chop or shorts 1 part.
From 150 pounds to finish—Oat chop 1 part. Barley chop or shorts 1 part.

Lot 3—Oat chop for the entire period

Protein supplement buttermilk.

OAT AND BARLEY CHOP VS. OAT CHOP AND SHORTS VS. OAT CHOP

—		Lot 1 Oat and barley chop	Lot 2 Oat chop and shorts	Lot 3 Oat chop only
Number of pigs in each lot		5	5	5
Initial weight of each lot	lb.	205	206	202
Initial average weight	"	41	41·2	40·4
Final weight of each lot	"	808	926	897
Final average weight per pig	"	161·6	185·2	179·4
Total gain per lot during test (156 days)	"	603	720	695
Average gain per pig	"	120·6	144	139
Average daily gain per pig	"	0·773	0·923	0·891
Oat chop consumed at 1c. per lb. plus $1.50 per ton for crushing	"	2,133	2,060	2,854
Barley chop consumed at 1c. per lb. plus $1.50 per ton for crushing	"	1,040	.....	
Shorts consumed at $1.15 per cwt	"	.....	1,050	
Buttermilk at 28c. per 100 pounds	"	520	520	520
Total quantity of meal consumed	"	3,173	3,110	2,854
Meal required per 100 lb. gain	"	526	431	410
Total cost of feed (including milk)	$	35 55	35 66	32 13
Cost of feed per 100 pounds gain	$	5 89	4 95	4 62
Returns per head at 10c. per lb. less cost of feed	$	9 05	11 38	11 51

The lot getting shorts made the greatest gains. The lot getting barley chop required more grain per 100 pounds gain than the other lots and the oat chop lot was lowest in grain requirements per 100 pounds gain and gave a higher return per pig after the cost of feed was deducted.

This is the first experiment conducted at this Station where oat chop was fed for the entire period, hence, further tests should be made before any conclusions are drawn.

FIELD HUSBANDRY

CROP ROTATIONS

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. The rotations include straight grain crops, grain with hay and pasture crops, grain with hay and sunflowers, and grain with hay and summer-fallow substitutes. Seven rotations are in operation comprising twenty-nine separate fields, and in addition to the larger fields, small plots are used to check the fertility of the land for each arrangement of crops, which work is undertaken in co-operation with the Chemistry Division, Central Experimental Farm, Ottawa.

COST OF PRODUCTION FACTORS

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 and return values for the season of 1927 are listed in detail for the information of the reader. A fixed charge for each operation is used per acre in order to give all rotations the same operation charge per acre irrespective of the size and shape of the fields.

Space will merely permit of a brief summary of the rotations in operation at the Scott Station; therefore, the reader desiring further detail regarding any particular rotation or farm operation is asked to kindly communicate by letter with the Superintendent.

COST VALUES FOR THE SEASON 1927

Rent	per acre	$2 60
Manure	per ton	1 00
Machinery	per acre	1 35
Ploughing	"	1 75
Packing	"	0 30
Harrowing	"	0 20
Cultivating	"	0 50
Cultivating intertilled crops (2 horses)	"	0 46
Scuffling intertilled crops (1 horse)	"	0 57
Discing	"	0 55
Seeding	"	0 35
Cutting grain	"	0 45
Mowing and raking hay	"	1 00
Stacking hay	per ton	1 50
Ensiling sunflowers	"	1 00
Seed wheat	per bushel	2 00
Seed oats	"	1 00
Seed barley	"	1 20
Seed rye	"	1 00
Sunflower seed	per pound	0 09
Sweet clover seed	"	0 17
Western rye grass seed	"	0 09
Twine	"	0 13
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 08
Threshing rye	"	0 14

RETURN VALUES FOR THE SEASON 1927

Wheat	per bushel	$1 20
Oats	"	0 51
Barley	"	0 60
Rye	"	0 90
Western rye hay	per ton	10 00
Sweet clover hay	"	10 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.

In the three-year system of cropping one-third of the land is fallowed each year and the remaining two-thirds cropped. As wheat is the main cash-crop, this rotation is followed by the majority of farmers in northwestern Saskatchewan.

Rotation "C" was started in 1912 and consists of three 1½-acre fields. The summer-fallow field has usually been ploughed in June to a depth of 6 inches, packed and harrowed after ploughing and kept clean of weeds throughout the summer by cultivating with a duck-foot cultivator. This season the summer-fallow was cultivated, and not ploughed, in the hope that a ploughless summer-fallow would help to check buckwheat in the succeeding crops. Previous to seeding on summer-fallow the land is either harrowed or cultivated, depending on the condition of the soil. The first crop on 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 1927	Cost of production 1927	Profit or loss per acre	
	1927	Average sixteen years			1927	Average sixteen years
	bush.	bush.	$	$	$	$
Summer-fallow	.....	.....	.....	7 00	—7 00	—6 83
Wheat—Marquis	14·7	18·8	17·64	10·96	6·68	10·10
Wheat—Marquis	21·3	17·3	25·56	13·48	12·08	6·75
Average per acre	.....	.....	14·40	10·48	3·92	3·34

The yield of wheat following wheat this season was 6.6 bushels more than the yield on summer-fallow. It will be observed that the average yield of wheat following wheat for sixteen years is 1.5 bushels less than the yield on summer-fallow. The summer-fallow field was not ploughed but disked once and kept cultivated throughout the season. A total of five cultivations was necessary to keep weeds in check. Two-thirds of the cost of summer-fallowing was charged to the first crop and one-third charged to the second crop after the summer-fallow. The cost per bushel of wheat was $1.06 for the first crop on summer-fallow and 74 cents for the second crop following summer-fallow.

ROTATION "J" (SIX YEARS' DURATION)

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

This rotation is gaining in popularity with farmers of the district for the following reasons: First, it returns a greater average profit per acre than Rotation "C" (Summer-fallow, wheat, wheat); second, 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; third, perennial weeds are more readily controlled and when the land is broken from cultivated hay, the succeeding crops are practically as clean as crops on prairie breaking.

Rotation "J" 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 observed that one-half the area is in grain each year, one-third in hay and pasture, and one-sixth in summer-fallow.

During the years 1919 to 1924 inclusive oats was grown as a second crop after summer-fallow. In the past three years wheat has been grown in the place of oats, for the reason that in ordinary farm practice a greater acreage would be sown to wheat on account of wheat being the major cash-crop.

No difficulty has been experienced in obtaining a catch of grass during the sixteen years this rotation 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 seeding is necessary to sow the required amount of seed per acre. This season Arctic sweet clover was used in place of common White Blossom, for the reason that Arctic has proven hardier and starts growth earlier in the spring. The first year's crop is usually taken off for hay and the second year's crop pastured. This season the first year's crop was pastured and the second year's crop cut for hay. Sweet clover being a biennial plant, the second year's hay-crop consists of straight rye grass instead of a mixture of western rye and sweet clover, and therefore, is more easily cured. The aftermath from the hay crop together with the stubble fields supply considerable fall pasture. Sod land to be summer-fallowed is usually pastured until the middle of June. It is then ploughed, packed and harrowed, and given one or more cultivations 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.

58170—3

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

Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit or loss per acre	
	1927	Average sixteen years			1927	Average sixteen years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow	.....	.....	2·55	6·75	—4·20	—6·39
Wheat—Marquis	26·9	25·3	32·28	13·11	19·17	16·15
Wheat—Marquis	12·9	19·0 (10-yrs.)	15·48	12·50	2·98	6·61
Oats (1919-24)	.....	38·3 (6-yrs.)	.....	.....	.....	.....
Oats—Banner	74·8	47·7	40·55	15·74	24·81	7·88
Hay or pasture	tons 0·77	tons 0·91 (12-yrs.)	11·45	7·16	4·29	2·16
Hay or pasture	1·92	.....	19·20	8·88	10·32	1·98
Average per acre	.....	.....	20·25	10·69	9·56	4·73

It will be observed the yield of wheat following wheat is 14.0 bushels less than the yield of wheat on summer-fallow. Unfortunately, this crop was damaged by frost on August 8, and later affected by rust. It was seeded sixteen days later than the wheat on summer-fallow and harvested twelve days later. The cost per bushel of wheat on summer-fallow was 59 cents and $1.08 for wheat following wheat. The oats cost 21 cents per bushel and the hay $4.63 per ton.

SUMMARY OF YIELDS (1912-1927)

Rotation "C" (Three-years' duration) Rotation "J" (Six years' duration)

Crop	Rotation "C" Average per acre sixteen years	Crop	Rotation "J" Average per acre sixteen years
	bush.		bush.
Summer-fallow	.....	Summer-fallow	.....
Wheat	18·8	Wheat	25·3
Wheat	17·3	Wheat	19·0
	.....	Oats	47·7
	.....	Hay	·91 tons
	.....	Pasture	.....

It will be observed that Rotation "J", for the sixteen years, has averaged 6.5 bushels more to the acre on summer-fallow than Rotation "C" and 1.7 bushels more to the acre for the second crop. This increase is not due to manure, for neither of these rotations has received manure during the sixteen-year period. On the other hand, the results of chemical analysis of soil samples taken from certain rotation fields at this Station in 1916, and again in 1922, furnish evidence that a loss of nitrogen and organic matter ensues from exclusive grain-growing; but, that the amount of these constituents has been maintained or increased by a rotation in which one or more hay crops (grasses and legumes), with or without manure, are included. For further details the reader is referred to Bulletin No. 44, New Series, by the Dominion Chemist, dealing with the "Influence of Grain-Growing on the Nitrogen and Organic Matter Content of the Western Prairie Soils of Canada."

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.

This rotation 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. The cost of the manure is distributed equally to all the crops in the rotation rather than to each year in the rotation. 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 26, packed and harrowed. It was afterwards given two subsequent cultivations.

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

Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit or loss per acre	
	1927	Average sixteen years			1927	Average sixteen years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow				7·25	−7·25	−7·69
Wheat—Marquis	26·7	22·3	32·04	15·38	16·66	12·02
Wheat—Marquis	30·0	17·0	36·00	17·39	18·61	5·50
Summer-fallow				7·20	−7·20	−7·75
	tons	tons				
Sunflowers	13·25	9·44 (8-years.)	46·38	24·63	21·75	9·40
	bush.	bush.				
Peas (1912-19)		22·1 (8-yrs.)				
Barley	46·0	27·7 (15-yrs.)	29·08	16·53	12·55	3·29
	tons	tons				
Hay	2·09	1·35 (7-yrs.)	20·90	12·55	8·35	2·70
Hay	2·85	1·20	28·50	12·69	15·81	2·01
Average per acre			24·11	14·20	9·91	2·44

The 1927 yields are much higher than the average for sixteen years. The cost of growing wheat on summer-fallow was 76 cents per bushel and the second crop of wheat following summer-fallow 66 cents. The high cost of wheat on summer-fallow is due to charging two-thirds of the cost of summer-fallowing against the crop. The sunflowers cost $2.22 per ton to produce. This figure includes cutting and ensiling. Barley cost 41 cents per bushel to produce. The first hay crop after seeding down cost $6 per ton and the second year's hay crop $4.45 per ton. Included in the hay cost is $1.50 per ton to cover the cost of hauling from field to barn.

SIXTEEN-YEAR SUMMARY OF ROTATIONS

In order that the results of the rotations started in 1912 may be easily compared, the following table is included showing the average cost, the returns, and profit per acre for the last sixteen years.

COSTS, RETURNS AND PROFITS FOR ROTATIONS (1912-1927)

Rotation	Average cost to operate per acre for sixteen years	Average return per acre for sixteen years	Average profit per acre for sixteen years
	$ cts.	$ cts.	$ cts.
"J" (Six years' duration)	8 76	13 49	4 73
"C" (Three years' duration)	9 14	12 48	3 34
"P" (Eight years' duration)	11 01	13 45	2 44

The summary table shows Rotation "J" has returned for the sixteen-year period, an average profit of $1.39 more per acre than Rotation "C" and $2.29 more than Rotation "P".

ROTATION "B" (TWO YEARS' DURATION)

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

This rotation was started in 1921. Two fields are used. One is summer-fallowed and the other sown to wheat. It is not a rotation which is likely to be practised in the district, for the reason that half the cultivated land is idle each year.

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

Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit or loss per acre	
	1927	Average seven years			1927	Average seven years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow	.....	.....	.....	7·20	−7·20	−8·10
Wheat—Marquis	28·8	24·6	34·56	13·17	21·39	13·49
Average per acre	.....	.....	17·28	10·19	7·09	2·69

The wheat crop cost 71 cents per bushel and the rotation shows a profit of $7.09 per acre. The seven-year average profit for a crop arrangement of alternate wheat and summer-fallow is $2.69 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 and the other 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 1927	Cost of production 1927	Profit or loss per acre	
	1927	Average four years			1927	Average four years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow	.....	.....	.....	7 20	−7 20	−8 82
Wheat—Marquis	26·2	22·9	31 44	12 81	18 63	14 18
Fall rye	27·0	22·0	24 30	11 31	12 99	6 46
Average per acre	.....	.....	18 58	10 44	8 14	3 94

It costs 67 cents per bushel to produce the wheat and 51 cents per bushel to produce the fall rye. This rotation returned a profit of $8.14 per acre and an average profit for four years of $3.94 per acre. By reason of soil drifting on some of the sandy areas of the territory served by the Scott Station, the area seeded to fall rye shows an increase. The soil at this Station is a chocolate loam and it is evident that when fall rye is drilled in the stubble, as is the case in this rotation, a fair crop may be expected.

ROTATION "S" (THREE YEARS' DURATION)

First year—Summer-fallow.
Second year—Wheat (one-half area seeded to sweet clover).
Third year—One-half area sweet clover, one-half area oats.

This rotation was started in 1922 with the object of determining the advisability of including sweet clover in a crop rotation.

Rotation "S" involves a comparison of sweet clover with oats in the third year, and the following division is made to make the comparison more easily followed—summer-fallow; wheat and sweet clover, versus, summer-fallow; wheat and oats. In other words, the latter division differs from Rotation "C" by having oats in place of wheat in the third year.

When seeding wheat, one-half of the field is seeded at the rate of 1½ bushels per acre, while the other half is seeded down to sweet clover at the rate of fifteen pounds of sweet clover to one bushel of wheat per acre. The sweet clover is mixed with the wheat at the time of drilling. The wheat stubble is spring-ploughed, packed and harrowed previous to drilling oats.

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

Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit or loss per acre	
	1927	Average six years			1927	Average six years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow				7 20	−7 20	−8 21
Wheat—Marquis	29·2	21·7	35 04	12 23	22 81	11 78
Sweet clover	tons 3·16	tons 1·70 (5-yrs.)	31 60	13 24	18 36	4 64
Average per acre			22 21	10 89	11 32	2 74
	bush.	bush.				
Summer-fallow				7 20	−7 20	−8 21
Wheat—Marquis	33·5	24·7	40 20	13 83	26 37	13 68
Oats—Banner	89·3	52·3	47 86	17 43	30 43	8 92
Average per acre			29 35	12 82	16 53	4 80

The wheat seeded alone yielded 4.3 bushels per acre more than the area seeded to wheat and sweet clover and cost 2 cents less per bushel to produce. The sweet clover was cut twice, yielding a total of 3.16 tons per acre. After the second crop was removed, had the field been fenced, it would have given considerable pasture—the choicest of feed for flushing ewes or sows.

Reference to the above table indicates that after six years' trial, sweet clover in the third year has not returned as much profit to the acre as oats. This season the oats were produced at the rate of 22 cents per bushel. The sweet clover cost $4.95 per ton, which includes a charge of $1.50 per ton for stacking.

ROTATION "D" (FOUR YEARS' DURATION)

First year—one-half area summer-fallow and one-half area wheat intertilled.
Second year—Wheat.
Third year—Oats.
Fourth year—Sweet clover hay or pasture.

This rotation consists of four 9-acre fields, making a total of 36 acres. The main object in view is to compare intertilled wheat as a summer-fallow substitute in the summer-fallow year with a straight summer-fallow.

The intertilled wheat was seeded on spring ploughing in triple rows, with 36 inches between the outside rows for cultivation. After seeding, the wheat was given two cultivations during the growing season with a one-horse scuffler. The preparation given the seed-bed for the wheat in the second year was to cultivate with a duck-foot cultivator and harrow previous to drilling. The summer-fallow land received similar treatment before seeding to wheat. The oats in the third year was seeded on spring ploughing at the rate of 1 bushel of oats and 15 pounds of sweet clover per acre. The sweet clover and oats were mixed together at the time of drilling.

As this rotation involves a comparison of summer-fallow, with intertilled wheat in the first year, the following division is made to make this comparison more easily followed:

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

Crop	Yield per acre 1927	Value of crop 1927	Cost of production 1927	Profit or loss per acre 1927
	bush.	$ cts.	$ cts.	$ cts.
Summer-fallow	.....	0 20	6 70	−6 50
Wheat—Garnet	32·7	39 24	13 72	25 52
Oats—Banner	60·9	33 16	13 56	19 60
	ton			
Sweet clover	1·00	13 42	9 00	4 42
Average per acre	.....	21 51	10 75	10 76
	bush.			
Intertilled wheat—Garnet	22·2	26 84	12 70	14 14
Wheat—Garnet	24·7	29 64	12 60	17 04
Oats—Banner	59·6	32 46	13 46	19 00
	tons			
Sweet clover	1·00	13 42	9 00	4 42
Average per acre	.....	25 59	11 94	13 65

The intertilled wheat cost 57 cents per bushel to produce. The wheat following intertilled wheat cost 51 cents, while the wheat following summer-fallow cost 55 cents per bushel. The oat crop following two wheat crops costs 23 cents, and the oat crop following one wheat crop cost 26 cents per bushel. The sweet clover was cut July 10 and pastured at intervals afterwards almost continuously until November 2 and then had a carrying capacity of 7.6 sheep for one month at a cost of 39½ cents for one sheep per month.

CULTURAL EXPERIMENTS

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

Nine separate cultural experiments are in operation embodying a total of 427 one-fortieth-acre plots. The plots are separated by a 4-foot pathway and to eliminate border effect a 1-foot border is removed from all plots previous to harvest. Prior to 1927 the removal of borders with a sickle or scythe was a hazardous job but this season a home-made plot-edger was used and one man experienced no difficulty in preceding the binder with the edger.

There are a number of factors which influence crop yields. For example, type of soil, seasonal conditions and tillage operations. Soils may vary even on the same farm, but seasonal conditions remain somewhat constant within the same year over most of northwestern Saskatchewan. On the other hand, tillage operations determine to an extent the amount of crop-growth. Each year a number of farmers visit this Station in the growing season to compare the effect of various tillage operations on the growth of the crop and to note the type of soil at this Station. Only experiments which have been conducted for a number of years are reported in the 1927 report.

In the cultural tables which follow, the 1927 yield for the various tillage treatments is inserted together with the average yield for the years the respective experiments have been in operation. The deductions following each table are drawn from the average yields and not the 1927 figures, as they are more representative of the results that may be expected throughout the district on soils similar to this Station.

SUBSOILING AND DEPTH OF PLOUGHING SUMMER-FALLOW

Object of Experiment.—To determine the optimum depth to plough summer-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. Additional necessary cultivation is given throughout the season to control weeds.

DEPTH OF PLOUGHING SUMMER-FALLOW

First crop after fallow

Plot No.	First crop after fallow	Plot Treatment	Yield in bushels per acre	
			Yield 1927	Average yield 13 years
1	Wheat....	Fallow ploughed 3 inches deep.....	29·8	23·5
2	"	" 4 " "	33·5	24·2
4	"	" 6 " "	31·5	23·5
5	"	" 7 " "	31·5	23·8
6	"	" 8 " "	29·4	22·9
7	"	Fallow ploughed 5 inches deep and subsoiled 4 inches below furrow.....	33·1	24·3
8	"	Fallow ploughed 6 inches deep and subsoiled 4 inches below furrow.....	35·4	24·6
9	"	Fallow ploughed 7 inches deep and subsoiled 4 inches below furrow.....	29·4	24·6
10	"	Fallow ploughed 8 inches deep and subsoiled 4 inches below furrow.....	30·6	23·4

Deductions.—The average yield for thirteen years shows that 4-inch ploughing for summer-fallow has given the highest yield. The lowest yield was obtained when summer-fallow was ploughed 8 inches deep. Comparing plots 3 to 6 with plots 7 to 10 it is apparent that subsoiling has not increased the yield sufficiently to warrant the extra labour.

DEPTH OF PLOUGHING SUMMER-FALLOW

Second crop after fallow

Plot No.	Second crop after fallow	Plot Treatment	Yield in bushels per acre	
			Yield 1927	Average yield 13 years
1	Oats.....	Fallow ploughed 3 inches. Stubble 3 inches.....	112·0	51·2
2	"	" 4 " " 4 "	106·4	52·9
3	"	" 5 " " 5 "	111·3	52·4
4	"	" 6 " " 5 "	103·0	50·8
5	"	" 7 " " 5 "	101·6	50·5
6	"	" 8 " " 5 "	100·9	50·8
7	"	Fallow ploughed 5 inches and subsoiled 4 inches. Stubble ploughed 5 inches.....	106·4	54·1
8	"	Fallow ploughed 6 inches and subsoiled 4 inches. Stubble ploughed 5 inches.....	106·4	53·8
9	"	Fallow ploughed 7 inches and subsoiled 4 inches. Stubble ploughed 5 inches.....	109·2	54·1
10	"	Fallow ploughed 8 inches and subsoiled 4 inches. Stubble ploughed 5 inches.....	106·7	12-year average 50·6

Comparing the first six plots, not subsoiled, the average yield of the second crop after fallow shows that 4-inch ploughing for summer-fallow followed with 4-inch ploughing of the fallow-stubble, has given the highest yield. Comparing plots 3 to 6 with plots 7 to 10 shows the subsoiling for the second crop has not given sufficient extra yield over 4-inch ploughing of the fallow-stubble to pay for the extra labour involved.

METHODS 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 1927	Average yield 12 years
1	Wheat....	Ploughed 4 inches in June.....	38·4	27·4
2	"	" 6 " "	36·0	25·8
3	"	" 8 " "	39·6	26·7
4	"	" 4 " " and 4 inches in September.....	39·2	26·6
5	"	" 6 " " " 6 " "	36·8	26·0
6	"	" 8 " " " 8 " "	36·8	25·2
7	"	" 6 " " " 4 " "	43·1	27·7
8	"	" 4 " " " 6 " "	42·7	30·7
9	"	Cultivated as necessary to control weeds. (Not ploughed)....	40·7	3-year average 33·5
10	"	Ploughed 5 inches in June—Seeded with ½ bushel oats per acre and pastured.....	38·4	12-year average 24·6

Deductions.—Comparing the twelve-year average yield of the plots once ploughed for summer-fallow the 4-inch shallow ploughing has given the highest yield.

The plot not ploughed for summer-fallow, but only cultivated with a duck-foot cultivator during the summer has given a three-year average yield of 33.5 bushels per acre. Although this yield is not comparable with the average for the other plots the yields for the three years this treatment has been given are higher than any of the once-ploughed plots.

The pasturing of fallow has returned such a low average yield as compared with the other summer-fallow treatments that it cannot be recommended.

CULTURAL TREATMENTS PREVIOUS TO FALLOW

Plot No.	First crop after fallow	Plot Treatment	Yield in bushels per acre	
			Yield 1927	Average yield 12 years
14	Wheat....	Cultivated in fall before summer-fallowing 6 inches in June.....	37·6	26·2
15	"	Ploughed 4 inches in fall before summer-fallowing 6 inches in June.....	38·4	27·2
16	"	Ploughed 6 inches in June.....	39·6	28·1
17	"	Cultivated in spring before ploughing 6 inches in June.....	41·5	28·6

CULTURAL TREATMENTS PREVIOUS TO FALLOW

The comparison of the cultural treatments given in the above table, previous to fallow, shows that cultivating in the spring and ploughing 6 inches in June gave the highest yield. This was one-half bushel more than plot 16 left untouched and ploughed in June.

Destroying the stubble by cultivating or shallow ploughing in the fall previous to summer-fallow reduces the wheat yield on summer-fallow.

EFFECT OF SUMMER-FALLOW TREATMENT ON SECOND CROP

Plot No.	Second crop after fallow	Plot Treatment	Yield in bushels per acre	
			Yield 1927	Average yield 13 years
		Wheat stubble spring ploughed after—		
1	Oats	Ploughing summer-fallow 4 inches in June	108·8	59·4
2	"	" " 6 " "	104·2	56·5
3	"	" " 8 " "	99·1	57·6
4	"	Ploughing summer-fallow 4 inches in June and 4 inches in September	109·2	57·0
5	"	Ploughing summer-fallow 6 inches in June and 6 inches in September	101·9	54·9
6	"	Ploughing summer-fallow 8 inches in June and 8 inches in September	107·0	54·6
7	"	Ploughing summer-fallow 6 inches in June and 4 inches in September	103·0	54·4
8	"	Ploughing summer-fallow 4 inches in June and 6 inches in September	105·8	53·6
9	"	Summer-fallowing by cultivating only (Not ploughed)	98·4	2-year average 63·5
10	"	Ploughing summer-fallow 5 inches in June seeding to oats and pastured	91·2	13-year average 52·4
14	"	Cultivating in fall before summer-fallowing	99·5	51·0
15	"	Ploughing 4 inches in fall before summer-fallowing	107·8	52·9
16	"	Ploughing summer-fallow 6 inches in June	105·3	52·9
17	"	Cultivating in spring before ploughing 6 inches in June	110·6	53·1

Second Crop after Fallow.—The thirteen-year average shows the highest yield after fallow to have resulted from ploughing 4 inches deep in the summer-fallow year.

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 1927	Average yield 12 years
11	Wheat 1st crop	Ploughed May 15	43·1	31·2
12	" "	" June 15	42·3	28·7
13	" "	" July 15	34·5	25·5
11	Oats 2nd crop	Fallow ploughed May 15	100·9	54·6
12	" "	" June 15	105·1	51·1
13	" "	" July 15	93·3	50·8

Deductions.—Ploughing for summer-fallow the middle of May as compared with the middle of July resulted in an increased average yield, for twelve years, of 5.7 bushels in the wheat crop on fallow and 3.8 bushels in the second crop (oats) after fallow.

Ploughing for summer-fallow the middle of June as compared with the middle of July resulted in an increased average yield for twelve years of 3.2 bushels in the wheat crop on fallow and $\frac{1}{3}$ bushel increase in the second crop (oats) after fallow.

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, substitutes and wheat alternating. The wheat stubble is spring-ploughed for the fallow substitutes and the row-crops 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 oats, barley, wheat in double and triple rows; also sunflowers, corn and potatoes in single rows 42 inches apart. The yields of the summer-fallow substitutes grown in rows are given in the following table:—

SUMMER-FALLOW SUBSTITUTES (FIRST YEAR)

Crop	Treatment	Yield in bushels per acre	
		Yield 1927	Average yield 6 years
Oats (Double rows)	Stubble spring ploughed	61·3	41·6
Oats (Triple rows)	"	67·9	48·2
Barley (Double rows)	"	24·6	18·7
Barley (Triple rows)	"	33·5	24·1
Wheat (Double rows)	"	15·9	14·3
Wheat (Triple rows)	"	20·8	17·0
Potatoes	"	112·7 tons	170·0 tons
			5-year average
Corn	"	3·17	3·22
Sunflowers	"	18·33	12·18

The foregoing table is included in this report to give the reader the yields of the crops grown in rows as summer-fallow substitutes.

SUMMER-FALLOW SUBSTITUTES—WHEAT FOLLOWING ROW-CROPS

Crop	Row-crop stubble cultivated in spring before seeding	Yield in bushels per acre	
		Yield 1927	Average yield 5 years
Wheat	Following Oats in double rows	27·6	26·3
"	" Oats in triple rows	29·5	26·2
"	" Barley in double rows	29·2	24·8
"	" Barley in triple rows	31·2	25·6
"	" Wheat in double rows	26·6	24·8
"	" Wheat in triple rows	28·3	23·2
"	" Bare-fallow	32·1	26·6
"	" Potatoes	32·5	26·2
"	" Corn	29·4	27·8
			4-year average
"	" Sunflowers	25·7	23·0

Deductions.—The sunflower crop was destroyed by rabbits in 1925. Hence, the yield of wheat following sunflowers is a four-year average and therefore is not comparable with the five-year average yields of wheat following the other summer-fallow substitutes.

It should be stated that corn is not a dependable crop at this Station. This crop merely averaged 3.22 tons during the five years it has been grown in rows as a summer-fallow substitute.

The results of this experiment at the end of five years show that the average yield of wheat following potatoes and oats in rows, as summer-fallow substitutes, is approximately the same as the average yield of wheat following summer-fallow. The average yield of wheat following barley and wheat in rows as a fallow substitute is less than the average yield of wheat following summer-fallow. The difference in yield of wheat following oats, barley and wheat grown in double and triple rows as summer-fallow substitutes is not consistent.

STUBBLE TREATMENT FOR WHEAT AND OATS

Object of Experiment.—To determine the best method of treating the stubble in preparation for wheat or oats.

Plan of Experiment.—Wheat is grown on summer fallow on all plots to provide uniform stubble land for the various stubble treatments tested for both wheat and oats.

STUBBLE TREATMENT FOR WHEAT

Plot No.	Second crop after fallow	Plot Treatment	Yield in bushels per acre	
			1927	Average yield 13 years
1	Wheat	Stubble ploughed 4 inches in autumn	27·0	16·6
2	"	Stubble disked in autumn	27·4	17·5
3	"	Stubble burned before disking in autumn	27·0	19·6
4	"	Stubble burned before ploughing 4 inches in autumn	27·8	18·5
5	"	Stubble burned in spring—seeded at once	27·0	21·1
6	"	Stubble ploughed 4 inches in spring	27·0	20·1
7	"	Stubble disked at cutting time—ploughed 4 inches in fall	22·1	18·8
8	"	Stubble disked at cutting time—ploughed 4 inches in fall	23·7	17·7
9	"	Stubble ploughed 4 inches in autumn	30·6	17·9
10	"	Stubble ploughed 4 inches in spring	27·4	20·3
				4-year average
14	"	Stubble cultivated shallow in autumn—No further cultivation	32·1	16·7
15	"	Stubble cultivated deeply in autumn—No further cultivation	32·9	19·1
16	"	Seeded in stubble in spring—No cultivation	failure	4·6

Deductions.—Thirteen-year average yields are available for plots 1 to 10 inclusive and therefore the yields from these plots are comparable. Four-year average yields are available for plots 14 to 16 and therefore the yields from these plots are comparable.

It will be observed that of the treatments in operation for thirteen years, burning the stubble in the spring without further preparation of the seed-bed previous to drilling has returned the highest average yield. However, it should be stated that a perfect burn was obtained each year. The two plots (Nos. 6 and 10) ploughed 4 inches in the spring are next in order of average yield. The destruction of the stubble in the fall by either ploughing, burning or disking has decreased the yield as compared with leaving the stubble to be either burnt or ploughed under in the spring before drilling to wheat.

Comparing plots 14 to 16 inclusive, it will be observed that the four-year average yield of "stubbling in" is very low. Cultivating deeply in the fall without further cultivation in the spring before seeding wheat has given a higher average yield for the four years than shallow cultivation in the fall.

STUBBLE TREATMENT FOR OATS

Plot No.	Second crop after fallow	Plot Treatment	Yield in bushels per acre	
			Yield 1927	Average yield 13 years
11	Oats	Stubble ploughed 4 inches in fall	90·6	49·6
12	"	" 4 inches in spring	91·2	57·3
13	"	Stubble cultivated in spring—seeded at once	87·1	52·1

Deductions.—Spring ploughing for oats has returned an average yield for thirteen years of 7.7 bushels per acre more than fall ploughing, and 5.2 bushels per acre more than preparing the seed bed by cultivating the stubble in the spring previous to drilling.

GREEN MANURE CROPS PLOUGHED DOWN

Object of Experiment.—To compare the increase in fertility of the soil as shown by the increase in yields from ploughing under green crops with that supplied by applying rotted manure.

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 with and without rotted manure ploughed under.

GREEN MANURE CROPS PLOUGHED DOWN

Plot No.	First crop after treatment	Plot Treatment	Yield in bushels per acre	
			Yield 1927	Average yield 5 years
1	Wheat	Sweet clover ploughed under in July	31·7	25·2
2	"	Peas ploughed under in early bloom	34·1	25·0
3	"	Peas ploughed under when in late bloom	35·3	26·0
4	"	Fallow ploughed in June—cultivated	29·0	23·3
5	"	Barnyard manure 12 tons per acre before ploughing for summer-fallow	38·4	33·3
6	"	Fallow ploughed in June—cultivated	31·3	26·3

Deductions.—The five-year average yield is higher following rotted manure than green crops ploughed under in July. The average yield of wheat on plot No. 5 receiving manure is 7 bushels higher than plot 6 receiving no manure and 10 bushels higher than plot 4 receiving no manure.

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 1927	Average yield 4 years
1	Oats	Sweet clover ploughed under in July	77·4	50·3
2	"	Peas ploughed under in early bloom	84·3	49·3
3	"	Peas ploughed under when in late bloom	89·9	50·4
4	"	Fallow ploughed in June—cultivated	89·9	52·1
5	"	Barnyard manure 12 tons per acre before ploughing for summer-fallow	107·8	59·6
6	"	Fallow ploughed in June—cultivated	89·9	50·6

Deductions.—The average yield of the second crop following the ploughing under of manure is higher than when green crops are ploughed under. No increase over the bare fallow resulted in the second crop by ploughing under green crops in the summer-fallow year.

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 1927	Average yield 5 years
2	Wheat	Extra stroke of harrow after ploughing	32·9	26·4
3	"	Culti-packed after ploughing	38·8	28·4
4	"	Surface-packed after ploughing	36·4	28·8
5–18	"	Extra stroke of harrow in spring before seeding	39·4	30·1
6–19	"	Culti-packed in spring before seeding	38·2	29·7
7–20	"	Surface-packed in spring before seeding	38·4	30·8
8–21	"	Harrowed after seeding	38·6	30·5
9–22	"	Culti-packed after seeding	40·8	29·3
10–23	"	Surface-packed after seeding	40·0	28·9
11–24	"	Harrowed before and after seeding	34·7	28·0
12–25	"	Culti-packed before and after seeding	38·4	27·8
13–26	"	Surface-packed before and after seeding	40·2	28·7
15	"	Harrowed after ploughing and after seeding	38·0	30·3
16	"	Culti-packed after ploughing and after seeding	40·0	30·9
17	"	Surface-packed after ploughing and after seeding	40·7	29·4

PACKING OF SPRING PLOUGHING

Plot No.	Crop	Plot Treatment	Yield in bushels per acre	
			Yield, 1927	Average Yield, 6 years
2–11	Wheat	Spring ploughing harrowed before and after seeding	31·9	22·5
3–12	"	Spring ploughing culti-packed before and after seeding	34·3	24·9
4–13	"	Spring ploughing surface-packed before and after seeding	34·9	23·0
5	"	Spring ploughing harrowed before seeding	35·3	23·7
6	"	Spring ploughing culti-packed before seeding	34·1	24·0
7	"	Spring ploughing surface-packed before seeding	36·4	24·9
8	"	Spring ploughing harrowed after seeding	29·4	23·2
9	"	Spring ploughing culti-packed after seeding	32·9	24·7
10	"	Spring ploughing surface-packed after seeding	33·3	23·2

PACKING FALL PLOUGHING

Plot No.	Crop	Plot Treatment	Yield in bushels per acre	
			Yield, 1927	Average Yield, 6 years
15	Wheat	Fall ploughing harrowed afte ploughing	32·9	20·0
16	"	Fall ploughing culti-packed after ploughing	27·4	21·8
17	"	Fall ploughing surface-packed after ploughing	33·7	21·7
18	"	Fall ploughing harrowed before seeding	34·5	23·1
19	"	Fall ploughing culti-packed before seeding	31·7	19·9
20	"	Fall ploughing surface-packed before seeding	32·1	21·7
21	"	Fall ploughing harrowed after seeding	34·5	20·7
22	"	Fall ploughing culti-packed after seeding	33·7	21·3
23	"	Fall ploughing surface-packed after seeding	32·1	18·9
24	"	Fall ploughing harrowed before and after seeding	32·5	19·7
25	"	Fall ploughing culti-packed before and after seeding	32·1	20·2
26	"	Fall ploughing surface-packed before and after seeding	26·6	19·4

To date, the average yields of the packing experiment do not show sufficient differences to permit of drawing deductions.

HORTICULTURE

Curtailment of space in the 1926 report necessitated omitting the section dealing with horticulture, hence, this report covers the two years 1926 and 1927.

Horticultural work at this Station attracts the attention of an increasing number of visitors each year. The growth of deciduous and coniferous trees on the grounds and in the arboretum is very marked. The flowering shrubs, annual and perennial flowers make the grounds a favourite locality for both town and country people throughout the summer months, and is an incentive to many throughout the adjacent districts to beautify their home surroundings.

SEASON

The winter of 1926-27 was severe. Snowfall was about average for this Station. High winds caused the snow to collect in the vicinity of trees and shrubbery. This may account for so little winter-killing in trees, shrubs and herbaceous perennials.

The season of 1927 opened with a backward spring. The first date of seeding in the open was April 26. Germination, although favoured with ample moisture was retarded by the cold nights. May was cool and cloudy with a precipitation of 2.54 inches as compared to a sixteen year average of 1.43 inches for the same month. Weather remained cool during June with a precipitation of 2.14 inches. July was an ideal growing month with a rainfall of 3.10 inches. A frost on August 8 for the second year in succession, did considerable damage to all tender flowers and vegtables and vitiated results to such a varying extent that few deductions are possible from either year's work, and the report covering horticulture is merely a summary of operations.

Incidentally, the frost-free period for the year 1926 was eighteen days less, and for the year 1927, twenty-eight days less than the sixteen-year average for this Station.

VEGETABLES

The seed of cabbage, cauliflower, celery, egg-plant, pepper and tomato was started in the greenhouse. Prior to 1927 this seed was started in hot frames.

ASPARAGUS

Asparagus is an easy vegetable to grow and is well worth more general adoption. Edible shoots are generally available from the middle of May to the middle of June. This year half the asparagus bed was left uncut to determine the effect a season's rest would have on the size and strength of the shoots. The varieties recommended are Argenteuil and Colossal.

ARTICHOKES

This native Canadian vegetable has been a complete failure both years. Tubers were planted in the garden in May, but when harvested in October were too small for table use.

BEANS

Approximately twenty varieties of string beans were under test. Seeding was done in rows, leaving half the row to ripen for seed. Both in 1926 and 1927 the frost on August 8 damaged the growth and no seed ripened. The following table gives the 1927 yields of some of the most promising varieties.

BEANS.—TEST OF VARIETIES OR STRAINS

Variety	Source of Seed	Season	Yield of Green Pods from 15-foot row	Remarks
			lb. oz.	
Jones White	Manitoba Agr. College.	Aug. 4 to Aug. 28	9 6	Very tender. One of the best table beans.
Masterpiece	Sutton	July 28 " " 15	7 12	Long pod. Slightly stringy.
Sutton Masterpiece	Vaughan	" 25 " " 16	7 6	Flavour very good, tender.
Davis White Wax	McDonald	" 30 " " 28	6 14	Flavour good, free from stringiness.
Wardwell Kidney Wax	Graham	Aug. 2 " " 16	6 14	Flavour excellent, tender.
Stringless Green Pod	Graham	July 26 " " 16	6 9	Flavour medium, slightly stringy.
Henderson Bountiful	D. & F.	Aug. 8 " " 26	6 2	Flavour mild, tender.
Round Pod Kidney	McDonald	" 4 " " 26	6 0	One of the best table beans.
Extra Early Valentine	S. & B.	" 2 " " 28	5 9	Flavour excellent, tender.
Pencil Pod Black Wax	Burpee	" 5 " " 26	5 0	Short pods, tender.
Webber Wax	McDonald	" 5 " " 20	5 0	Flavour medium, very tender.
Princess Artois	O-9388	" 5 " " 15	4 12	Flavour excellent, very fine.
Golden Cluster Wax	Dreer	" 8 " " 20	4 10	Short pods, tender.
The Prince	Sutton	" 8 " " 15	4 10	Good, but rather late.
Challenge Black Wax	Ferry	July 25 " " 28	4 9	Short pods, tender.
White Pole	O-5964	Aug. 8 " " 8	4 8	Good, but rather late. Completely destroyed by frost, Aug. 8.

The varieties recommended are Challenge Black Wax, Wardwell Kidney Wax, Davis White Wax and Stringless Green Pod.

Distance of Spacing.—Two varieties were used, stringless Green Pod and Round Pod Kidney. The seed was spaced 2, 4 and 6 inches apart in the row. The 2-inch spacing gave the highest yields.

BEETS

Fifteen varieties were seeded in 1926 and 11 varieties in 1927. Seeding was done in rows 30 inches apart and the beets thinned to 3 inches apart in the row. The following table gives the dates when some of the most promising varieties grown in 1927 were ready for use and the yield from a 30-foot row:—

TABLE BEETS.—TEST OF VARIETIES OR STRAINS

Name of Variety	Source of Seed	Date ready for use	Yield from 30-foot row	Remarks
			lb.	
Detroit Dark Red	O-10468	July 25	134	Flavour fine, colour deep, quality superior.
Crimson Globe	McDonald	Aug. 4	129	Deep colour, good grain, small core.
Crosby Egyptian	D. & F.	" 7	125	Very uneven in shape, otherwise good.
Extra Early Flat Egyptian	Moore	" 12	120	Good quality, shape and size.
Early Wonder	Burpee	" 10	111	Good table-beet, uneven in shape.
Detroit Dark Red	McDonald	July 27	99	Colour deep, good shape and quality.
Detroit Dark Red	Moore	" 27	98	Even in shape and size.
Black Red Ball	Burpee	Aug. 1	82	Colour deep, very uneven in size and shape.
Black Red Ball	O-8694	July 25	77	Colour very deep, fine texture.
Improved Dark Red	Webb	" 28	63	Colour very deep, fine texture.
Carter Perfection	A. M. Co.	Aug. 8	60	Good table beet, fine texture.

CARROTS

Ten varieties of carrots were sown in 1927 on May 14 and harvested October 4. The carrots were thinned to 2 inches apart in the row. The following table gives the varieties sown, when ready for use and total yield from a 30-foot row:—

CARROTS.—TEST OF VARIETIES OR STRAINS

Name of Variety	Source of Seed	Date ready for use	Yield from 30-foot row	Remarks
			lb.	
Garden Gem	McKenzie	Aug. 13	101	Size medium, type fairly good.
Market Garden	Rennie	" 5	97	Flavour excellent, stump rooted, very uniform.
McDonald Selected Chantenay.	McDonald	" 5	95	Finely grained half long.
Guerande or Oxheart	Steele Briggs	" 13	87	Large variety, inclined to split.
Select Chantenay	McDonald	July 31	83	Good main crop.
Imp. Danvers Half Long	D. & F.	Aug. 18	71	Crisp and tender.
Chantenay	O-8934	July 31	61	Shape very good, finely grained.
Half Long Scarlet Nantes	Steele Briggs	Aug. 3	56	Colour good, uniform.
Amsterdam	Burpee	" 25	46	Flavour excellent, shape uneven.
Early Scarlet Horn	D. & F.	" 25	44	Size even, texture fine.

The varieties recommended are Chantenay, Half Long Scarlet Nantes, and Improved Half Long.

Dates of Seeding.—Six sowings were made of the Chantenay variety of carrot at ten-day intervals, commencing as early as possible in the spring. From the standpoint of yield and quality the results of both seasons are consistent, that is, the earlier carrot seed is sown in the spring the better the crop.

CAULIFLOWER

Eight varieties of cauliflower were transplanted to the garden on June 15, 1927. The variety Snowball was ready for use July 28. In the cooking test, Extra Early Dwarf Erfurt was of finer texture and quality. The varieties recommended are Extra Early Dwarf Erfurt, Snowball and Autumn Giant.

CABBAGE

Twenty-two varieties or strains of cabbage were under test in 1926 and 27 this season. Cabbage is an easy vegetable to grow and gives good yields even in the driest years. Early varieties recommended are Copenhagen Market and Golden Acre, and for winter storage Danish Ballhead and Succession. The following table gives the yields for 1927 of some of the leading varieties or strains:—

CABBAGE—TEST OF VARIETIES OR STRAINS

Name of Variety	Source of Seed	Yield from ten average heads (trimmed)	Remarks
		lb.	
Copenhagen Market	Graham	120	Large solid heads good keeper.
Golden Acre	Harris	115	Large solid heads, early and good keeper.
Glory of Enkhuizen	Rennie	110	Heads solid, good variety.
Brandon Market	McKenzie	100	Conical in shape, good winter keeper.
Dale	McDonald	100	One of the best late varieties.
Kildonan	S. & B.	100	Large heads splits in wet weather.
Succession	Ewing	100	Large flat heads splits in wet weather.
XXX Early Summer	Rennie	100	" " "
Premier Flat Dutch	McDonald	85	Large solid heads, good keeper.
Autumn King	Rennie	80	Large cabbage, medium.
Brunswick	Madsen	80	Short Stem, large quantity outside leaves.
Early Express	Bruce	75	Very fine, well protected with leaves.
Winnigstadt	Madsen	75	Conical in shape, good winter keeper.
Danish Roundhead	D. & F.	70	Round solid heads, good variety.
Danish Ballhead	S. & B.	65	Medium heads, good keeper.
Early Jersey Wakefield	McDonald	60	Conical in shape, one of the best early varieties.
Extra Amager Danish Ballhead	O-8930	60	Large solid heads, good winter keeper.
Mammoth Beefheart	A.M.Co.	45	Hearts not solid.
Danish Stonehead	Gregory	40	Hearts solid good for pickling.

Dates of Seeding.—Two varieties Copenhagen Market and Extra Amager Danish Ballhead were sown in the open at a ten-day interval commencing as early as possible and continuing for six successive sowings. This experiment has been in operation for several years and the results indicate that no cutting heads are procured when the seed is sown in the open after the middle of May.

CHINESE CABBAGE

Chinese cabbage is merely grown for greens and does not form a head. The varieties Wong Bok and Pe Tsai can be successfully grown by sowing the seed in the open about June 10. It has no commercial value, as other greens are available for table use at the same time.

CELERY

This vegetable can be successfully grown and will keep throughout the winter when carefully packed in sand in a cool cellar. The chief reason celery is not more generally grown is the labour entailed in blanching. For several years approximately 20 varieties have been tested and of this number the varieties recommended are Golden Self-Blanching, Golden Plume, Paris Rose Ribbed, Giant Pascal and White Plume. The following table gives the 1927 results of the 18 varieties of celery and one of celeriac:—

CELERY—TEST OF VARIETIES OR STRAINS

Name of Variety	Source of Seed	Height	Date ready for use	Yield per 30-foot row
		ins.		lb.
Winter King	Graham	27	Sept. 10	142
Easy Blanching	McDonald	22	" 2	132
Giant Pascal	Graham	25	" 10	132
Columbia	McDonald	23	" 10	128
Giant Pink	A.M.Co	33	" 5	125
Paris Golden Yellow	S. & B	25	" 6	125
Emperor	Schell	27	" 10	122
Paris Golden Yellow	D. & F	25	" 7	118
Easy Blanching	Garrahan	24	" 3	115
Easy Blanching	Graham	28	" 3	115
Golden Plume	Garrahan	20	" 9	112
Golden Self-Blanching	McDonald	24	" 3	111
Golden Self-Blanching	O-3410	24	" 1	110
Fordhook Emperor	Schell	24	" 10	108
White Plume	Graham	20	" 1	107
Wonderful	D. M. Ferry	20	" 9	107
Golden Plume	Morse	20	" 9	101
Golden Self-Blanching	McDonald	22	" 3	100
Large Smooth Prague (celeriac)	S. & B	22	" 10	76

CUCUMBERS

Ten varieties of cucumbers were included in the test in 1926 and eight in 1927. The plan followed was to seed in rows 4 feet apart and thin the plants to a distance of 12 inches in the row. Cucumbers can be grown very easily and the recommended varieties in order of earliness and yield are Early Russian, Snow Pickling and Improved Long Green.

CORN

Tests of varieties of corn likely to be suitable for table purposes are continued each year. All varieties from commercial seed were frozen the past two seasons on August 8; but home-grown seed of the following varieties ripened: Pickaninny, Howes Alberta Flint, Banting Assiniboine, Assiniboine Red, and Scott No. 74.

CITRON

In the past two years the crop of citron has been fair considering the August frosts. The varieties safely recommended are Colorado and Red Seeded.

EGG-PLANT

Two varieties were grown in 1927. The seed was sown in the greenhouse on April 14 and when the plants had reached a height of 3 inches, they were reset in flats to harden. On June 17 the plants were transplanted to the garden. The variety Extra Early Dwarf (Wills) produced much larger fruit than the variety Purple Earliest (Herb).

LETTUCE

Tests are continued with head, leaf and cos lettuce and usually a second sowing is made about June 15 to ensure a supply of lettuce throughout the growing season. Varieties recommended are: head—Improved Hanson and Crisp as Ice; leaf—Grand Rapids and Black Seeded Simpson; cos—Paris White Cos and Trianon Cos.

58170—5½

MUSK MELON

The only musk melon which has ripened at this Station is an unknown variety of Russian origin now named "Scott Select." The melons are small when ripe, the largest weighing about five pounds. This melon gave a yield of 137 pounds of excellent fruit for a 30-foot row in 1926, and a yield of 179 pounds in 1927.

ONIONS

Nineteen varieties were tested in 1926, and 16 varieties in 1927. Onion seed is sown in the garden the end of April and when the plants are from 2 to 3 inches in height they are thinned to 3 inches apart in the row. The onion maggot is held in check by frequent dusting with wood ashes. In the past three years better success has been had with growing of onions than previously. The varieties recommend are Yellow Globe Danvers, Large Red Wethersfield and Australian Brown.

PEPPERS

A number of varieties of peppers are annually tested. In the last two years growth was impeded by the August frosts, with the result that no peppers ripened outside. A number from each of the varieties were taken inside to ripen.

PARSLEY

The variety McDonald Perfecta is grown each year. Leaves are of a dark green colour and a desirable type for garnishing. For this purpose, during the winter months, a plant may be transplanted to a flower pot and grown inside.

PARSNIPS

This vegetable is gaining in popularity for winter use. Parsnips are easily grown and invariably give a profitable crop. The yield from a 30-foot row this season was Cooper Champion, 62 pounds; Hollow Crown (Graham), 59 pounds; and Hollow Crown (0-8695), 57 pounds.

Dates of Seeding.—The Hollow Crown variety is seeded as early as possible in the spring and for six successive sowings at a ten-day interval. The results of this experiment after four years' test show that the earlier parsnip seed is sown in the spring the greater is the total yield of marketable sorts.

PEAS

The number of varieties or strains of garden peas tested each year varies from twenty to thirty. Half of the rows are harvested as green peas and the remainder left to ripen for seed. The recommended varieties are: early—Little Marvel and English Wonder; medium early—Danby Stratagem and Potlach. The following table gives the results of the 1927 variety test:—

PEAS—TEST OF VARIETIES OR STRAINS

Name of Variety	Source of seed	Per cent germination	Date ready for use	Yield of green pods per 15-foot row	
				lb.	oz.
Invermere Gradus	Scott Station	95	Aug. 15	13	8
Thomas Laxton	McDonald	95	July 31	11	4
English Wonder	O-10909	95	" 25	10	15
Early Morn	Scott Station	95	" 20	10	11
Stratagem	Graham	95	Aug. 8	10	7
Gregory Surprise	Scott Station	90	July 10	9	13
Lincoln	"	90	" 29	9	13
Gradus	O-6739	95	Aug. 15	9	11
Danby Stratagem	O-6370	95	" 15	9	8
American Wonder	Scott Station	95	July 25	8	11
Little Marvel	"	95	" 9	8	8
Western Beauty	"	95	Aug. 10	8	8
Invermere Seedling No. 1	"	95	July 30	8	7
Gregory Surprise X English Wonder	O-8627	95	" 24	8	6
Invermere Seedling No. 6	Scott Station	90	Aug. 10	8	4
Homesteader	"	90	" 15	7	15
Eight Weeks	"	95	July 18	7	8
Gradus X English Wonder	O-2346	95	" 28	7	4
English Wonder	O-8511	90	Aug. 15	6	15
Invermere Seedling No. 2	Scott Station	90	July 30	6	12
" Seedling No. 3	"	95	Aug. 10	6	12
Potlach	"	95	" 15	6	4
Gradus X American Wonder	O-3584	90	July 29	5	15
Champion of England	Scott	90	Aug. 12	5	13
Sutton Excelsior	Scott Station	90	" 12	4	14

POTATOES

Twenty-four varieties and strains of potatoes were tested in 1927. They were planted on May 21 and dug September 23. All varieties were planted in rows 36 inches apart and the sets were dropped 1 foot apart in the row. They were planted in furrows and covered with a plough. The sets were carefully cut in the field at time of planting to average approximately 2 ounces in weight.

This season was not a favourable one for potatoes. The top growth was destroyed by a frost on August 8 and potato diseases were prevalent, especially in the field lots. All varieties were carefully inspected on August 4 and again on September 2. Traces of the following diseases were noticed: Common scab (*Actinomyces scabies*), Black scurf (*Rhizoctonia solani*), Blackleg (*Bacillus phytophthorres*), Mosaic, and root rot.

POTATOES—TEST OF VARIETIES

Name of Variety	Date of blooming	Date ready for use	Total yield	Yield of unmarketable	Small	Yield of marketable
			bush.	bush.	per cent	bush.
Wee MacGregor	July 8	Aug. 22	411·4	60·5	14·7	350·9
Carman No. 1	" 9	" 17	371·1	36·3	9·8	334·8
Dreer Standard	" 10	" 19	359·0	44·4	12·4	314·6
Mitchell	" 18	" 12	330·7	24·2	7·3	306·5
Gold Coin (Scott)	" 11	" 12	338·8	40·3	11·9	298·5
" (G9419)	" 13	" 15	330·7	40·3	11·9	290·4
Prince of Albany	" 9	" 13	302·5	36·3	12·0	266·2
Irish Cobbler (Scott)	" 8	" 16	294·5	32·3	11·0	262·2
Empire State	" 15	" 16	342·9	80·7	23·2	262·2
Irish Cobbler (Reg.)	" 8	" 5	286·3	28·2	23·5	258·1
Everitt	" 10	" 19	270·3	20·2	7·5	250·1
Green Mountain	" 12	" 22	286·4	36·3	12·7	250·1
Gold Nugget	" 20	" 12	233·9	12·1	5·2	221·8
Early Ohio (Olds)	" 13	" 12	242·0	32·3	13·3	209·7
Sutton Abundance	" 8	" 14	229·9	24·2	10·5	205·7
Factor	" 8	" 18	238·0	32·3	14·0	205·7
Bliss Triumph	" 21	" 22	229·7	29·4	12·8	200·3
Morgan Seedling	" 11	" 15	225·8	28·2	12·5	197·6
Bovee	" 12	" 20	217·8	36·3	16·7	181·5
Utility	" 21	" 25	205·7	32·3	15·7	173·4
Early Six Weeks	" 15	" 12	181·5	20·2	11·1	161·3
Early Ohio (Scott)	" 12	" 12	169·4	20·2	11·9	149·2
Burbank Russet	" 20	" 25	161·3	28·2	17·5	133·1
Royal Russet	" 20	" 18	153·3	24·2	15·7	129·1
British Queen	" 21	" 22	141·2	24·2	17·1	117·0

POTATOES—THREE AND ELEVEN-YEAR AVERAGES

Name of Variety	Yield of Marketable Potatoes per acre	
	Three-year average	Eleven-year average
	bush.	bush.
Gold Coin	391·5	307·0
Carman No. 1	407·4	296·0
Dreer Standard	395·2	286·6
Wee MacGregor	389·9	286·4
Prince Albany	376·5	285·7
Empire State	368·4	276·7
Irish Cobbler	359·0	256·7
Everitt	294·5	239·6
Green Mountain	373·8	.....
Early Six Weeks	372·0	.....
Factor	361·7	.....
Morgan Seedling	358·9	.....
Sutton Abundance	328·0	.....
Early Ohio	295·8	.....
Bovee	283·6	.....
Gold Nugget	263·5	.....
Royal Russet	213·4	.....

SPROUTING OF POTATOES BEFORE PLANTING

Two varieties were used in this experiment: Everitt and Gold Nugget. The Potatoes were placed in flats in a cool light room with the seed end up about six weeks before planting. When planted on May 21 the green shoots were about 3½ inches in length.

SPROUTED VS. NON-SPROUTED

Name of Variety	Date of blooming	Date ready for use	Total yield	Yield of Unmarketable	Small	Yield of Marketable
			bush.	bush.	per cent	bush.
Everitt—Sprouted	July 8...	Aug. 5...	278·0	41·8	15·0	236·2
" Non-sprouted	" 18...	" 16...	227·5	40·0	18·5	187·5
Gold Nugget—Sprouted	" 10...	" 2...	213·7	33·3	15·6	180·4
" Non-sprouted	" 16...	" 12...	184·6	40·8	22·1	143·8

This experiment has been conducted for the past four years with the Everitt and Gold Nugget. The average results for this period show that new potatoes for table use of the Everitt variety were obtained fifteen days sooner by planting sprouted tubers, and the Gold Nugget were available twenty days sooner when compared with non-sprouted potatoes of the same variety. Sprouting reduced the average yield of marketable potatoes during the four-year period by 54.8 bushels for the Everitt variety and 15.9 bushels for the Gold Nugget variety.

PUMPKIN

This season nine varieties of pumpkins were seeded in hills 9 feet apart and thinned to three plants to the hill. Both years the growing season was shortened by the August frost but nevertheless a fair crop was harvested. The crop in 1927 from three hills was 263 pounds for King of the Mammoth, 184 pounds for Connecticut Field, 156 pounds for Sweet or Sugar, 139 pounds for Winter Luxury, and 105 pounds for Pie.

RADISH

Radish are easily grown and require no special care. At this Station a second sowing is made the middle of June for the purpose of prolonging radish for table use. The variety Vaughan 20-day is the earliest and of excellent flavour. Other recommended varieties are Saxa, Icicle and French Breakfast.

RHUBARB

Five varieties are under test in the rhubarb plantation namely Ruby, Victoria, Linnaeus, MacDonald and Hobdays Giant. The last named is green in the stalk and lacks quality. Ruby is the earliest variety and of excellent quality —particularly fine in the stalk. Victoria is a variety with attractive colour and fine quality, but when cooked requires more sugar than Ruby. Linnaeus in quality comes between Ruby and Victoria but is not generally grown. MacDonald has recently been included in the plantation and was obtained from MacDonald Agricultural College.

The reader is referred to Page 45 of the 1925 Scott Report for a detailed discussion on the propagation and culture of rhubarb.

SQUASH

Eleven varieties were tested in the past two years but growth was checked by the August frosts. Varieties of winter squash recommended are English Vegetable Marrow and Long White Bush.

SPINACH

This vegetable is grown for greens and the varieties compared showed no difference. The variety King of Denmark is sold by the leading seedsmen.

SWISS CHARD

Swiss chard is another vegetable grown for greens. The leaves may be cooked like spinach and the large leaf ribs served like asparagus. The varieties recommended are Lucullus and Silver Leaf.

SALSIFY

Mammoth Sandwich Island was the variety tested. Plants were thinned to 2 inches apart in the row and when harvested resembled a small-size parsnip.

TURNIPS

A number of summer and winter turnips are tested each year. Summer turnips as a rule are strong in flavour except when the seed is sown in the fall. For a summer variety, Early Purple Top Milan has the mildest flavour. For winter use swedes are preferred as turnips have poor keeping qualities. The varieties recommended are Canadian Gem and Purple Top Swede.

TOMATOES

The average number of varieties tested annually is 30. In 1927 seed of each of the varieties was sown in the greenhouse April 13. On June 14 the plants were transplanted to the garden at a distance of 4 feet apart each way. The following table gives the results of the 1927 variety test:—

TOMATOES—TEST OF VARIETIES OR STRAINS

Name of Variety	Source of seed	Date in blossom	Yield		Total from 3 plants
			Ripe fruit	Green fruit	
			lb. oz.	lb. oz.	lb. oz.
Self-pruning	Burpee	July 25	6 0	69 0	75 0
Perfection	Carter	" 5	11 0	61 0	72 0
Alacrity 18131	O-6558	" 5	24 6	29 0	66 0
Earliana	Ferry	" 10	11 10	54 0	65 10
Duke of York	A.M. Co.	" 12	8 0	57 0	63 0
Pink No. 2	O-9730	June 28	21 8	39 0	60 8
Early Prolific	Bolgiano	July 5	12 0	48 0	60 0
Jewel	Langdon	" 12	10 8	47 0	57 8
A. B. B. No. 2	O-11390	" 7	24 4	31 0	55 4
Bonny Best	Stokes	" 5	24 6	29 0	53 6
Alacrity X Hipper	O-9725	" 8	26 0	27 0	53 0
Select Earliana	Moore	" 10	16 15	34 0	50 15
Avon Early	Vaughan	" 8	13 0	37 0	50 0
Penn State Earliana	Stokes	" 25	4 10	44 8	49 2
Golden Queen	Sutton	" 12	9 8	38 0	47 8
L. G. B. B. No. 3	O-11392	" 10	6 8	40 0	46 8
June Pink	Livingston	" 12	13 12½	32 0	45 12½
Sunrise	A. M. Co.	" 5	7 12	34 0	41 12
Prosperity	Patmore	" 7	4 11	37 0	41 11
Success	Bruce	" 12	8 0	32 8	40 8
Pink No. 1	O-9731	June 28	12 0	27 0	39 0
Avon Early	Dreer	July 8	17 3	21 0	38 3
Alacrity	O-9720	" 5	12 6	25 0	37 6
Red Canner	Moore	" 8	.. 12	36 0	36 12
Early Atlantic	McKenzie	July 5	10 10	24 0	34 10
Alacrity X Earlibell	O-9729	" 2	17 8	16 0	33 8
John Baer	S. and B.	" 12	2 10	30 8	33 2
Princess Mary	McKenzie	" 27	2 2	31 0	33 2
Fifty-day	Buckbee	" 20	2 13	29 8	32 5
Red Rock	Bruce	" 12	1 12	30 0	31 12
Manyfold	Livingston	" 20	1 0	27 0	28 0
Red Rock	Langdon	" 25	1 10	26 0	27 10
Bloomsdale	"	" 23	3 8	23 8	27 0
Albino	Rennie	" 29	Nil	21 8	21 8
Giant Yellow	"	" 27	Nil	20 0	20 0
Magnus	Livingston	" 27	Nil	20 0	20 0
Acme	"	" 25	Nil	19 8	19 8
Dwarf Ponderosa	Buckbee	" 27	Nil	17 0	17 0
Imperial Beefsteak	Rennie	" 27	Nil	16 8	16 8
Chalks Early Jewel	S. and B.	" 12	1 5	12 0	13 5
Early Dwarf Champion	Buckbee	" 27	Nil	11 0	11 0

Pruning Experiment.—A pruning experiment has been conducted for five years comparing the varieties Bonny Best and Alacrity. The experiment consists of cutting off the plants above the first truss of fruit and comparing with the cutting above the second and third truss to hasten ripening. The result of this experiment for 1927 is given in the following table:—

PRUNING EXPERIMENT—COMPARISON OF BONNY BEST AND ALACRITY

Name of Variety	Treatment	Date in bloom	Date first ripe fruit	Yield		Total from 12 plants
				Ripe fruit	Green fruit	
				lb. oz.	lb. oz.	lb. oz.
Bonny Best	Stopped at 1st truss	July 5	Aug. 25	17 7	19 0	36 7
"	" 2nd "	" 5	" 21	12 0	52 0	64 0
"	" 3rd "	" 5	" 21	13 0	72 0	85 0
"	Not stopped	" 5	" 21	24 6	29 0	53 6
Alacrity	Stopped at 1st truss	June 28	Aug. 15	26 0	6 0	32 0
"	" 2nd "	" 28	" 15	37 0	42 0	79 0
"	" 3rd "	" 28	" 15	28 0	50 0	78 0
"	Not stopped	" 28	" 19	20 0	46 0	66 0

The variety Bonny Best is of excellent shape whereas the fruit of Alacrity usually splits when ripe. When pruned the variety Alacrity ripened ten days earlier than Bonny Best and when left unpruned there was only 2 days difference in time of ripening. Averaging the results of five years, the vines not pruned gave the highest yield of ripe fruit.

SOWING VEGETABLES IN THE FALL

Commencing in the fall of 1922 seed of some of the hardiest kinds of vegetables was sown just before freeze-up, and a similar sowing of the same vegetables was made early in the spring to compare the yields and the dates when the vegetables were ready for table use.

Sowing vegetable seeds in the fall gives earlier vegetables and usually an increased yield. The seed of the following vegetables can be safely sown in the fall: beet, cabbage, carrot, lettuce, onion, parsnip, spinach, radish and turnip.

TREE FRUITS

APPLES

Progress with the growing of apples continues slowly. Several new cross-bred apple trees were obtained from the Morden Experimental Station in the spring. Trees of the Osman and Prince continue to thrive well and appear to be the hardiest under test at this Station. In addition to these two varieties, trees of the following cross-breds fruited this year: Jewel, Martha, Jewel X Simbirsk, and Jewel X Tetofsky.

PLUMS

The Manitoba native plum-trees are winter hardy. The fruit of a number of the late maturing varieties was destroyed by the September frosts in 1926 and 1927. Unfortunately, much damage was done by the plum pocket this spring at the time the fruit was setting. The varieties Sapa and Opata came through the winter in excellent shape and fruited for the first time in 1926. The bushes were again heavily laden this year, and the fruit ripened before the September frosts. The Rocky Mountain or Sand Cherry fruits well but to date the fruit of the Compass Cherry has not ripened before the September frosts.

SMALL FRUITS

CURRANTS

All varieties of currants so far tested are winter hard. The bushes of the red and white varieties were sprayed with a Paris green solution to prevent leaf destruction by the aphids. The following table gives the 1927 yields obtained from six bushes of each variety:—

BLACK CURRANTS

Variety	Date ready for use	Size of fruit	Yield from 6 bushes
			lb. oz.
Black Naples	Aug. 1	Medium..	13 1
Black Beauty	" 3	" ..	17 12
Black Grape	" 2	Large.....	15 9
Buddenburg	" 1	"	19 8
Climax	" 3	Medium..	21 10
Clipper	July 29	Large.....	17 5
Eagle O-139	Aug. 1	"	17 11
Kerry	July 29	"	13 5
Lee Prolific	" 29	Medium..	14 0
Magnus	" 29	Large.....	14 10
Saunders	" 29	"	17 1
Topsy	" 29	"	13 10

RED CURRANTS

Variety	Date ready for use	Size of fruit	Yield from 6 bushes
			lb. oz.
Cumberland Red	July 30	Medium..	11 10
Greenfield Red	" 30	" ..	9 14
L. B. Holland	Aug. 1	Large.....	13 14
Pomona	" 2	"	17 15
Raby Castle	" 1	"	20 9
Red Grape O-150	" 1	"	14 1
Red Cross	July 30	"	13 11
Rankins Red	" 30	Medium..	11 4
Red Dutch	Aug. 2	"	10 12
Simcoe King	" 2	" ..	14 4
Stewart	July 30	Large.....	24 8
Victoria Red	" 30	"	15 6

WHITE CURRANTS

Variety	Date ready for use	Size of fruit	Yield from 6 bushes
			lb. oz.
Large White	Aug. 5	Large	11 7
White Grape	" 5	Medium	9 8
White cherry	" 5	"	8 0

GOOSEBERRIES

Seven varieties are under test. Both in 1926 and 1927 all varieties bore an exceptionally heavy crop. Varieties recommended are Silvia, Charles, Duncan and Josselyn (Red Jacket).

RASPBERRIES

Eight varieties of raspberries are under test in the small fruit plantation. The Herbert variety is recommended as it produces large berries of excellent quality. Two other outstanding varieties are Count and Brighton, introductions from the Central Experimental Farm.

STRAWBERRIES

Eight varieties of strawberries are under test. Picking commenced this season on July 9 and continued until July 28, with the exception of Americana —an everbearing variety which ripened on July 26 and continued bearing until freeze-up. Dakota was the heaviest yielding variety.

FALL MANAGEMENT OF SMALL FRUITS

Currant bushes are pruned late in the fall, some of the new growth is taken out in the case of the red and white, and old growth in the case of the black. With gooseberry bushes when they become very dense, some old wood and some of the new wood is removed in the fall. All old wood is removed from the raspberry canes after the fruiting season and all weak canes, leaving about five strong canes to fruit the following year.

At the Scott Station currant bushes are not given winter protection. Gooseberry bushes are covered with two to three inches of straw. Raspberry canes are bent over after freeze-up and covered with about 6 inches of straw. If straw or strawy manure is not available, raspberry canes and gooseberry bushes may be covered with soil, in this case the covering must be done before freeze-up. The strawberry plantation is covered with about 2 inches of straw just before freeze-up. This is removed in the spring about May 1.

ORNAMENTAL TREES AND SHRUBS

The question of suitable trees and shrubs for home planting is attracting increasing attention from the people of northwestern Saskatchewan and farmers who are making permanent homes on the prairies are very interested in varieties which can be grown successfully. Ornamental shrubs recommended for this district are:—

Clematis or Virgin's Bower.—One of the choicest and most satisfactory climbing flowering plants. Of strong rapid growth, dense green foliage and pure white fragrant flowers which appear in great abundance during August and September, followed by silvery coloured pods which make an attractive appearance until winter. This vine also affords excellent shade around a balcony.

Tartarian Honeysuckle.—A great favourite and one of the most attractive shrubs. Blooms in May and the flowers contrast beautifully with the foliage. Fruit, red and orange, ripening in summer and persisting until autumn.

Prunus Maackii and Prunus Grayana.—The masses of sweetly scented white blossoms on these shrubs and fruit which resembles the choke cherry presents a most attractive appearance until late fall.

Ribes Aureum or Missouri Currant.—Thrives well and is one of the most promising of this family. In addition to the yellow fragrant flowers in the spring there is usually a good crop of berries late in the summer.

Spiraea Van Houttei.—This variety is a generally acknowledged favourite and thrives well at Scott. It is covered in June with masses of tiny white blossoms.

Syringa, Lilac.—There are a large number of lilacs nearly all of which are hardy. Congo a deep purple and Charles X rosy lilac are recommended. The lilacs when in bloom at this Station are greatly admired by visitors.

PERENNIAL FLOWERS

The perennials made an excellent showing this year, and losses from winter-killing were nil. From early spring until the middle of September the flower borders were one continual mass of bloom.

Perennial flowers recommended are: *Achillea* (The Pearl), *Aquilegia* (Columbine), *Chrysanthemum Leucanthemum* (ox-eye daisy), *Delphinium* (perennial larkspur), *Dicentra* (Bleeding heart), *Dianthus* (Sweet William), *Gypsophila paniculata* (baby's breath), *Gypsophila acutifolia, Hemerocallis* (day lily), *Hesperis matronalis* (sweet rocket), *Lychnis chalcedonica* (Jerusalem Cross), Pæonies, *Papaver orientale* (oriental poppy) and *Papaver nudicaule* (Iceland Poppy).

ANNUAL FLOWERS

Two hundred varieties of annual flowers are grown. The majority are sown in the open the middle of May, while the more tender varieties were raised under glass and transplanted to the flower borders the middle of June. The early frosts of August damaged the more tender varieties but both years after the frost they renewed their growth and bloomed freely.

Annual flowers recommended are *Alyssum* (Little Dorrit), *Asperula azurea, Bartonia aurea, Brachycome* (Swan river daisy), *Calendula,* Candytuft, *Clarkia* (Salmon Queen), Chrysanthemum (Bridal robe), *Coreopsis atrosanguinea, Coreopsis marmorata, Dimorphotheca aurantiaca* (Africa daisy), *Helichrysum* (Everlasting), Larkspur, *Lavatera* (Mallow), *Linaria, Linum rubrum,* Malope, Mignonette, *Nemesia, Nicotiana,* Poppy, *Scabious, Schizanthus,* Sweet peas, *Tagetes signata pumila,* Virginian stock and Zinnia.

BULBS

Tulips made an excellent display in the spring, at a time when few flowers are available. The bulbs are planted in the fall before freeze-up.

Each fall a number of newer sorts are set around the grounds. The following table gives the results of the tulips planted in the fall of 1926:—

VARIETY TEST OF BULBS—TULIPS

Name of Variety	Commenced to bloom	Bloom over	Height including bloom	Size of bloom	Remarks
			inches	inches	
Belle Alliance	May 28	June 12	20	3	Brilliant scarlet, large flower.
Cottage Maid	" 30	" 25	12	1¾	Rose pink shaded with white.
Chrysolora	" 30	July 1	18	3¼	Clear golden yellow, large flower.
Couronne d'Or	" 31	" 1	14	2½	Deep yellow flushed orange red.
Couleur-de-Cardinal	June 3	" 5	25	2	Brilliant crimson with yellow base purplish shaded.
Duchesse-de-Parma	" 1	June 30	20	3	Deep orange scarlet with an irregular border of deep yellow.
Inglescombe Yellow	" 10	" 30	15	3½	Clear yellow large flower
Keizerskroon	" 4	" 23	12	2½	Crimson scarlet bordered with clear yellow.
La Reine	May 30	" 22	12	2	White faintly flushed pale rose.
Murillo	June 1	" 27	15	2½	Delicate rose pink flushed white.
Proserpine	May 31	" 27	18	3	Rosy carmine with white base.
Pink Beauty	June 2	" 15	20	3¾	Rosy pink shaded white.
Pottebakker White	May 28	" 15	25	4	Pure white large flower.
Pottebakker Scarlet	" 28	" 15	18	3½	Bright scarlet.
Rubra Maxima	June 3	" 30	15	3½	Deep vermilion crimson.
Vermilion brilliant	May 30	" 29	20	2¾	Deep vermilion scarlet.
White Hawk	June 2	" 15	18	4	Beautiful pure white large flower.
Yellow Prince	May 28	" 22	12	3	Clear yellow, large flower, sweet scented.

WINTER PROTECTION OF BIENNIAL AND PERENNIAL FLOWERS

With the exception of Chrysanthemum (King Edward VII and Ox-Eye Daisy) Dianthus, Iceland Poppy, Pansy, Pink and Sweet William all other biennial and perennial flowering plants are cut back to within 4 inches of the ground. Paeonies are covered with about 4 inches of burnt-out manure the first winter after resetting but not afterwards. Pinks and Pansies are given a very light covering of about 2 inches for early spring protection. Roses, Hollyhocks and Lupinus are covered about 4 inches and Canterbury Bells to a depth of 6 inches. During the past two winters, Iceland Poppies and Sweet Williams have not been covered and it appears that these perennials do not need winter protection. All other biennials and perennials are left unprotected at the Scott Station. Tulip bulbs are covered to a depth of 6 inches the first winter after planting.

CEREALS[1]

SEASON

The 1927 crop season as affecting the production of cereal grains was unusal in several respects. Spring was late and seeding was not general until May 9, which is about ten days later than the average for this district. the growing season was favoured with an ample supply of moisture, but remained cool and cloudy. The sunshine recorded during the month of May was the lowest for that month since this Station has been in operation. These conditions, followed by only a moderately warm summer, were not conducive to rapid growth and crops remained backward during the entire growing season.

Rust was noticeable shortly after the crops headed out and caused more damage in this district than has been the case since 1916. The main factors for the favourable development of rust this year were—early stage of maturity of crop when first attacked, heavy growth of straw, and low wind velocity during the month of July.

[1] Work in cereals, forage crops and field cultural investigations, is under the supervision of Mr. F. M. MacIsaac, B.S.A. Assistant to the Superintendent.

For the second year in succession damage from frost was noticeable on the morning of August 8, although the thermometer at this Station registered only 32.1 degrees. Due to the backward stage of the crop considerably more damage to wheat from frost was reported than was the case last year when 3 degrees of frost was registered on the same date. It is difficult to apportion the respective damage from frost and rust in this district. Four or five days after the frost, it was evident that some fields would not pay for the cost of cutting, while in other fields no damage could be detected; nevertheless, in some of the latter cases where the crop was late and the growth of straw heavy, a poor grade and low yield resulted.

The crops on the larger fields at this Station were not damaged to the same extent as in the adjacent district. This was probably due to their more advanced stage of maturity. No damage from frost was noticed on the experimental plots. Rust was present on all varieties, but did not damage yields to the same extent as in the larger fields. Harvest was delayed by frequent rains but the weather remained cool, and no sprouting occurred in the stook as was the case last year. Owing to adverse weather conditions, threshing was prolonged in the district until after snowfall. This was due not so much to the amount of precipitation as to lack of drying weather.

DISEASES

The following list gives the cereal diseases found on the experimental plots at Scott, September, 1927, as reported by Doctor Margaret Newton, Plant Pathologist, Dominion Research Laboratory, Winnipeg.

Wheat—

Stem rust—*Puccinia graminis tritici*
Leaf rust—*Puccinia triticina*
Bunt—*Tilletia tritici*
Loose smut—*Ustilago tritici*
Take-all—*Ophiobolus graminis*
Basal glume rot—*Bacterium atrofaciens.*
Black chaff—*Bacterium translucens var. undulosum*
Ergot—*Claviceps purpurea*
Glume blotch—*Septoria nodorum*

Oats—

Halo leaf-blight—*Bacterium coronafaciens*
Leaf spot—*Helminthosporium avenae*
Crown rust—*Puccinia coronata*
Stem rust—*Puccinia graminis avenae*
Loose smut—*Ustilago avenae*
Covered smut—*Ustilago levis*

Barley—

Spot blotch—*Helminthosporium sativum*
Net blotch—*Helminthosporium teres*
Stripe—*Helminthosporium gramineum*
Stem rust—*Puccinia graminis*

CEREAL ACTIVITIES

Two blocks of land are used for cereal work at Scott. One block is summer-fallowed each year—cereal crops and summer-fallow alternating. Thus all cereal tests are conducted on summer-fallow land. The surface soil to a depth of 6 to 7 inches is a light to medium dark brown loam quite high in silt. The subsurface soil is a silty loam merging into a silty clay loam. In nitrogen content it is average to below average for the Province with the phosphorous and potash content quite normal. All tests with ordinary standard varieties were carried on this year in triplicate one-fortieth-acre plots instead of duplicate plots, as has been the practice previously. A one foot border is removed from

all plots just previous to cutting. In the case of the rod-row plots a change was made this year from three rows per plot to five. Where three-rowed plots are used only one row is left for yield purposes as the two guard rows are kept separate. By using five-rowed plots, the yields are taken from three rows or three times the area. In addition to growing the standard varieties in one fortieth-acre plots they are further tested in the rod-row plots together with a large number of other sorts. Including named varieties, hybrids, and selections there were tested this year 107 of wheat, 42 of oats, 31 of barley, 26 of rye, 10 of peas, 3 of flax, and 1 of emmer, making a total of 220 sorts. Of this number 28 were selections sent in by farmers.

Over 1,500 plots were devoted to headrow testing. The chief feature of this work is testing new selections, and the purity of the different varieties.

PRODUCTION OF REGISTERED SEED

The term Registered Seed denotes the highest official grade of seed in Canada as determined by the Canadian Seed Act as well as by the Canadian Seed Growers' Association.

The production of Registered Seed has received increasing attention at this Station during the past three years, with a view of propagating Elite Stock Seed of the most commonly grown varieties for registration. As Elite Stock Seed can only be grown in limited quantities it has not been found practicable to offer this class of seed for sale, but rather is the Station adopting the method of multiplying Elite Stock, and offering it for sale as First Generation Seed. To attain this purpose, it is the intention of the Station to grow sufficient Elite Stock Seed each year to seed the larger fields the following year, and it is hoped to have this plan in operation by 1929. Provided the seed passes field inspection it will then be eligible to be offered for sale as First Generation. For the time being only seed of the commonly grown varieties in the district will be multiplied. The policy of the Station is not to compete with legitimate seed growers and dealers but to maintain the purity of the variety, and sell pure seed to farmers in limited quantities, dependent upon the demand.

LOCAL VARIETY TESTING

With the increasing number of new varieties coming into commercial use, the many distinct types of soil and the widely different climatic conditions, it becomes apparent that certain varieties may be more adaptable to some districts than others. In view of this fact, the Cereal Division of the Central Experimental Farm, in 1924, instituted the plan of conducting local variety tests on farms in the different grain-growing areas. The main object is to "zone" the wheat producing sections into variety districts. At the time of adopting this system it was the intention of the Cereal Division that all co-operative work within the territory served by the Dominion Experimental Farms would ultimately be taken over and conducted by that Farm or Station. This year, the Scott Experimental Station took charge of all co-operators located in its territory, numbering about 30. In order eventually to zone northwestern Saskatchewan into variety districts the Scott Experimental Station solicits other farmers who will undertake this work in a careful and accurate manner. This work has proven of value in providing information regarding the merits of the various varieties in different districts.

The plan of procedure followed in conducting local variety tests with farmers has been arranged to make the work as simple as possible, and yet one which will supply the required information. This plan is outlined in detail in a circular which may be obtained free upon application to this Station. If the farmer is willing to comply with the instructions in this circular, seed of five or six of the most promising varieties is forwarded to him in time for

seeding. A form is also sent with the seed, upon which the farmer records his observations and gives his opinion as to the suitability of the different varieties for his particular district. A member of the Experimental Station staff visits each co-operator during the growing season. The results to date indicate that this work has appealed strongly to a considerable number of farmers and the quality of their work is commendable. With close and careful co-operation betwen the experimental farms and the co-operators, it should be possible in the near future to divide the grain-growing sections into "variety districts" where certain varieties may be safely recommended.

SPRING WHEAT

Fifteen varieties of spring wheat were tested in 1927. The dates of seeding were May 6 and May 9, at the rate of 1½ bushels per acre for all varieties, except the Durum wheats, which were seeded at the rate of 1¾ bushels.

All varieties germinated evenly and good stands were procured. Tillering was slow, but on the other hand weather conditions permitted tillering to proceed uniformly.

With the exception of the Durum wheats rust was noticeable earlier than usual on all varieties this year. At the time of cutting 40 to 70 per cent of the rust had developed to the black stage, varying with the variety attacked. The straw of Supreme, Renfrew, Early Red Fife and Red Fife showed the greatest amount of rust infection in the order named. Threshed samples of grain from these varieties also showed considerable evidence of rust damage. The straw of Garnet was affected with rust almost as much as Supreme, and the other varieties mentioned above; yet no damage could be detected on the threshed grain. This may be partly attributed to the advanced stage of this variety at the time the black rust began to develop. Excepting the Durums, the straw of the Marquis strains and Reward showed the least rust and in the threshed grain only slight damage could be detected.

The 1927 results as presented in the following table are considerably above the average yield of spring wheats for this Station:—

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) Ottawa 15	Weight per measured bushel after cleaning
			ins.		bush.	per cent	lb.
Marquis, Ottawa 15	Aug. 28	114	43·7	9·7	48·8	100·0	62·0
Red Bobs (Wyler)	" 24	110	40·0	10·0	48·8	100·0	61·2
Early Triumph	" 24	110	41·0	10·0	48·7	99·8	61·6
Renfrew	" 31	117	47·0	9·7	47·4	97·1	61·7
Acme, Sask. 450	Sept. 6	123	45·0	5·0	46·7	95·7	63·3
Marquis 10B	Aug. 28	114	42·3	9·7	46·1	94·4	62·0
Red Bobs 222	" 24	110	39·0	10·0	45·8	93·9	62·0
Kubanka Sask. 6	Sept. 6	123	46·0	5·0	45·4	93·0	62·7
Supreme	Aug. 26	112	40·7	10·0	45·2	92·6	61·5
Garnet, Ottawa 652	" 20	106	38·0	9·0	44·0	90·2	63·8
Kitchener	" 30	116	46·7	9·4	43·9	90·0	61·6
Red Fife, Ottawa 17	Sept. 3	120	43·7	8·3	42·3	86·7	61·1
Reliance	Aug. 26	112	41·7	9·0	39·3	80·5	62·5
Early Red Fife, Ottawa 16	" 30	116	45·7	9·7	39·2	80·3	63·6
Reward, Ottawa 928	" 22	108	38·7	10·0	39·0	79·9	64·5

Ten varieties have been tested for a sufficient length of time to permit of a five-year average. In order to compare Reward with some of the standard varieties, a four-year average also is submitted:—

WHEAT—FIVE-YEAR AVERAGE

Name of Variety	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre
		ins.		bush.
Red Bobs (Wyler)	117·4	32·8	9·6	34·2
Early Triumph	116·8	32·6	9·6	33·9
Supreme	118·6	32·6	9·6	32·5
Garnet, Ottawa 652	111·0	31·7	9·5	31·6
Kitchener	125·0	34·5	9·5	31·3
Marquis, Ottawa 15	121·2	34·2	9·5	31·2
Acme, Sask. 450	129·4	37·8	6·5	30·8
Marquis 10B	121·2	33·9	9·5	30·5
Kubanka, Sask. 6	129·4	40·2	6·8	30·0
Red Fife, Ottawa 17	127·2	35·1	9·0	29·1

WHEAT—FOUR-YEAR AVERAGE

Name of Variety	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre
		ins.		bush.
Garnet, Ottawa 652	108·8	29·9	9·5	30·1
Reward, Ottawa 928	110·8	31·7	9·8	28·2
Marquis, Ottawa 15	119·5	31·6	9·9	27·8
Red Fife, Ottawa 17	125·5	32·3	9·3	26·1

Garnet is an early maturing variety, first distributed to the public in the spring of 1926. It matures about ten days earlier than Marquis at this Station and from seven to fourteen days earlier in tests conducted by farmers. No significant difference in yielding ability is apparent between Garnet and Marquis in the five-year average; but in the four-year average, Garnet leads by 2.3 bushels per acre. The kernel of Garnet is normally smaller and more linear in shape; in colour it is quite reddish compared to the darker colour of Marquis. When exposed to unfavourable weather conditions in the stook, Garnet does not appear to bleach as badly as Marquis. In dry seasons the kernel of Garnet is inclined to be lean, which makes it less desirable for milling purposes. For this reason Garnet is not recommended for drier areas where Marquis can be safely grown.

Reward, a promising new variety was obtained from a cross made at Ottawa between Marquis and Prelude. It is easily recognized by its pubescent (fine hair) chaff, a characteristic which it inherits from its Prelude parent. In the four years Reward has been tested at this Station it has ripened 8.7 days earlier than Marquis, and has yielded about one-half bushel more per acre. It appears to be excellent in milling and baking tests and usually produces a uniform plump sample of grain, having a high weight per measured bushel. Reward is equal to Marquis in length and strength of straw and does not bleach quite as readily when exposed to adverse weather conditions, although it is not quite as resistant to bleaching as Garnet. In dry seasons the kernels of Reward and Garnet have a shrunken appearance; but the degree of shrinkage is less apparent in Reward.

Red Bobs (Wyler) is a selection made by R. O. Wyler out of the original Red Bobs and is very similar to Early Triumph, which is another selection made from Red Bobs by Dr. Wheeler. Both varieties have made a very good showing in a five-year test at this Station. Threshed samples of grain of these varieties do not usually have the characteristic dark red colour found in the Fifes and Marquis and bleach considerably when exposed to adverse weather conditions for any length of time. In weight per measured bushel they are generally under Marquis. Both varieties mature three to five days earlier than Marquis. Red Bobs (Wyler) and Early Triumph are, however, more susceptible to rust than Marquis and for this reason are considered objectionable in districts where rust occurs. Nevertheless, these varieties are worthy of a trial in districts where rust is not a limiting factor in crop production.

Supreme is a selection from Red Bobs made by Dr. Seager Wheeler of Rosthern, Sask. It differs from Early Triumph in that the head tapers more toward the tip and matures from one to two days later. It was also found to be more susceptible to rust at Scott this year than the other Red Bobs selections.

Kitchener is a selection made by Dr. Wheeler from Marquis. It is equal to Marquis in yield, but requires three to four days longer to mature. It is normally slightly below Marquis in weight per measured bushel. The kernel of Kitchener resembles Marquis in colour but it shows more resistance to bleaching than the latter. In districts with a reasonably long growing season and which are not subject to rust, Kitchener should be worthy of consideration.

Early Red Fife Ottawa 16 is a pure line selection made from the original Red Fife. The head instead of being pointed at the tip is somewhat blunt. It matures from one to two days later than Marquis and yields two bushels less per acre in a four-year average. The kernel is larger than Marquis and is of a dark red colour with a high weight per measured bushel. This variety has shown the greatest resistance to bleaching of any of the standard varieties under test at this Station. The fact that Early Red Fife is somewhat longer in the straw than Marquis, and that it has a larger kernel which does not bleach like Marquis, when exposed in the stook for some time, to frequent rains, has increased the popularity of this variety in some districts. However, this variety is very susceptible to stem rust and shatters badly.

Red Fife Ottawa 17 is a pure line selection made from the ordinary Red Fife. It requires five to seven days longer to mature than Marquis and has yielded 2 bushel less per acre in a five-year average. The claim is often made for Red Fife that it is much longer in the straw than Marquis, and has an advantage over the latter variety in dry seasons. An average taken from three of the driest years at this Station shows Red Fife to be only one inch longer in the straw than Marquis and 1.5 bushels lower in yield for the same period. It is usually, slightly under Marquis in weight per measured bushel. The kernels are a dark red colour and do not bleach to the same extent as Marquis when exposed to unfavourable weather conditions in the stook. Red Fife Ottawa 17 is more subject to rust than Marquis and shatters quite readily.

Renfrew and Red Bobs 222 are two introductions by the University of Alberta. Both wheats were tested at Scott for the first time this year.

Acme and Kubanka belong to the Amber Durum class of spring wheat. Speaking generally, most of the Durum varieties are bearded, weak in the straw and late in ripening. Due to their resistance to black stem rust, they are more likely to be grown in areas subject to rust attacks. In districts where only a small acreage is grown it may be necessary to market the Durum wheats in carload lots, as country elevators are not generally in a position to handle it in smaller amounts.

OATS

Fifteen varieties of oats were tested in 1927. All varieties were seeded on May 9 at the rate of 2¼ bushels per acre, except the hulless varieties which were seeded at the rate of 1¼ bushels per acre.

The plots germinated uniformly and good stands were produced from all varieties. Weather conditions were conducive to a steady vigorous growth throughout the entire growing season. In the second replication of plots, a heavy rainstorm caused some of the later maturing varieties to lodge at an early stage of development and prevented the grain from filling properly. The yields where lodging occurred were no doubt reduced to some extent. This was the only setback the plots received during the growing season.

The yields presented in the following table are considerably above the average yield of oats for this 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 Ottawa 49 = 100)	Weight per measured bushel after cleaning
			ins.		bush.	per cent	lb.
Victory	Aug. 24	107	46·3	9·0	115·0	104·2	38·0
Banner, Sask. 144	" 24	107	46·0	8·8	111·0	100·5	36·8
Banner, Ottawa 49	" 24	107	45·7	8·8	110·4	100·0	38·0
Legacy, Ottawa 678	" 18	101	40·0	9·5	107·4	97·3	37·5
Gerlach, Sask	" 25	108	45·7	9·0	103·2	93·5	38·0
Prolific, Ottawa 77	" 25	108	47·0	8·8	100·0	90·6	38·5
Gold Rain	" 23	106	47·0	9·0	97·7	88·5	39·8
Leader	" 24	107	46·0	8·7	97·7	88·5	35·5
Columbian, Ottawa 78	" 25	108	45·7	9·0	97·0	87·9	38·7
Cole, Sask. 795	" 12	95	38·5	7·0	96·8	87·7	36·3
O.A.C. No. 3	" 14	97	43·0	9·5	96·1	87·0	36·5
Alaska	" 13	96	42·0	10·0	92·4	83·7	39·8
Longfellow, Ottawa 478	" 22	105	45·0	8·0	89·4	81·0	37·3
*Laurel, Ottawa 477	" 20	103	42·7	10·0	83·6	75·7	49·3
*Liberty, Ottawa 480	" 20	103	45·7	9·5	76·0	68·8	48·2

* Hulless varieties.

As seasonal conditions vary annually the three and five-year averages tabulated in the following table are a safer guide to the relative merits of the different varieties under test.

OATS—THREE AND FIVE-YEAR AVERAGES

Name of Variety	Yield of Grain per acre	
	Three-year Average	Five-year Average
	bush.	bush.
Banner, Ottawa 49	81·6	80·0
Gerlach, Sask	80·5	78·9
Victory	80·7	78·7
Gold Rain	77·4	78·4
Leader	80·3	77·2
Columbian, Ottawa 78	71·6	70·0
Longfellow, Ottawa 478	70·5	69·4
Prolific, Ottawa 77	69·1	67·1
Alaska	69·8	63·2
*Liberty, Ottawa 480	51·3	49·8
Banner, Sask. 144	84·9	.....
Legacy, Ottawa 678	83·1	.....
O.A.C. No. 3	70·3	.....
Cole, Sask. 795	69·7	.....
*Laurel, Ottawa 477	60·9	.....

* Hulless varieties.

Victory has outyielded all varieties of oats tested this season. It produces a fine sample of grain and is generally favoured over Banner as an exhibition oat. In point of yield it compares favourably with Banner in a five-year test; but is not so consistently high from year to year.

It will be observed that Banner Ottawa 49 has given the highest yield of the ten varieties tested over a period of five years. In the three-year average a Banner selection has also produced the highest yield. Banner is of good length and strength of straw. The appearance of the kernel is probably not quite so attractive as some of the other varieties; yet its performance as a consistently high yielding variety has made it one of the most popular varieties in commercial use.

Leader is a side-oat, coarse in the straw and leaf. It is a variety which is very popular with some growers, but has no qualities to recommend it over Banner.

Gerlach, Sask. is a selection made by the University of Saskatchewan from seed received from P. Gerlach, Allen, Sask. It has made a good showing in a five-year test at this Station.

Legacy Ottawa 678 is a cross between Banner Ottawa 49 and Eighty-Day Ottawa 42. It is an early maturing variety and is second, from a yield standpoint, in a three-year test at this Station.

O.A.C. No. 3, Alaska and Cole Sask 795 have given satisfactory yields for early maturing sorts. However, their yields are low when compared with the later maturing varieties. Hence, where the season is long enough the standard sorts should be used.

Liberty Ottawa 480 and Laurel Ottawa 477 are two hulless sorts. Both varieties are very susceptible to smut and should be treated with copper carbonate before seeding, as the ordinary formalin treatment impairs the germination of the seed. Laurel has outyielded Liberty by a considerable margin in a three-year test. It produces a larger kernel than Liberty and has as a rule a higher weight per measured bushel.

The other varieties mentioned are of minor importance and should not be given preference over the standard varieties.

BARLEY

Thirteen varieties of barley were tested in 1927. All varieties were seeded on May 10 at the rate of 2 bushels per acre, excepting the hulless varieties which were seeded at the rate of 1¾ bushels.

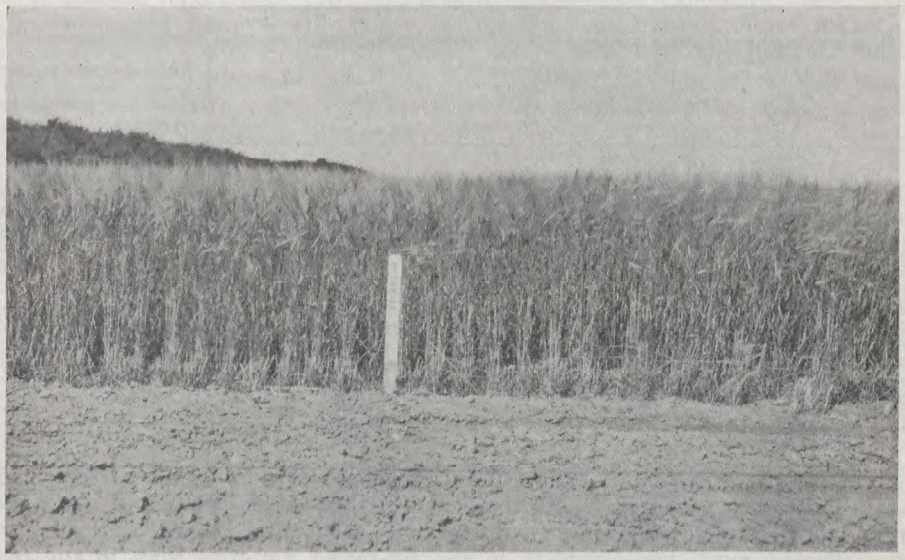
The seed germinated evenly and the stand was excellent on all plots. Following are tabulated the 1927 results:—

BARLEY—TEST OF VARIETIES OR STRAINS

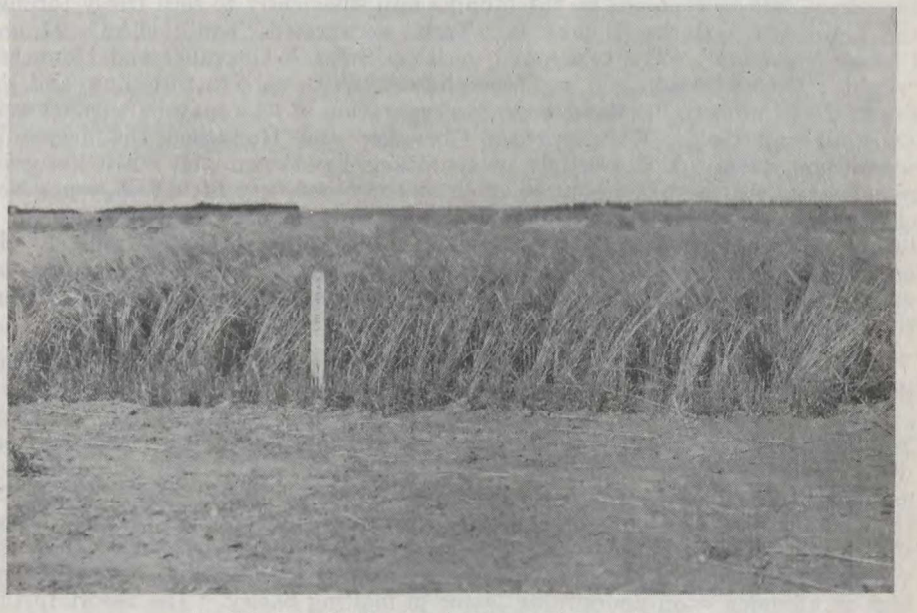
Name of Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre	Comparative yields (O.A.C.21 = 100)	Weight per measured bushel after cleaning
			ins.		bush.	per cent	lb.
Trebi	Aug. 18	100	34·7	8·5	85·0	126·0	49·7
*Himalayan, Ottawa 59	" 16	98	31·0	10·0	70·0	104·0	64·3
O.A.C. 21	" 19	101	45·3	7·7	67·3	100·0	48·5
Gold	" 21	103	35·0	4·3	67·2	99·9	50·3
Chinese, Ottawa 60	" 19	101	45·7	7·7	66·1	98·2	49·3
*Junior, Ottawa 471	" 14	96	32·3	10·0	64·3	95·5	64·7
Feeder, Ottawa 561	" 15	97	44·3	8·0	63·9	94·9	50·0
Hannchen	" 21	103	37·3	5·3	63·6	94·5	51·0
O.A.C. 21 (Sask. 228)	" 19	101	44·7	7·7	61·4	91·2	50·2
Barks Excelsior	" 23	105	36·3	5·7	60·7	90·2	46·7
Duckbill, Ottawa 57	" 25	107	40·3	9·7	56·0	83·2	52·8
Bearer, Ottawa 475	" 23	105	42·3	5·0	51·7	76·8	48·5
Swedish Chevalier	" 24	106	36·3	4·0	48·8	72·5	49·0

* Hulless varieties.

The yields for the 1927 crop season should not be taken as a true comparison of the relative yielding ability of the different varieties under test. A heavy rainstorm at the time the varities were emerging from the milk stage caused considerable lodging in most of the later maturing sorts. The early



Duckbill barley showing strength of straw.



Swedish Chevalier barley showing weakness of straw.

lodging and failure to recover prevented filling proceeding in a normal manner. This reduced yields to a varying extent, depending on the amount of lodging that occurred. Duckbill was the only variety of the late maturing sorts which did not lodge. The varieties most affected were Swedish Chevalier, Gold,

Bearer, Hannchen and Barks, followed by Chinese and O.A.C. 21. The early maturing and hulless varieties did not lodge.

The three and six-year averages as presented in the following table are a more reliable comparison of the merits of the different varieties tested.

BARLEY—THREE AND SIX-YEAR AVERAGES

Name of Variety	Yield of Grain per acre	
	Three-year Average	Six-year Average
	bush.	bush.
*Himalayan, Ottawa 59	48·8	37·8
Barks Excelsior	47·7	36·6
O.A.C. 21	49·3	36·3
Duckbill, Ottawa 57	43·0	35·3
Chinese, Ottawa 60	50·3	35·0
Trebi	60·0	.....
Hannchen	53·3	.....
O.A.C. 21 (Sask. 228)	48·5	.....
Bearer, Ottawa 475	46·4	.....
*Junior, Ottawa 471	43·7	.....
Swedish Chevalier	43·1	.....
Feeder, Ottawa 561	40·7	.....

* Hulless varieties.

Awn Separation.—Complete separation of the awn from the grain is difficult when barley is threshed with the ordinary threshing machine. Results from work done in this connection, during the past three years, indicate that separation is much less complete in the six-rowed varieties than in the two-rowed. All six-rowed types require to be tramped or pounded in sacks before the awns could be removed by the fanning mill sufficiently to seed freely through the grain drill. Barks, Bearer and Trebi were rated "bad"; O.A.C. 21 and Chinese "medium". The two-rowed varieties Swedish Chevalier and Hannchen "slight"; Duckbill and Gold as "very slight." With care in threshing, and the use of the fanning mill, almost complete separation of awn may be effected with Duckbill and Gold. With Swedish Chevalier and Hannchen the degree of separation is less. A close study of conditions has shown that when the grain remained only a short while in the stook and received very little rain, separation of the awn was more difficult than where it had remained in the stook for a longer period subject to frequent rains. These remarks apply only to the varieties listed above, as there are some varieties which partly shed their awns when ripe, for example—Charlottetown 80. In districts where barley is extensively grown, a barley-awner may be used to advantage.

Malting Barley.—Owing to the keen interest shown in malting barley during the past few years, the Scott Experimental Station decided last year to send samples of two and six-rowed types to the Chief Chemist of the Canadian Malting Company to be analyzed for malting purposes. The varieties sent were grown on summer-fallow land upon which 12 tons of well rotted manure had been applied in the fall before summer-fallowing. Each sample was tested for moisture, germination, albumen, steeping and mealiness, and also put through the regular process of malting. The report of the analysis showed that "all varieties sent were of excellent quality as regards germination, but were very high in albumen"—an undesirable factor in malting barley. The report further stated that the barley had probably been grown on soil which contained too high a nitrogen content, and that the high percentage of albumen was possibly due to the soil being too highly fertilized, or to the fertilizer used. Had these varieties been grown on unmanured soil, it is probable they would have shown a lower albumen content and therefore been more suitable for malting pur-

poses. The first requirement of a good malting barley is purity of variety, which will ensure more even germination; thus, some of the varieties which are now only considered medium for malting purposes might be improved considerably by selecting a pure-line strain.

A special report issued by the Canadian Malting Company states that "The two-rowed barleys will, under favourable conditions, produce malts of normal albumen content and high extract comparable with the best six-rowed barleys; yet the chances of obtaining a satisfactory malting barley are much greater with the six-rowed type on account of its adaptability to a wider range of soil and climatic conditions than is the case with the two-rowed type." Results obtained from a series of tests with the six-rowed varieties favour O.A.C. 21 and selections of similar type. The varieties Hannchen, Duckbill and Thorpe are recommended in the two-rowed types in districts where this type can be grown to better advantage than the six-rowed.

PEAS

Five varieties of peas were tested during the past season. The seed was sown on May 17 at the rate of 1½ to 3 bushels per acre, depending on the size of the seed. A particularly good stand was secured this year in all varieties and yields harvested were above the three-year average. The results are summarized in the following 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	
					1927	Three-year average
			ins.	ins.	bush.	bush.
Mackay, Ottawa 25	Sept. 16	122	54	1·8	57·8	40·2
Golden Vine, Sask. 625	" 10	116	54	1·8	54·9	38·1
Chancellor, Ottawa 26	" 8	114	55	1·8	52·9	38·0
Cartier, Ottawa 19	" 12	118	48	2·0	49·1	35·5
Arthur, Ottawa 18	" 12	118	52	2·0	48·2	35·8

It will be noted the difference in yield between the varieties is greater this year than in the three-year average. Mackay, a large yellowish pea easily distinguished by having a black hilum (eye), leads in point of yield. The later maturity of this variety favours it for hay production especially with oats. Chancellor and Golden Vine, Sask. 625, are two early maturing small-seed varieties. Both varieties have given good yields at this Station. Cartier and Arthur are medium-early maturing varieties. They have medium-size seed and produce fair yields.

Peas grown in a dry climate have a greater tendency to split at the time of threshing than when grown under more humid conditions. A small-seed variety such as Chancellor is less likely to split than a large-sized variety like Mackay.

To avoid splitting when threshing, all except one row of teeth is removed and the concaves lowered as far as possible. The separator is then run slowly with the wind practically shut off. This season it was found by threshing in the morning, when the peas were slightly tough, less splitting occurred.

FLAX

Three varieties of flax were tested this season. The seed did not germinate evenly. Spring growth was slow and all varieties were backward—as late as the middle of July. The greatest progress in growth was made after July

20. None of the varieties were completely ripe at the time of cutting, which reduced yields to some extent. However, due to a plentiful supply of moisture during the growing season, the yields harvested were considerably above the average yield of flax for this Station. No variety shows a significant difference in yield over a period of years. Following are tabulated the 1927 results together with a six-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	
					1927	Six-year average
			ins.		bush.	bush.
Crown, Sask.	Sept. 20	116	26	9·7	19·6	11·2
Novelty, Ottawa 53	" 20	116	26	9·5	19·5	10·8
Premost	" 20	116	27	9·7	19·3	11·4

WHEAT AND FLAX—COMBINATION CROP

An experiment has been in operation at this Station for the past five years, to determine whether wheat and flax seeded together will produce returns of greater value than the respective crops seeded alone. Several seedings were made each year varying the proportions of wheat and flax sown. In addition, plots were seeded to both kinds of grain separately. Two seedings were made for each plot. The wheat was seeded first at approximately 2½ inches deep, followed by the flax seeded 1 to 1½ inches.

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
	bush.	bush.			bush.	bush.
Wheat and flax	¾	¼	42	22	39·2	1·1
Wheat and flax	1	¼	42	22	39·2	1·1
Wheat and flax	1¼	¼	43	21	39·6	0·8
Wheat and flax	¾	¾	42	22	40·0	1·1
Wheat and flax	½	½	43	23	31·3	1·7
Wheat (alone)	1½	.....	44	.....	43·1	.....
Flax (alone)	.....	½	.....	27	.....	23·5

It will be noted, that the yields of flax grown in combination with wheat are abnormally low. There is, generally, a fair stand of flax produced; but the plants are weak and backward compared with the wheat in the same plot, or with flax seeded alone, which results in the balls being immature or frozen at the time of cutting. It will also be observed that the net returns are greater from wheat alone than from any of the plots sown in combination. Only once in five years has the yield of flax been significant.

TESTS—SPRING RYE AND EMMER

One variety of spring rye and one of emmer was tested in 1927. The seed was sown on May 26 at the rate of 1¼ bushels per acre for spring rye and 1½ bushels for emmer.

The yields harvested this season were considerably above the six-year average. The 1927 results are presented in the following table together with a six-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	
					1927	Six-year average
			ins.		bush.	bush.
Spring rye (Prolific)	Sept. 3	99	54	5·0	52·6	36·0
Early emmer, Ottawa 44	" 4	100	42	7·5	45·2	25·5

FALL GRAINS

One variety of fall wheat (Kharkov) and one of fall rye (Dakold) were seeded on summer-fallow land September 16, 1926. The seed was sown in duplicate plots at the rate of 1½ bushels per acre for the wheat, and 1¼ bushels for the rye. The wheat yielded 21.9 bushels per acre, which is the first successful crop of winter wheat grown at this Station. The fall rye yielded 37.6 bushels per acre this season, with an average yield of 31.6 bushels for a period of three years.

FORAGE CROPS

A precipitation of 1.85 inches above the average for the three main growing months, (May-June-July) resulted in a more favourable season than usual for the production of all kinds of forage crops. The crops harvested, with the exception of roots and corn, were considerably above the average for this Station. The yield of roots from year to year does not vary to the same extent as do other forage crops by the amount of precipitation. With corn the temperature during the growing season and the number of frost-free days are the principle factors in determining the success of this crop at Scott.

The testing of varieties or strains which show possibilities of hardiness, yield and drought resistance under northwestern Saskatchewan conditions constitute the major projects in operation. The field experimental work includes variety tests with corn, sunflowers, roots, annual hay crops, grasses and legumes.

The different kinds of forage crops vary widely in the percentage of moisture they contain when cured for feed, therefore, it is apparent that a constant basis for comparison is necessary. For this purpose, the absolute dry matter or water-free matter is used. Samples are taken from all plots at the time of cutting and oven-dried to a moisture-free condition. From the percentage dry matter the dry weight yields are calculated. In order that the reader may be able to follow more easily the merits of each variety and compare the different classes of forage crops, the dry weight yields are inserted in the tables.

The results of the various experiments are presented in tabular form and where tests have been conducted for several years deductions are drawn. It should be stated that there are a number of experiments in progress which are not mentioned in this report for the reason that they have been in operation only for a short time. The work in forage crops is treated under three headings—intertilled crops, annual hay crops and perennial and biennial hay crops.

INTERTILLED CROPS

CORN

Twenty-one varieties or strains of corn were tested for ensilage in 1927. The seed was sown with a corn planter in rows 3 feet apart and after emergence thinned to 12 inches apart in the row. All varieties were seeded in quadruplicate plots on May 28 and harvested September 28. Owing to the cool soil temperature the corn did not emerge until the middle of June. This, followed by only moderately warm weather resulted in slow growth during the first part of the growing season. The greatest progress in growth was made the latter part of July and the first week in August. All varieties were slightly frosted on August 8. This gave the corn a set-back and although some growth was made afterwards the corn did not fully recover.

CORN—TEST OF VARIETIES FOR ENSILAGE

Name of Variety	Source	Average height of plants	Maturity at harvest	Yields per acre 1927	
				Green weight	Dry weight
		ins.		tons	tons
Improved Squaw	Medicine Hat	54	Cobs forming	12·31	2·07
Amber Flint	A. J. Wimple	50	Early silk	10·81	1·52
Northwestern Dent	Dak. Imp. Seed Co.	68	Late tassel	10·17	1·43
Hybrid	A. J. Wimple	58	Tassel	9·84	1·49
Burr Leaming	Carter	62	Early tassel	9·63	1·18
Quebec 28	Dr. Todd	48	Tassel	8·88	1·08
Northwestern Dent N. Dak. grown	A. E. McKenzie	60	Early tassel	8·56	1·12
Pride Yellow Dent	Dak. Imp. Seed Co.	68	"	8·45	1·11
90-Day White Dent	Dak. Imp. Seed Co.	68	Silk	7·92	0·92
Minnesota No. 13	Medicine Hat	68	Tassel	7·81	1·10
Northwestern Dent Crookston strain	A. E. McKenzie	61	"	7·70	1·17
Yellow Dent	A. J. Wimple	68	Early tassel	7·38	0·92
North Dakota	Steele Briggs	52	Tassel	6·31	0·83
Longfellow	J. O. Duke	54	Early tassel	5·99	0·79
Northwestern Dent	Exp. Farm Brandon.	54	Early silk	5·67	0·73
Comptons Early	J. O. Duke	48	Early tassel	5·35	0·70
Bailey	J. O. Duke	54	Silk	3·96	0·45
Leaming	J. O. Duke	54	Early tassel	3·42	0·39
White Cap Yellow Dent	Steele Briggs	67	"	3·32	0·49
Wisconsin No. 7	J. O. Duke	48	"	3·21	0·45
Golden Glow	J. O. Duke	46	"	3·21	0·37

Experimental results to date indicate that corn is not a dependable silage crop at this Station. The chief limiting factors in the successful production of this crop under conditions that prevail in the Scott district are the short growing seasons and the comparatively cool growing weather—especially the nights. The susceptibility of corn to frost injury and the fact that the frost-free period for an average of sixteen years is only eighty-six days, results in relatively low yields in the most favourable seasons. Under less favourable conditions the crop was merely cut for comparison of variety purposes.

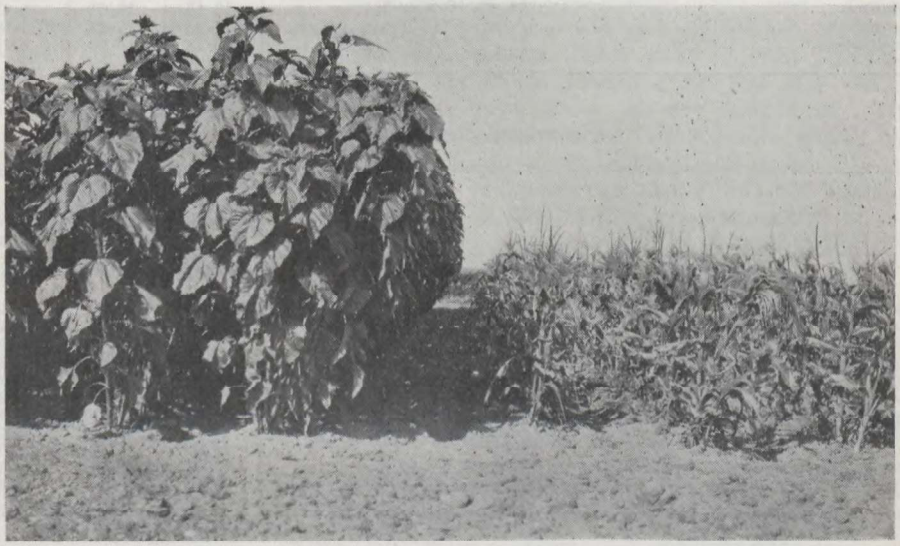
SUNFLOWERS

Five varieties of sunflowers were tested on summer-fallow land in 1927. The seed was sown with a corn-planter in rows 3 feet apart on May 28 and harvested September 20. After all varieties had fully emerged the plants were thinned to 12 inches apart in the row. The yields and other data presented in the following table are the average results from triplicate plots.

SUNFLOWERS—TEST OF VARIETIES

Variety	Source	Average height of plants	Stage of maturity at harvest	Type of growth	Yield per acre green weight	Per cent dry matter	Yield per acre dry weight
		ins.			tons		tons
Mammoth Russian.	K. McDonald.	76	Heads just formed.	Single stalk.....	15·94	15·29	2·44
Mammoth Russian.	Ewing.....	76	" "	"	14·98	17·44	2·61
Russian Giant.	Dak. Imp. Seed Co.	68	100% in bloom..	"	14·98	16·78	2·51
Ottawa No. 76.	C.E.F.....	66	" " ..	"	13·38	16·23	2·17
Mennonite...	Exp. Farm Rosthern.	45	" " ..	" ..... 2% branching.	6·95	16·12	1·12

Three varieties were past the bloom stage when the crop was harvested for ensilage purposes. All varieties tested showed evidence of impurity in one or more of the following characters: type of growth, number of flowers, colour of seed, and unevenness in height and time of maturity.



Sunflowers vs. Corn, 1927.

It is generally acknowledged that sunflowers make heavier demands on soil moisture than corn and that it is not as palatable a succulent feed as the latter crop. Furthermore, corn may be grown to be pastured off or fed as fodder without the use of a silo; whereas, in the case of sunflowers ensiling is necessary except when used as a soiling crop. On the other hand, sunflowers have withstood the drought better than corn at this Station and even in the driest seasons have produced a satisfactory crop. While the palatability and feeding value of sunflower silage is generally below that of corn, it is nevertheless a succulent feed which is eaten readily by stock. The fact that sunflowers can withstand 6 to 8 degrees of frost without serious damage to the crop and that it produces a greater green weight tonnage than either corn or oats have made it the most dependable silage crop for this district.

FIELD ROOTS

Thirty-three varieties of roots, including fall turnips, swedes, mangels, and sugar beets, were tested on summer-fallow land in 1927. The seed was sown in rows 36 inches apart on June 4 and the crop harvested on September 7. After emergence all varieties were thinned to 12 inches apart in the row. The results presented in the following tables are the average from duplicate plots:—

SWEDES—TEST OF VARIETIES

Variety	Source	Green weight per acre	Per cent dry matter	Dry weight per acre
		tons		tons
Olsgaard Bangholm	Hjalmar Hartmann	23·25	9·73	2·26
Ditmars	McNutt	23·25	9·83	2·29
Bangholm	Gen. Swedish Co	20·85	10·55	2·20
Improved Yellow Swedish	"	19·65	10·94	2·15
Bangholm	Exp. Farm Nappan	15·38	11·16	1·72
Shephards Golden Globe	Hjalmar Hartmann	15·30	11·70	1·79
Bangholm	Exp. Farm Kentville	15·08	12·58	1·90
Bangholm	Ewing	14·33	11·66	1·67
Magnum Bonum	"	13·73	11·70	1·61
Monarch	A. E. McKenzie	13·43	10·67	1·43
Bangholm	"	13·05	12·44	1·62
Superlative	"	10·58	10·90	1·15

FALL TURNIPS—TEST OF VARIETIES

Name of Variety	Source	Green weight per acre	Per cent dry matter	Dry weight per acre
		tons		tons
Early Six Weeks	Sutton	14·03	6·80	0·95
Greystone	Steele Briggs	13·80	7·48	1·03
Purple Top Mammoth	Sutton	13·05	7·48	0·98
Red Paragon	"	12·83	7·16	0·92
Finsk Bortfelcher	D.L.F	12·53	8·15	1·02
Hardy Green Round	Sutton	12·23	7·23	0·88
Purple Top Mammoth	Steele Briggs	12·23	6·45	0·79
White Globe	Ewing	11·70	7·29	0·85
Pomeranian White Globe	"	10·80	7·30	0·79
Purple Top Aberdeen	Sutton	9·38	7·77	0·73
Green Top Yellow Aberdeen	Ewing	8·18	8·22	0·67

MANGELS—TEST OF VARIETIES

Name of Variety	Source	Green weight per acre	Per cent dry matter	Dry weight per acre
		tons		tons
Barres Oval	Gen. Swedish Co	9·98	11·59	1·16
Giant Long Red	A. E. McKenzie	6·68	11·90	0·79
Yellow Intermediate	C.E.F	5·78	13·03	0·75
Giant Yellow Globe	A. E. McKenzie	5·70	10·55	0·60
Yellow Eckendorfer	Gen. Swedish Co	5·10	9·46	0·48
Giant Rose	A. E. McKenzie	5·10	11·39	0·58
Elvetham Mammoth	Hjalmar Hartmann	3·53	10·86	0·38

Generally speaking, good stands have been procured in most of the tested varieties of swedes and fall turnips, and fairly satisfactory yields obtained. The yield of turnips is usually below swedes. In the case of mangels and sugar beets the chief difficulty experienced in growing these crops is the low germination of the seed with the stands ranging from 30 to 70 per cent.

The growing of roots is not likely to become popular in northwestern Saskatchewan for some time on account of the extra labour involved in the production of these crops.

As the commercial names listed in seed catalogues are not a true indication of the type, a mechanical classification of the various field root varieties was undertaken by the Forage Crop Division, Central Experimental Farm, Ottawa. The varieties are classified according to measurements under the six following terms: long, half-long, intermediate, tankard, ovoid, and globe. Over fifty thousand measurements were made from mature roots of the various varieties. The results of this work are published in Bulletin No. 84, "Field Roots in Canada". The reader desiring information on this subject may procure this bulletin free upon application to the Publications Branch, Department of Agriculture, Ottawa.

ANNUAL HAY CROPS

The term annual hay crops usually implies any crop used for hay that can be sown and harvested within the same season. This class of crop plays an important part in the live stock industry of the Prairie Provinces, due chiefly to the uncertainty of grass and clover crops under adverse conditions. The remarkable progress evidenced in the dairy industry of this province within the last few years is a further indication of the need for this class of crop.

The various experiments in operation consist of comparing different kinds of annual hay cops; growing oats and peas in combination; a comparison of oat varieties cut at different stages of maturity; testing varieties of peas cut in pod stage; and seeding varieties of oats at different dates.

KINDS OF ANNUAL HAY CROPS

Eight kinds or combinations of annual hay crops were tested in 1927. The experiment was conducted on summer-fallow land in duplicate one-fortieth-acre plots. All seedings were made June 4. The 1927 results are summarized in the following table together with a four-year average:—

COMPARISON OF CROPS FOR ANNUAL HAY

Crops	Rate of seeding per acre	Yield per acre			
		1927 Results		Four-year Average	
		Green weight	Dry weight	Green weight	Dry weight
	lb.	tons	tons	tons	tons
Banner Oats	56	10·92	3·72	6·18	2·14
Mackay Peas	70				
Banner Oats	85	9·08	3·77	6·06	2·34
*Prolific Spring Rye	70	10·56	2·08	5·37	1·51
Hungarian Millet	30	7·36	2·22	4·62	1·46
Alaska Oats	56	10·56	3·45	.....	.....
Chancellor Peas	40				
Alaska Oats	85	9·99	3·58	.....	.....
Feeder Barley	96	8·90	1·59	.....	.....
Siberian Millet	30	7·94	2·21	.....	.....

* Two cuttings are made from spring rye each season.

This year early maturing varieties of oats, peas and barley were included in the list of annual hays. The varieties were Alaska oat, Chancellor peas and Feeder barley. It will be noted that the dry weight of barley is low compared with oats. This crop was cut too early in error.

It will be observed that a combination of oats and peas has in both cases, this year, outyielded the plots seeded to oats alone. The relative yielding ability of oats seeded alone as compared with a mixture of oats and peas has not been consistent and has varied from year to year. For example, in 1925 and 1926 oats seeded alone gave higher yields than peas and oats seeded together. Seeding peas with oats improves the feeding value of the hay, but when the high cost of seed peas is considered and the difficulty of curing in unfavourable weather, it is doubtful whether a mixture of peas and oats should be recommended in preference to oats alone. In the four-year average, a combination of oats and peas show a difference of only 0.12 tons green weight, while in the dry weight oats alone exceeds by 0.20 tons.

Spring rye attracts attention as an annual hay crop chiefly because of its earliness and dependability in unfavourable seasons. It is a hardy drought resistant crop and has produced two cuttings each season even in the driest year at this Station. It is, however, inferior to oats in point of yield and due to the woody nature of its growth is not eaten readily by live stock.

Millets are quick-growing crops and require a comparatively short season to mature. Ample moisture and heat is needed for best results. The climate of northwestern Saskatchewan is not conducive to maximum returns from these crops. Millets are more difficult to cure than oats or rye when harvested under unfavourable weather conditions. The hay is of medium quality and fair yields are produced each year.

Early maturing varieties of oats and peas were tested this year in comparison with the later maturing varieties. Alaska oats was compared with Banner oats. Alaska oats and Chancellor peas were compared in combination with Banner oats and Mackay peas.

Feeder is an early maturing beardless barley, the straw strong and of good length. The fact that this variety is free from awns and is quite leafy makes it promising as a hay crop.

VARIETIES OF OATS FOR HAY

Oats is the most popularly grown annual hay crop in this district. An experiment was undertaken at this Station in 1922 to determine the best stage of maturity to cut oats for hay and to ascertain the highest yielding variety. The experiment was started with seven varieties, including early and late maturing sorts. In 1925, two other varieties were added to the test. All varieties are seeded on duplicate one-fortieth-acre plots during the first week in June. Each plot is divided into three parts of one one-hundred and twentieth-acre and cut at three different stages of maturity—first at time of bloom; second when the kernels are in the late milk to early dough stage; third when kernels are ripe. 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. This experiment was conducted for a period of five years (1922 to 1926 inclusive). An average of three years' work was published in the 1926 report. Although the analyses of all samples have not been completed sufficient work has been done to indicate that oats cut in the late milk to early dough stage gave the best returns—food value and yields considered. Acting on this information the stage of maturity of the two last cuttings were changed

this year from late milk to early dough and ripe stage, to milk and dough stage.

This experiment will be continued for a period of five years.

VARIETIES OF OATS FOR HAY CUT IN DIFFERENT STAGES OF MATURITY

Name of Variety	Stage cut	Yield per acre	
		Green weight	Dry weight
		tons	tons
Alaska	Bloom	8·10	1·30
Daubeney	"	11·73	2·07
Liberty	"	12·45	2·11
Longfellow	"	14·31	2·79
Gold Rain	"	16·68	3·32
Banner	"	18·06	3·86
Victory	"	17·76	3·66
Leader	"	17·46	3·28
Columbian	"	15·93	3·16
Alaska	Milk	11·82	3·19
Daubeney	"	12·72	3·56
Liberty	"	11·73	3·08
Longfellow	"	10·35	2·94
Gold Rain	"	13·47	3·56
Banner	"	12·90	3·35
Victory	"	12·30	3·33
Leader	"	12·21	3·29
Columbian	"	11·70	3·30
Alaska	Dough	8·70	3·68
Daubsney	"	10·17	3·77
Liberty	"	9·87	3·63
Longfellow	"	9·90	4·14
Gold Rain	"	11·01	4·08
Banner	"	10·50	4·66
Victory	"	10·05	4·20
Leader	"	8·85	3·89
Columbian	"	9·84	4·56

It will be observed from a study of the table that the bloom stage gave the highest green weight yields for all varieties except Alaska and Daubeney and that the highest dry weight yields for all varieties were obtained from cuttings in the dough stage.

Oats have produced higher yields than most of the annual hay crops tested at this Station. It has many other advantages, seed is cheap and easy to procure, no special machinery is needed for seeding or harvesting. The crop is hardy and may be safely seeded any time after seeding starts until the middle of June. When oats are seeded on summer-fallow or other well prepared land it is one of the most dependable annual crops and comparatively good yields may be expected. Oats are fed in all stages from the green cut oats that have just headed to ripe sheaves.

VARIETIES OF PEAS FOR HAY

Four varieties of peas were tested on summer-fallow land in 1927. The seed was sown on June 6 at the rate of 1½ to 3 bushels per acre, depending upon the size of the seed. All varieties were cut as soon as most of the plants had reached the pod stage. No variety appears to be outstanding in yield. Following are summarized the results obtained together with a two-year average:—

VARIETIES OF PEAS FOR HAY

Name of Variety	Stage cut	Average length of vine	Yield per acre			
			1927 results		Two-year average	
			Green weight	Dry weight	Green weight	Dry weight
		inches	tons	tons	tons	tons
Arthur O. 18	At formation of pods	58	16·84	3·55	10·87	2·35
Solo	" "	48	15·38	2·67	10·29	1·89
Mackay O. 25	" "	54	14·82	2·96	10·57	2·21
Chancellor O. 26	" "	48	14·56	2·42	10·33	1·68

DATES OF SEEDING OATS FOR HAY

As a rule oats for hay are not generally seeded until the major spring operations are over. An experiment has been underway for several years to determine the latest date oats may be seeded with the assurance of reasonable returns. The first seeding is made during the last week in May and continued for five successive sowings at ten day intervals. Last year Alaska, an early maturing variety was added to the test as the two later seedings of Banner have generally been frozen before reaching the milk stage. The test was conducted on summer-fallow land and the seed sown at the rate of 2½ bushels per acre.

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 26	Late milk to early dough.	Late milk to early dough.	11·00	5·19	13·90	5·88
June 6	" "	" "	10·90	4·04	13·50	5·56
June 16	" "	" "	10·90	4·76	10·55	4·39
June 27	" "	Frozen in milk stage	8·50	3·20	7·75	3·51
July 7	Slightly frozen in early milk.	Frozen in bloom stage.	7·50	2·91	7·15	2·09

The last two years all seedings of Alaska reached the milk stage and results indicate that this variety may be seeded as late as the last week in June without danger of frost. Banner, a late maturing variety when seeded after the middle of June is generally damaged by frost before reaching the milk stage. The yields from any of the seedings are considerably influenced by rains during the growing season particularly the amount and the time of occurrence.

PERENNIAL AND BIENNIAL HAY CROPS

Practically no winter-killing occurred in alfalfa and sweet clover during the winter of 1926-27. All plots were covered with 5 to 6 inches of snow before the severe frosts came, which may be partly responsible for these crops coming through the winter in such good position. Although the growing season for grasses and legumes was comparatively cool there was ample moisture at all times for the growing needs of the crops, and yields harvested were well above the average for this Station.

Western rye grass, brome grass, sweet clover and alfalfa may be considered the most important permanent forage crops under northwestern Saskatchewan conditions. The yields of these crops together with a combination of western rye and brome grass are given in the following table:—

PERENNIAL AND BIENNIAL HAY CROPS

Crop	Rate of seeding	Yield per acre					
		Green weight 1926	Dry weight 1926	Green weight 1927	Dry weight 1927	Average for two crops	
						Green weight	Dry weight
	lb.	tons	tons	tons	tons	tons	tons
Western rye	14	2·36	1·06	3·56	1·20	2·96	1·13
Brome grass	14	3·00	1·24	5·68	1·68	4·34	1·46
Western rye and brome grass	7 and 7	2·42	1·04	3·66	1·17	3·04	1·11
White Sweet Clover	15	7·92	1·31	13·15	2·51	10·54	1·91
Alfalfa	15	3·80	1·10	9·12	2·20	6·46	1·65

All crops were seeded on summer-fallow land without a nurse-crop. Alfalfa, western rye, brome and the combination of both grasses were sown in 1925 and two crops are taken from the one seeding. With sweet clover a seeding is made for each crop. Two cuttings were made in 1927 from both the alfalfa and sweet clover.

Western rye grass is one of the most dependable grasses adapted to prairie conditions on account of its hardiness and drought resistance. In the sixteen years this grass has been tested at Scott no difficulty has been experienced in obtaining a catch, seeding with or without a nurse-crop. It is favoured over brome grass at this Station for the reason of its ease of eradication. Ploughing once has always been found sufficient to kill the roots of rye grass in the breaking year.

Brome grass is another hardy drought resistant grass well adapted to prairie conditions. It is longer in the stem and more leafy than western rye grass. Where sown for pasture the brome grass is eaten by stock in preference to western rye grass. On the other hand, considerable difficulty has been experienced in eradicating brome grass on account of its spreading underground rootstocks. To completely kill the roots it requires ploughing twice in the same season compared with ploughing once for western rye grass.

Experiments have been conducted with alfalfa since 1914. All seedings were made on summer-fallow land. Results to date indicate that it cannot be considered a dependable crop under conditions in this district. The chief limiting factor is its inability to survive the severe winters.

A number of varieties or strains of sweet clover obtained from different sources have been tested and with the exception of the Arctic variety none has proven hardy under northwestern Saskatchewan conditions. In addition to its hardiness Arctic also makes quicker growth in the spring than any of the other varieties tested.

MIXTURES OF WESTERN RYE GRASS AND SWEET CLOVER

Western rye and sweet clover mixed in different proportions have been grown on two rotation fields at this Station for a period of sixteen years and have given satisfactory results. The sweet clover improves the feeding value of the hay and cures more easily when mixed with rye grass. A good aftermath principally of sweet clover is always secured from the first crop after seeding. The

one objection to this mixture is that sweet clover is generally ready for cutting before the western rye grass and tends to become coarse by the time the rye grass is ready.

Sweet clover being the most dependable legume for this district and the fact that western rye grass is preferred to brome on account of its ease of eradication an experiment was undertaken in 1922 with a view of determining what proportions of western rye grass and sweet clover should be used in order to return the highest yield.

Seedings were made each year varying the proportion of western rye grass and sweet clover sown for five years (1922-26 inclusive). Two crops were produced from each seeding. The results are summarized in the following table. It will be observed that the difference in yield between western rye and brome grass is small for the ten-crop average.

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

Mixtures	1921 Seeding		1922 Seeding		1923 Seeding		1924 Seeding		1925 Seeding		Average for ten crops
	1922 crop	1923 crop	1923 crop	1924 crop	1924 crop	1925 crop	1925 crop	1926 crop	1926 crop	1927 crop	
Western rye grass 14 lb.	1·36	2·02	3·28	1·60	2·34	5·20	4·12	2·36	4·20	3·56	3·00
Brome grass 14 lb.	1·20	2·00	2·60	2·80	2·04	5·64	2·72	3·00	4·74	5·68	3·24
Western 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	3·66	3·32
Western 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	3·60	3·32
Western 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	3·40	3·39
Western 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	4·00	3·51
Western 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	3·30	3·46
Western rye grass 8 lb.; sweet clover 12 lb.	3·08	1·90	3·56	2·16	2·32	4·32	5·44	3·26	4·80	3·48	3·43
Western 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	4·00	3·23
Western 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	4·70	3·15
Western 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	4·70	3·21 4 crops
Western rye grass 12 lb.; sweet clover 8 lb.	Plough ed up		3·74	1·68	1·74	3·60	.....	.....	.....	.....	2·69
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
Brome 10 lb.; sweet clover 10 lb.	1·94	1·90	.....	.....	.....	.....	.....	.....	.....	.....	2 crops 1·92 2 crops

STRAINS—WESTERN RYE GRASS

Fifty-four of the leading strains of western rye grass at the Central Experimental Farm, Ottawa, were sent out by the Forage Crop Division in the spring of 1926. All strains were seeded in triplicate one one-hundredth acre plots at the rate of 15 pounds per acre. A border of one foot is removed from all plots just previous to cutting. Notes are also taken on purity, habit of growth, percentage of leaf and colour of foliage. This experiment will be continued for at least five years before definite deductions are made regarding the value of the different strains. The following table gives the 1927 yields of twenty of the highest yielding strains:—

WESTERN RYE GRASS—TEST OF STRAINS FOR YIELD AND PURITY. 1926 SEEDING

Strain	Yield per acre		
	Green weight	Dry weight	Cured hay
	tons	tons	tons
Strain No. 77	6·80	2·07	2·44
Strain No. 28	6·15	1·93	2·27
Strain No. 114	6·05	2·01	2·36
Strain No. 97	6·00	1·91	2·25
Strain No. 86	5·68	1·82	2·14
Strain No. 4	5·67	1·73	2·04
Common	5·63	1·72	2·02
Strain No. 87	5·58	1·76	2·07
Strain No. 124	5·52	1·80	2·12
Strain No. 81	5·48	1·71	2·01
Strain No. 84	5·47	1·72	2·02
Strain No. 99	5·45	1·76	2·07
Strain No. 54	5·38	1·72	2·02
Strain No. 15	5·35	1·71	2·01
Strain No. 57	5·32	1·73	2·04
Strain No. 83	5·28	1·75	2·06
Strain No. 71	5·27	1·62	1·91
Strain No. 56	5·22	1·68	1·98
Strain No. 7	5·20	1·65	1·94
Strain No. 53	5·18	1·65	1·94

In calculating the cured hay yields, the moisture holding capacity was taken as 15 per cent.

POULTRY

The only kind of poultry kept at this Station is the Barred Plymouth Rock—a popular breed in the territory served by the Scott Station. All stock is carefully culled in the autumn and the culls marketed for table purposes. Each pullet is trap-nested and a record is kept of her production. A pullet laying less than 150 eggs during her first laying year is marketed with the culls.

The poultry runs are alternated each year as a precautionary measure against intestinal parasitism. The parasites live-over in the soil, consequently the poultry runs are thoroughly ploughed and cropped the season the birds are on other land.

Considerable progress can be reported in the poultry department during the year 1927. First, out of 1,635 eggs incubated in the spring 1,093 chicks were hatched. When the chicks were wing-banded at the age of three weeks 87·8 per cent were on hand. The total number of eggs required, including infertiles, for each chick wing-banded was 1·9. This, with one exception, is lower than any other Dominion Experimental Farm or Station for this year. Second, all previous laying records made at this Station were broken by a pullet laying 290 eggs in her pullet year. Third, all birds retained for breeding purpose and all cockerels and pullets sold to farmers this fall were blood-tested for bacilliary white diarrhœa. Fourth, five registered barred rock hens were received this fall from the Morden Experimental Station, and with additional registered cockerels forthcoming from the Central Experimental Farm, Ottawa, pedigree-work will be commenced in the spring of 1928.

FEEDING FOR EGG PRODUCTION

A method of feeding which has given good results at this Station is as follows: dry mash—equal parts by weight of shorts, bran, barley chop, oat chop and beef scrap. To each 100 pounds of the mixture one-quarter of a pound of salt and 2½ pounds of fine charcoal is added. It should be stated that when a

regular supply of milk is available the beef scrap may be omitted. The dry mash is kept before the birds in a self-feeder throughout the year. During extremely cold weather some of this mash is moistened and fed warm in a trough in a crumbly condition, but only a quantity which will be consumed in about five minutes. Two per cent cod liver oil is added to the dry mash during the breeding season, with a view to improving fertility of the eggs and the vitality of the chicks.

Scratch Grain.—Consists of 4 parts wheat or wheat screenings to 1 part oats and 1 part barley. About 16 pounds of this mixture per 100 birds is fed in the litter in the evening, some of which is usually left over in the litter to be scratched for the next day.

Green Feed.—A mangel or cabbage is hung on the wall during moderate weather. In cold weather sprouted oats are fed about 10 a.m. each day at the rate of 8 to 10 pounds per 100 birds.

FEEDING INVESTIGATIONAL WORK

The experimental work during the year consisted chiefly of comparing feeds and feed mixtures for laying pullets during the winter.

OAT CHOP VERSUS MEAL MIXTURE FOR LAYING PULLETS

Object of Experiment.—To determine the value of oat chop as a mash for laying pullets.

Plan of Experiment.—Three lots of pullets of twenty-five each were used. The dry mash fed in the self-feeder consisted of four parts hulless oats to one part beef scrap in one case, four parts common oats (unsifted) with one part beef scrap in the second, and a mixture of equal parts of hulless oat chop, barley chop, bran, shorts and beef scrap in the third case. The scratch grain contained the same kind of oats as was used in the respective pens in the mash. For a period of six months, from November 1 to May 1, the hulless oats, common oats and mash mixture gave a net profit of $1.24, $1.14, and $1.24 per bird respectively over the cost of all feed. The average number of eggs laid per bird was 74, 68, and 72 respectively. In this single test the ration of straight oat chop with one-fifth beef scrap was slightly cheaper, but the pen of pullets receiving this ration laid a smaller number of eggs.

STANDARD (HOME-MIXED) VERSUS COMMERCIAL MASH FOR LAYING PULLETS

Object of Experiment.—To compare a home-mixed mash with a commercial mash for laying pullets.

Plan of Experiment.—The standard home-prepared mash of equal parts shorts, bran, barley chop, oat chop (sifted) and beef scrap was compared with a commercial mash known as "Radio Laying Mash".

One year's work indicates the home-prepared mash to be superior to the commercial mash and in this experiment was $1.46 per 100 pounds cheaper. This experiment is again in course of operation.

HULLESS VERSUS COMMON OATS FOR LAYING PULLETS

Object of Experiment.—To ascertain the value of hulless oats as one-fifth of the mash mixture for laying pullets.

Plan of Experiment.—The standard mash was used excepting that the regular weight of hulless oats was used in one case, and the same quantity by weight of unsifted common oats was used in the other case.

One year's work shows practically no difference in net returns, as the number of eggs laid in each pen was exactly the same, and but a few cents difference in the cost of the feed. This experiment is again in course of operation.

STORAGE OF EGGS

An egg-preservative known as Columbus egg-preserving powder was compared with water-glass. The manufacturers state: "Any time after three days the eggs may be removed from the Columbus solution and kept in a dry, dark, cool place for several months." In this experiment the eggs were packed in both solutions on August 31 and on November 10 they were taken from the Columbus solution and stored in a cardboard egg-box. On February 23 the eggs were used and compared with those which had been in water-glass for the full period. Eggs from both lots were in excellent condition and no difference in flavour could be detected. An egg-preservative test underway but incompleted at the end of the calendar year is a comparison of Columbus preservative and Barral compound.

INVESTIGATIONAL WORK (WINTER 1927-28)

Experiments underway during the winter of 1927-28 have to do with:—

1. Feeding of Laying Pullets—
   (*a*) Milk Powder vs. Beef Scrap.
   (*b*) Standard Home-mixed Mash vs. Home-grown Mash.
2. Housing of Laying Pullets—
   (*a*) Best Type of Front for Laying House.
   (*b*) Heated vs. Cold Houses for Laying Stock.

APICULTURE

Owing to curtailment of space in the 1926 report the section dealing with apiculture was omitted. Hence, this report covers the two years 1926 and 1927.

The fall count for 1925 was nine colonies, one of which was queenless in the spring and was united with another colony. During the summer of 1926, four colonies were started from package bees received from Alabama by mail and seven other colonies were started by division. The spring count in 1927 was sixteen colonies and the increase during the season was four new colonies from package bees and six by division, which makes a total of twenty-six colonies for the fall count of 1927.

The season of 1927 was not as favourable as 1926 for honey production on account of cold backward weather early in the season and cool rainy weather in the fall, when usually there is a second crop of nectar. The highest yield from one colony for 1927 was 86 pounds, while the highest yield in 1926 was 109½ pounds. The daily weighings of the colony on the scales showed the highest yield in one day to be 10¼ pounds on August 28, 1926 and 8½ pounds on July 29, 1927.

In the fall when the colony on the scales commences to show a steady decrease in weight, the honey is extracted and feeding for winter stores begins. The syrup is fed warm as rapidly as possible until each hive weighs about 75 pounds with cover off. The syrup is made by using 2 parts pure granulated sugar to 1 part water which is heated to the boiling point in order to thoroughly dissolve the sugar.

The 1927 fall feeding of twenty-six colonies required 650 pounds of sugar. It has been found that for each 100 pounds of sugar fed approximately the same weight of food is stored, which means that most of the water is evaporated by the bees.

Two types of feeders have been used, the standard Miller feeder and the inverted honey pail with small holes in the lid. The most common method of feeding is with the pail and when rapid feeding is desired several pails may be used in one hive. It is necessary that the lids fit tightly or the syrup may feed too fast and drown many bees.

SWARM CONTROL

The modern beekeeper does not permit swarming. Several methods of control have been employed at this Station. Merely destroying the queen cells as they are found is an old and expensive method of swarm control. It is not advised as it requires too much time and labour and is not always efficient as cells are often overlooked. A colony does not show a swarming impulse without a cause. The most common cause is a congested brood-chamber. When attention is given to this point swarming is reduced to a minimum.

METHODS OF DETECTING PREPARATIONS FOR SWARMING

The common method of searching for queen cells by taking out each frame of brood requires much time and labour. An experiment is conducted at this Station to ascertain if preparations for swarming can be detected by use of a double brood-chamber. An extra super with drawn comb is used above the regular brood-chamber giving the queen access to the extra space. The super is merely tipped at the back to look for queen cells. This experiment has been conducted for two seasons. In 1926 the queens were very quick to take advantage of the extra brood space. In one case larvae were found in a queen cell when tipping the shallow super on August 9. The cell was left untouched and on August 17 it was found that it had been destroyed by the bees. As there was plenty of room in the brood-chamber, this cell was considered to be a supersedure cell on account of the failing of the old queen. The old queen was removed and a young laying queen was introduced. No further signs of swarming were observed during the season in any of the colonies which were given the additional super for brooding space.

A method of swarm control which has given good results is to destroy the queen cells and move the brood to an empty super above the honey super, leaving only one frame of stores in the lower chamber with the old queen. The remainder of the brood-chamber is filled with drawn comb or foundation. In addition, the queen cells are destroyed in the top brood-chamber. At the end of a week all queen cells are again destroyed. Colonies treated in this way did not show any further signs of swarming during the season.

A method of swarm control sometimes recommended is to remove the queen and destroy all queen cells, and in nine or ten days destroy all queen cells again and introduce a young laying queen. The chief objection to this method is that there is usually a very large number of queen cells to be destroyed, and if one should be overlooked the newly introduced queen will be killed by the bees. If a new queen is not available one queen cell may be left at the end of ten days but demoralization may follow until the new queen is mated.

CELLAR VERSUS OUTSIDE WINTERING

Both methods of wintering are employed at this Station. The cellar-wintered colonies are placed on shelves and the oilcloth and cover replaced with burlap. The colonies wintered outside are placed in 1-, 2- and 4-colony cases provided with flight-holes. The tunnels are the full width of the hive with $1\frac{3}{4}$-inch opening. As soon as zero temperature is recorded the entrance-block is dropped, reducing the opening to $\frac{3}{8}$ by $1\frac{3}{4}$ inches. Chaffy straw is utilized for packing, using 6 inches on the bottom and from 6 to 12 inches on the sides as

follows: Single cases 12 inches, double cases 10 inches, one quadruple case 8 inches, and two quadruple cases 6 inches. A bran sack is partly filled with chaffy straw and placed on top of the hives in the cases after the hive covers have been removed. The case is then provided with a water-tight cover. The reader desiring further detailed information is referred to Bulletin No. 74—New Series—dealing with "Wintering Bees in Canada", by the Dominion Apiarist.

Colonies wintered outside have the advantage of the first good weather in the spring and under such circumstances start brood rearing earlier than cellar-wintered colonies.

PACKAGE BEES AS A MEANS OF STARTING COLONIES

On April 27 this year a 2-pound and a 3-pound package was received from the Southern States and on May 14 a duplicate shipment was received. As a check for these colonies an over-wintered colony with bees covering 5½ frames was used. The yield of honey was as follows:—

COMPARISON OF TWO AND THREE-POUND PACKAGE WITH OVERWINTERED COLONY

Date received	Weight of package	Yield of honey
		lb.
April 27	2-lb.	25·5
" 27	3-lb.	43·5
May 14	2-lb.	24·5
" 14	3-lb.	86·0
	Overwintered colony..	66·0

The 3-pound package producing 86 pounds had an unusually prolific queen, which may account for the larger crop.

PACKAGE BEES AS A MEANS OF STRENGTHENING COLONY

The experience at this Station indicates that for a colony with less than three frames of bees the addition of a 2-pound package of bees about the first week in May is very beneficial, but package bees added to stronger colonies has not proven profitable. It has also been noted that when package bees are introduced into a queen-right colony that they will sometimes build queen cells on the brood frames and kill the queen of the colony to which they have been introduced.

METHODS OF UNITING PACKAGE BEES WITH COLONY

Two methods recommended by the Dominion Apiarist when the colony is queenless are as follows:—

1. Where the colony is very weak remove enough combs from one side of the brood-chamber to allow the package containing the bees to slip in freely. Place two sticks on the floor-board upon which the package may rest. Remove the feeder can and caged queen from the package, place queen cage between two frames, shake a few bees into the hive and place package in hive. Close the hive and leave for a couple of days. The bees in the package will gradually intermingle with those in the hive without fighting or danger to the queen. At the end of two days the empty package may be removed from the hive and the combs replaced.

2. Another method is to place over a colony an empty shallow super, remove the feeder can and caged queen from the package, place queen cage between two frames in hive, shake a few bees out of the package on the top of the frames of the lower chamber then lay the package on its side in the shallow super and replace cover.

One thing to keep in mind in uniting package bees to established colonies is not to disturb the bees in the hive and it is also advisable to sprinkle both lots of bees with sugar syrup before uniting.

SPRING FEEDING TO STIMULATE BROOD PRODUCTION

In cases where there are ample stores present the feeding of sugar syrup in the spring with a view to stimulating brood production has not been found profitable. Spring feeding is only recommended when the stores are nearly exhausted and there are no nectar-producing flowers from which the bees can gather their food.

In the spring of 1926 a colony which had ample stores for food was fed 30 pounds of sugar in the form of syrup and at the end of the feeding period only had one-half frame more brood than the check colony which was not fed.

In the spring of 1927, 27 pounds of sugar was fed at the rate of about 1 pound per day in the form of a thin syrup to a colony and only one-quarter of a frame more brood was produced than in the check colony which was not fed. The honey extracted in the fall was 57 pounds from the colony which was fed in the spring and 77 pounds from the other colony. When ample stores are present spring-feeding seems to be unnecessary; but, if the stores are low, feeding is unavoidable. Colonies which are fed in the fall to a weight of 75 pounds without cover will very seldom require spring-feeding.

NECTAR SECRETING PLANTS AT SCOTT

In addition to keeping a record of nectar secreting plants one colony is placed on scales during the summer to ascertain the density of the flow throughout the season.

NECTAR SECRETING PLANTS

Name of Flower	Date Nectar Produced	
	1926	1927
Crocus	April 19 to May 1	April 26 to May 25.
Native Buttercup		May 8 " June 4.
Manitoba Maple	May 1 " " 10	" 16 " " 8.
Dandelion	" 15 " June 10	" 25 " " 18.
Choke Cherries		June 4 " " 14.
Tulips		" 4 " " 17.
Fruit bloom (Manitoba Native Plum and Crab apple)	May 15 to June 6	" 6 " " 10.
Golden Willow		" 7 " " 20.
Caragana	May 22 to June 10	" 10 " " 20.
Lilac	June 1 " " 10	" 18 " July 1.
Tartarian Honeysuckle	" 8 " " 15	" 12 " " 20.
Native Vetch	" 10 " July 15	" 20 " " 23.
Dog Wood	" 12 " June 20	" 16 " " 27.
Sainfoin	" 12 " July 6	" 18 " July 2.
White Dutch Clover	" 22 " " 24	July 1 until frost.
Alsike Clover		" 1 "
Sweet Clover (first crop)	July 2 to July 28	" 5 to Aug. 8.
Alfalfa	" 6 " " 28	" 6 " " 23.
Snowberry	" 9 " " 28	" 10 " " 15.
Fire weed	" 9 " " 26	" 12 " " 3.
Golden Rod	" 22 " Sept. 1	" 24 " Sept. 3.
Sweet Clover (second crop)	Aug. 4 until frost	
Sunflowers	Valuable when in bloom but were cut in 1926 before many were in bloom.	Sept. 1 until frost.

In 1927 the second crop of sweet clover gave evidence of being better than the first but was frosted on August 8.

QUEEN REARING

On account of the inconvenience and expense of getting mated queens from a distance just at the time they are required it is sometimes desirable for the beekeeper to raise his own queens. Queen-raising was started at this Station in 1926. Seventeen queens were raised in 1926, and 27 in 1927. The grafting was done in 1926 from stock which came from the colony giving the highest honey flow in 1925. No mismatings occurred. No queens were introduced to the full colonies before they had begun to lay in nuclei. The larvæ from the same queen mother were used for 1926 and 1927. This queen was very prolific and her colony has not shown a swarming impulse or a need of supersedure during the three seasons.

Farmers at Scott Station, August 6, 1927.

Each year shows a greater interest in beekeeping in northwestern Saskatchewan, and, where nectar producing plants are reasonably plentiful, particularly sweet clover and alfalfa, the enterprise should prove profitable; but conditions in northwestern Saskatchewan are not as favourable as in some parts of the prairies and for this reason only moderate crops of honey can be expected.

EXTENSION AND PUBLICITY

Conveying the results of our experimental work to the people of northwestern Saskatchewan receives considerable attention. This is accomplished through the distribution of annual reports, articles to the press, through the medium of an exhibit sent to the summer fairs, by visitors who come to the Station and have the results of experiments explained to them, through correspondents writing for information, and by members of the Station staff addressing agricultural meetings throughout the district. In addition addresses were broadcast over the radio the past winter. The Unity Broadcasting Station deserves special mention for granting us this free service.

During the year members of the Station staff judged at a number of fairs, the beeman assisted beekeepers, and the poultryman culled a number of flocks.

Each year a marked interest is shown in the work of the Station as evidenced by the increase in correspondence, visitors to the Station and in the number of special field days held by agricultural societies. One of the outstanding events of the season was the joint picnic of the United Farmers of Canada and Wheat Pool on August 8 when over ten thousand visited this Station.

OTTAWA: Printed by F. A. ACLAND, Printer to the King's Most Excellent Majesty, 1928.