DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

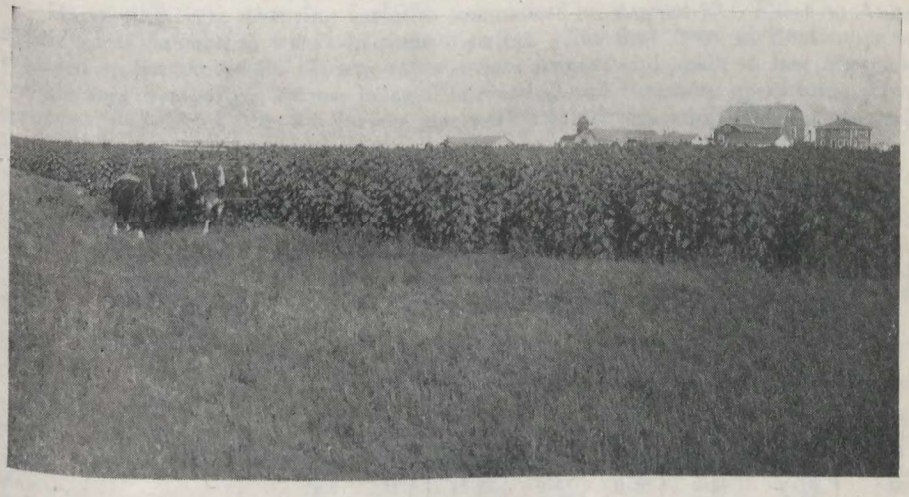
EXPERIMENTAL STATION

SCOTT, SASK.

INTERIM REPORT OF THE SUPERINTENDENT

M. J. TINLINE, B.S.A.

FOR THE YEAR ENDING MARCH 31, 1921



Sunflowers. A sure forage crop even in a short, dry season

Printed by authority of the HON. S. F. TOLMIE, Minister of Agriculture
Ottawa, 1921

24648—1

EXPERIMENTAL STATION, SCOTT, SASK.

REPORT OF THE SUPERINTENDENT, M. J. TINLINE, B. S. A.

SEASONAL NOTES

Winter weather continued throughout the early part of April; no work was done on the fields until the 26th. Seeding variety plots of wheat was commenced on the 30th. The mean temperature for the month of May was below normal but there was an absence of the usual spring frosts. The water from the spring thaws provided ample moisture for germination of all grain sown in good season. Very little rain fell during May and approximately an average precipitation for June was recorded. From July 1 to 22 there was only 0·23 of an inch of rain. From July 15 to 21 unusually hot weather prevailed and this coming after a prolonged dry period and at the time when the early sown grain was in the flowering and early milk stages it caused a serious decrease in the number of kernels per head. During the two days succeeding the hot weather 3·26 inches of rain fell. This moisture aided early sown grain to fill and was particularly beneficial to late crops. A second growth came up in the oat crop and while in early sown crops the new heads did not mature, the amount of straw harvested was much in excess of what it would otherwise have been.

Harvesting early maturing varieties commenced on August 13. Frost on August 21 did some damage to wheat in some districts. The first frost in September was recorded on September 19. Heavy rains in late August and again in late September and showery weather in October delayed harvesting and threshing operations. Grain sprouted in the stook. In the variety plot work stook covers were used but even with these some sprouting occurred at the base of the stooks.

WEATHER OBSERVATIONS TAKEN AT SCOTT EXPERIMENTAL STATION, 1920

Month	Temperature F.			Precipitation				Total sunshine
	Highest	Lo west	Mean	Rain fall	Snow fall	Total	Heaviest in 24 hours	
	°	°	°	Inches	Inches	Inches	Inches	Hours
January	30·3	−41	− 3·5	.....	1·30	1·30	0·50	100·7
February	35·7	−20·8	11·64	.....	0·27	0·27	0·10	118·7
March	42·0	−26·	14·6	.....	1·35	1·35	0·30	135·3
April	51·2	−20·8	25·97	0·29	0·32	0·61	0·20	175·4
May	79·7	24·2	45·23	0·45	0·10	0·55	0·19	266·2
June	80·5	29·4	56·5	2·47	.....	2·47	1·22	246·9
July	97·	37·7	61·88	3·74	.....	3·74	1·88	327·6
August	91·	29·2	63·5	2·37	.....	2·37	0·76	281·2
September	81·	27·	51·7	1·49	.....	1·49	0·55	221·3
October	79·7	15·2	40·63	0·49	0·05	0·54	0·19	185·9
November	51·2	− 4·2	23·9	0·21	0·15	0·36	0·16	87·8
December	43·	−19·2	12·5	.....	0·45	0·45	0·20	63·0
Total for year				11·51	3·99	15·50	.....	2,210·0
Total for six growing months, April to September						11·23	.....	1,518·6

During the year a threshing barn was erected and two dwelling-houses were moved over from the town.

With the co-operation of the Provincial Departmental of Agriculture four excursions were arranged to the Station in early July. A large number of farmers visited the Station during these days.

An exhibit from the Station was sent to the summer fairs in the northern parts of the province.

There has been a marked increase in correspondence during the year just closed.

ANIMAL HUSBANDRY

Horses

There are four pure-bred Percheron mares and one Percheron filly foal on the Station, the remainder of the seventeen head are grade Clydesdales with the exception of the driving mare. Four of the work-horses were raised on the Station and in addition two other young mares were given in exchange on two of the Percheron mares.

COST OF FEED FOR WORK-HORSES

The cost of horse labour is one item that is not seriously considered by the average farmer. If it were given more consideration more attention would be paid to keeping the best type of work animals, to breeding only the better classes of mares and feeding the colts so that they would develop into good sized work animals. Other methods for curtailing the cost of labour are caring for the horses so that there is little lost time from sickness, and providing steady employment instead of having so many idle horses for a large part of the year.

Records have been kept of the cost of feed and the hours of labour for the work-horses used on the Station for a four-year period. The feed calculated at market prices cost a total of $5,369.29; the total hours of labour amounted to 70,900 hours. As from eight to twelve horses were kept, the average hours of work per horse amounted to about five hours per day. The cost of feed amounted to 75 cents per day per horse. The cost of caring for the animals during the summer season would amount to at least 10 cents per horse per day. To this must be added the interest on the investment, cost of housing and cost of harnessing. This makes the total cost per horse per day amount to very close to $1 or $365 per year.

COST OF RAISING HORSES

The investigation into the cost of raising horses has been continued. During the past year the colts were fed the rations outlined in the following table. In determining the cost of raising horses only the cost of feed from weaning until they are ready for harness at three years has been taken into consideration.

Daily Ration Fed Colts—1920-21

Age	Oat Chop	Boiled Barley	Bran	Hay	Straw	Milk
Months	Lbs.	Per week	Lbs.	Lbs.	Lbs.	Lbs.
5 to 10	8 to 10	6	2	10	..	7
17 to 22	8 to 10	10	..	..	15	..
29 to 34	10 to 14	12	..	..	15	..

During all the summer months and during the winter days the two older colts were out on pasture.

The Cost of Feed for Colt Rising One Year Old

The colt in this experiment is a pure-bred Percheron; it was weaned when about five months old. The following table gives the gains made by the colt and the feed consumed. The colt only arrived at the Station a short time before weaning and was in rather low condition.

Colt rising one-year old:—		
Weight at beginning of experiment, November 1st	Lb.	465
Weight at termination of experiment, March 31		900
Total gain in weight in 151 days	"	435
Gain in weight per day	"	2.9
Cost of feed—		
Oat chop—632 pounds at 1.02c per lb.	$	6.44
Boiled barley—92 pounds at 2.6c. per lb.		2.38
Bran—172 pounds at $30 per ton		2.58
Hay—1,200 pounds at $12.50 per ton		7.50
Milk—600 pounds at 1c a lb.		6.00
Total cost for 151 days	$	24.90
Total cost for 1 day		16.4c.

The colt was stabled at night and turned out in the paddock almost every day. The milk was given as the water is alkaline; it added to the cost of feed however.

Cost of Feed for Colt Rising Two Years Old

This colt was stabled at night during the spring of 1920 and allowed to run in the pasture during the day. During the summer it was left in the pasture and brought up at the commencement of winter.

Colt rising two years old:—		
Weight on April 1, 1920	Lb.	640
Weight on March 31, 1921	"	1,075
Gain in 365 days	"	435
Gain in 1 day	"	1.19
Cost of feed:—		
Oat chop—1,220 pounds at 85 and 35c a bushel	$	14.94
Boiled barley 212 pounds at 50c a bushel		1.37
Bran—52 pounds at $30 per ton		.78
Hay—300 pounds at $12.50 per ton		1.87
Oat straw—2,250 pounds at $3 per ton		3.37
Pasture—7 months at $1.00 per month		7.00
Total cost for 365 days	$	29.33
Total cost for 1 day		8.03c.

Cost of Feed for Colt Rising Three Years Old

This colt was on pasture during the summer and was stabled at night after November 1. During the latter part of March he was kept in the barn and broken to harness.

Colt rising three years old:—		
Weight April 1, 1920	Lbs.	1,025
Weight March 31, 1921	"	1,400
Gain in weight in 365 days	"	375
Gain in 1 day	"	1.02
Cost of feed—		
Oat chop—1,404 pounds at 35 and 85c a bushel	$	17.99
Boiled barley—256 pounds at 50c a bushel		2.66
Prairie hay—600 pounds at $12.50 a ton		3.74
Oat straw—2,250 pounds at $3 a ton		3.37
Pasture—7 months at $1 per month		7.00
Total cost for 365 days	$	34.75
Total cost for one day		9.4c.

Summary of Cost of Feed for the Three Colts, 1920-21

Summary of cost of feed for colts from weaning until ready for harness—	
From time of weaning until 1 year old	$ 24.90
From 1 to 2 years old	29.33
From 2 to 3 years old	34.75
Total cost from weaning until ready for harness	$ 88.98

An average for a seven-year period shows the cost of feed for a colt from weaning until ready for the harness at three years old to amount to $79.79.

Beef Cattle

Investigational work in steer feeding at this Station has been conducted during the past four years along four lines:

First. Determining the profitableness of winter fattening.

Second. Comparing cheap methods of housing.

Third. Ascertaining the loss from dehorning.

Fourth. Determining the value of sunflower ensilage.

In order to determine the profitableness of winter fattening steers, records have been kept of the amount of feed consumed and the returns secured for the feed. Seventy-eight animals have been fattened and sold with twenty head in the feed lot at the time of writing this report. From the results obtained it would appear advisable for farmers who have roughage going to waste, and have a fair supply of feed grain to winter fatten steers rather than put them on the market in the autumn at a time when the prices are usually depressed.

In the experiments conducted the animals were bought in the autumn and sold in the spring. Feeds were charged for at market prices. The profit per steer over feed cost amounted to $25.15 one year, $17.77 the next, and $19.25 the third.

COMPARING METHODS OF HOUSING

Two cheap shelters were tested, one a straw shed in which the animals were fed, the other a shed constructed of a single-ply of lumber opening on the south into a high board corral in which the animals were fed. The steers were loose in both shelters. This experiment was conducted for two years. The following table gives the gains made, the cost of the gains and the profits per steer:

		Fed in Straw Shed		Fed in Corral	
		1916-17	1917-18	1916-17	1917-18
Average daily gain	lbs	1·3	0·87	1·02	0·76
Cost of 1 lb. of gain	c	11·6	27·1	14·8	34·4
Profit per steer over feed cost	$	27·26	17·40	23·03	13·58

It was observed that the steers fed in the straw shed kept dry while the steers fed in the corral frequently had snow on their backs; some of this snow would melt from the heat of their bodies. In addition those in the frame shed suffered most from the cold. These two factors undoubtedly account for the gains made by the lot fed inside.

DEHORNING STEERS

Each season a number of the steers purchased were horned and the balance were either natural muleys or had been dehorned. During three years, records were kept of the losses sustained from dehorning. The steers were usually put into the feed lot about the time of the first winter weather. The horns were removed with a Keystone dehorner after weighing the animals. The newly dehorned steers were divided up so that a nearly equal number were placed in each division of the experiments. The following table shows the comparative average gain per animal for three years:—

Year of Experiment	Dehorned	Hornless
	lbs.	lbs.
1917-18	64	119
1919-20	147	142
1920-21	181	218

Average increased gain of hornless steers, 29 pounds per head per season.

SUNFLOWER ENSILAGE FOR FATTENING STEERS

During the past two winters investigational work has been conducted to determine the value of sunflower ensilage fed in conjunction with straw and crushed grain. In the winter of 1919-20 wheat straw, turnips, and oats and standard screenings meal were fed. The silage was given one lot of steers as extra feed. The same plan was used in 1920-21 excepting that good oat straw was used instead of the wheat straw, turnips were dispensed with, and barley replaced the standard screenings. The steers fed during the past winter have not as yet been sold, consequently no statement of profits per steer is available.

SUNFLOWER ENSILAGE FOR FATTENING STEERS

—		1919-20		1920-21	
		Silage fed	Straw fed	Silage fed	Straw fed
Number of steers in lot		10	10	10	10
First gross weight	lb.	11,100	10,960	10,660	10,565
First average weight	"	1,110	1,096	1,066	1,056
Finished gross weight	"	12,820	12,150	12,610	12,400
Finished average weight	"	1,282	1,215	1,261	1,240
Total gain	"	1,720	1,190	1,950	1,835
Average gain per steer	"	172	119	195	183
Average daily gain per steer	"	1·37	0·95	1·39	1·3
Quantity of oats consumed	lb.	5,523	5,523	6,355	6,355
Quantity of standard screenings consumed	"	5,523	5,523	.....	.....
Quantity of barley consumed	"	.....	.....	5,915	5,915
Quantity of straw consumed	"	24,000	36,000	64,400	85,400
Quantity of roots consumed	"	12,950	12,950	.....	.....
Quantity of hay consumed	"	350	350	.....	.....
Quantity of ensilage consumed	"	22,120	.....	40,350	.....
Gross cost of feed	$	316 28	261 92	344 60	255 05
Average cost of feed per steer	$	31 62	26 19	34 46	25 50
Cost of 1 lb. of gain	c.	18·4	0·22	17·6	13·9
Average value of steers in autumn	$	102 90	101 60	81 01	80 29
Average cost of steers at conclusion of experiment	$	134 52	127 79	115 47	105 89
Average selling price per steer	$	158 71	142 11	.....	.....
Average increase in value	$	55 81	40 52	.....	.....
Average profit per steer		24 19	14 32	.....	.....
Gain of silage fed lot 1919-20		9 87	.....	.....	.....
Value of silage per ton		13 83	.....	.....	.....

Notes.—Steers from 1920-21 unsold at end of year. It was found necessary to feed the check lot for a further period in order to put them into as good shape as the

silage fed lot. Some were in extra good shape but the majority of the animals in this lot required further feeding.

Conclusions.—Steers take readily to sunflower ensilage.

Where roughage is inferior, ensilage can be used to good advantage.

Where roughage such as oat straw containing a high percentage of green growth can be secured it is more economical than the sunflowers providing it can be secured at little cost.

Stacking straw from thresher around silo to prevent freezing. Straw was used during latter part of winter for feed and bedding

Ensilage provides a dependable supply of good feed.

Freezing in the silo can be controlled in some measure by stacking straw around the silo, and by keeping a couple of feet of cut straw on top of the silage.

Breeding Sheep

The flock of grade Shropshires now number ninety-two breeding ewes, twenty-five yearling ewes, five lambs, two pure-bred rams, and seventy-three feeder lambs used in the fattening experiments. With the exception of the rams these animals have all been raised on the Station.

During the latter part of the winter the flock was increased by four pure-bred Shropshire ewes received from the Central Experimental Farm and six Cheviot ewes and one ram lamb from Macdonald College. In addition one pure-bred Cheviot ram was secured in the autumn from the Lacombe Experimental Station. This stock will be used as foundation material for pure-bred flocks.

The work of grading up the flock on the Station has been underway for four years with excellent success. The work is to be continued and will be compared with crossing the Cheviot males on the grade Shropshire ewes.

SHEEP FEEDING EXPERIMENT, 1920

Object of Experiment.—To determine the value of Standard Screenings for feeding sheep.

How Experiment was Conducted.—Seventy-one lambs, about ten months old, were divided into two flocks of thirty-five and thirty-six respectively. The ewe lambs and wethers were divided as equally as possible between the two flocks. Both lots were fed in a rough lumber shed with a corral in front. The doors were kept open at all times.

Ration used.—Both lots received barley, and wheat straw, and green oat sheaves at the rate of one sheaf per day to seven lambs. Both lots were watered once per day and had access to snow at all times. Lot 1 (35 lambs) were fed at the commencement screenings at the rate of one pound per day per sheep, while lot 2 (36 lambs) were fed the same quantity of grain in the following proportion: one-quarter pound of barley to three-quarters pound of oats. Both lots received turnips at the rate of one pound per day per sheep.

Prices charged for feed:—
Barley.....at 2·5c. per lb.
Oats.....at 2·5c. per lb.
Screenings.....at 1¼c. per lb.
Turnips.....at $5.00 per ton.
Oats sheaves.....at 7c. per sheaf.

SUMMARY OF LAMB FEEDING EXPERIMENT

		Screenings	Oats and barley
		Lot 1—	Lot 2—
Number of lambs in lot		35	36
First weight gross, Feb. 21st	lb.	2,640	2,740
First weight average		75·4	76·1
Finished weight gross, April 13th		2,920	3,105
Finished weight average		63·43	86·25
Total gain in 52 days		280	365
Average gain per lamb in 52 days		8	10·14
Daily gain per lamb		0·15	0·19
Gross cost of feed	$	51·60	66·75
Cost to produce 1 lb. gain	c.	18·4	18·3
Number of pounds meal for 100 lbs. gain	lb.	637	491

This experiment is a duplicate of an experiment conducted in 1919; the findings are practically the same. In the previous year when the cost of screenings only amounted to 1¾ cents per pound and barley was a little higher in price the balance was in favour of the screenings.

BREEDING EWE LAMBS

Object of Experiment.—To determine the advisability of breeding ewe lambs.

How Experiment was Conducted.—Commencing in the autumn of 1917, fifteen ewe lambs were selected and put in with the breeding flock, fifteen other ewe lambs were used as a check lot.

The weights of the ewes were taken at the commencement of the breeding season and each year thereafter.

Records were kept of the lambing percentage.

The flock on the Station is kept under conditions similar to those existing on the average farm excepting that some difficulty has been found in providing sufficient exercise during the winters.

Results.—In the autumn of 1919 the weights were taken of the lambs of that year from ewes bred both as lambs and as shearlings, the progeny from the ewe lambs bred the preceding autumn were also weighed. These two lots of lambs were compared with the lambs from ewes bred for the first time in their shearling year. The following table gives some of the particulars secured:—

—	No. of Lambs alive from 1919 Lambing Season	Average Weight of Lambs
	No.	Lbs.
Lot 1—Bred first time 8 to 9 months and again in 1918	14	71
Lot 2—Bred first time 20 to 21 months in autumn 1918	21	69
Lot 3—Bred first time 8 to 9 months in autumn 1918	8	71

Conclusions.—More difficulty is found with young ewes in parturition than with older sheep. They do not take so readily to their lambs.

Young ewes are usually late lambing, this makes weaning time late and leaves the ewe in thin condition for the second breeding season.

Apparently early breeding makes little difference to the ultimate weight of the ewe or to the weights of the fleece, providing the young ewe is properly fed.

For the average flock owner breeding ewes as shearlings appears to be the most profitable time.

FINANCIAL STATEMENT FOR SHEEP

Below is submitted a balance sheet covering a four-year period closing March 31, 1921. The cost of labour, interest on investment, or cost of housing or pasture are not included as these vary in different districts under different conditions. The increase in value is shown after writing off the depreciation occurring during 1920.

BALANCE SHEET FOR SHEEP 1917 TO 1921

Value April 1, 1917		Value March 31, 1921		Returns Including Sales, Ex-charges and Increased Value	Cost of Feed and Purchases	Profits over Cost of feed and Purchases. 4 years
No. of Sheep	Value	No. of Sheep	Value			
131	$1,255·05	209	$2,543·00	$6,028·46	$3,071·37	$2,957·09

SWINE

There are two breeds of swine on the Station, Berkshire and Yorkshire. The breeding stock consists of six Berkshire sows and one boar and the same number of Yorkshires. In addition there are ten young pigs and eight feeders on hand.

The experimental work has consisted in determining the value of pasture crops for swine; in comparing the self-feeder and trough methods of feeding; in comparing methods of housing for winter. Another experiment has recently been started to determine the profitableness of cross-breeding for the production of market swine.

PASTURE CROPS FOR SWINE

Two experiments have been tried out during the past two years to ascertain the value of pasture crops. Besides testing out pastures the experiments were planned to compare the self-feeder and trough methods of feeding. In 1919 the feed consisted mainly of half oats and half Standard Screenings. In 1920 the ration was comprised of two parts oats, one part Standard Screenings and one part barley. In 1919 the pasture consisted mainly of rape but the pigs had the run of a plot of western rye grass. In 1920 rape was compared with oats and fall rye. The following tables give the results secured:—

PASTURE CROPS FOR SWINE AND TROUGH *VS.* SELF-FEEDER

Value of feed:—
Oats.....at 2½c. per lb.
Screenings.....at 1¼c. per lb.
Shorts.....at 1·7c. per lb.

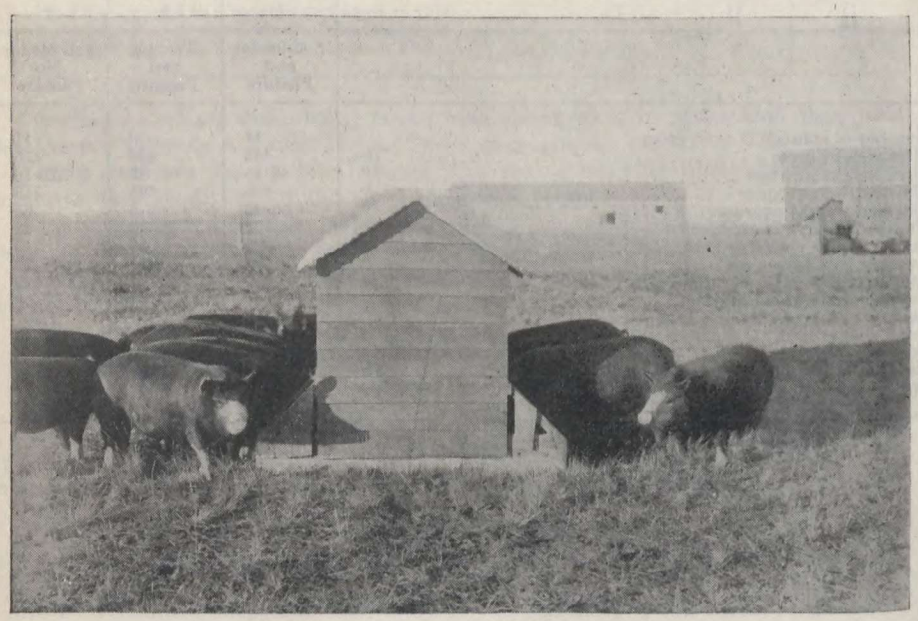
Lot		1	2	3
		Self-feeder and Pasture	Trough and Pasture	Self-feeder No Pasture
Number of animals in each group		11	10	11
First weight gross	lbs.	445	430	475
First weight average	"	40·45	43	43·18
Finished weight gross	"	665	665	715
Finished weight average	"	60·45	66·5	65
Number of days in experiment		32	32	32
Total gain for period	lbs.	220	235	240
Average gain per animal	"	22	23·5	21·82
Average daily gain per animal	"	0·625	0·734	0·682
Average daily gain for group	"	6·87	7·34	7·50
Quantity of meal eaten by group	"	1,127	947	1,407
Total cost of feed	$	22·49	18·87	28·15
Cost of feed per head	$	2·04	1·88	2·56
Number of lbs. meal mixture for 1 lb. gain	lbs.	5·12	4·03	5·86
Cost to produce 1 lb. gain	cts.	10·2	8·0	11.7

PASTURE CROPS FOR SWINE AND TROUGH *VS* SELF-FEEDER

Value of feeds:—
Oats.....2½ cts.
Screenings.....1¾ cts.
Shorts.....2½ cts.
Barley.....2½ cts.

Lot		1	2	3	4
		Self-feeder No Pasture	Trough No Pasture	Self-feeder Rape Pasture	Self-feeder Fall Rye and Oat Pasture
Number of animals in each lot		8	8	8	8
First gross weight	lbs.	470	471	476	462
First average weight	"	58·8	58·8	59·5	57·7
Finished weight gross	"	1,194	1,126	1,254	1,159
Finished weight average	"	149·2	153·2	156·7	144·9
Number of days in experiment	"	70	70	70	70
Total gain in 70 days	"	724	755	778	697
Average gain per animal	"	90·5	94·3	97·2	87·1
Average daily gain per animal	"	1·29	1·34	1·37	1·24
Average daily gain per lot	"	10·3	10·7	11·1	9·95
Quantity of meal eaten	"	3,060	2,646	2,898	2,866
Total cost of feed	$	60·71	52·72	57·50	56·84
Cost of feed per animal	$	7·58	6·59	7·18	7·10
Number of lbs. of meal mixture for 1 lb. gain	lb.	4·2	3·5	3·7	4·
Cost to produce 1 lb. gain	cts.	8·3	6·9	7·3	8·1

Rape pasture decreased the production of pork by one cent per pound.



Fat Hogs on Self-feeder. Self-feeder method of feeding.

SELF-FEEDER VS. TROUGH METHOD OF FEEDING

In both the preceding tables the trough-fed swine made the most economical gains. This has not been true of all experiments particularly where the self-feeders were used

for finishing the swine for market. The average comparative daily gains and grain required for each pound of gain has been summarized for each year and is given below:—

Year	Trough Method		Self-feeder	
	Daily Gain	Grain Required for 1 lb. of Gain	Daily Gain	Grain Required for 1 lb. of Gain
1918 ..... lbs.	1·32	5·26	1·98	4·46
1919 ..... "	0·78	4·6	0·79	5·86
1920 ..... "	1·65	4·2	1·64	4·9

METHOD OF HOUSING

The first attempt to winter fall pigs on the Station was made in a straw shed. This was constructed of sufficient timbers and wire to support a pile of straw that was threshed on and around this framework. Thirty-seven young pigs were wintered in this shed. The gains made during the winter were costly but as soon as the weather warmed up they made exceptional gains and were sold at a profit over cost of feed of $489.46.

In the season of 1919-20 an attempt was made to compare wintering fall pigs in the main piggery with wintering in a portable cabin. Both lots were fed through self-feeders and the ration consisted of half oats and half standard screenings with roots added as a succulent feed. Owing to the pigs in the main building becoming affected with rheumatism the experiment was closed out during January. The following table gives the information secured:—

EXPERIMENT IN FEEDING SWINE

	Inside	Outside
Lot	1	2
How Fed	Self-feeder	Self-feeder
Ration Used	1—part Oats 1—part Screenings	1—part Oats 1—part Screenings
Number of animals in each group	12	12
First weight gross ..... lbs.	825	775
First weight average ..... "	68·75	64·6
Finished weight gross ..... "	1,249	1,164
Finished weight average ..... "	104·08	97
Number of days in experiment	42	42
Total gain for period ..... lbs.	424	389
Average gain per animal ..... "	35·3	32·4
Average daily gain per animal ..... "	0·84	0·77
Average daily gain per group ..... "	10·1	9·26
Quantity of meal eaten by group ..... "	1,630	1,580
Total cost of feed ..... $	32·60	31·60
Cost of feed per head ..... $	2·72	2·63
Number of lbs. meal mixture per lb. gain ..... lbs.	3·84	4·06
Cost to produce 1 lb. gain ..... cts.	7·7	8·1

Conclusions.—Cost of producing one pound gain was slightly in favour of lot 1. On the other hand lot 1 suffered from rheumatism while lot 2 were perfectly healthy and had experiment been conducted further, results would undoubtedly have been reversed. It seems that a well protected hog cot is a satisfactory winter quarter for

early fall litters, but it would be advisable to place the self-feeder in a sheltered place.

BALANCE SHEET FOR SWINE 1920-21

Good returns were secured from swine sold during the past year. The cost of feed was high during the first half of the year but later feed has been secured very cheaply. Below is submitted a balance sheet for the year just closed:—

Value April 1, 1920		Value April 1, 1921		Returns Including Sales Exchange and increased Value	Cost of Feed and Purchases	Profit over Cost of Feed and Purchases
No. of Swine	Value	No. of Swine	Value			
60	$935·00	32	$839·00	$2,282·74	$1,373·42	$909·32

FIELD HUSBANDRY

Weather and Crop Conditions, 1920.

In reporting the results from the field crop experiments, it has been thought advisable that, for the most part, such report should consist of a summary of the work conducted during the past several years. In this period there have been two years with excellent crops, three with medium and three with crops below the average. The yields varied from the heaviest crops ever harvested in the northwest in 1915 to almost a failure in the year 1918. During the three dry years the precipitation did not exceed 5·1 inches in the four growing months in any one year, whereas, during the years of heavier crop such as 1915 and 1916, there was 7·5 and 14·8 inches recorded respectively for the corresponding periods. Seeding usually commenced the second week in April and was never later than May 1. Spring frosts frequently occurred in May and as late as June 16. In some years high winds were quite prevalent during April, May, and June but the only year in which soil drifting occurred on the Station was in 1918 and then only to a minor extent. In 1920 crop prospects were excellent up to July 15, but between that date and the 22nd hot weather prevailed and as this followed two weeks without rain, the crop development was checked on many fields. Heavy rains during the latter part of the summer delayed harvesting and threshing operations and a quantity of grain was injured by sprouting and bleaching while in the stook.

FIELD CROP YIELDS

Crop	Preceding Crop	Preparatory Treatment	Yield per Acre
Wheat (Marquis)	Summer-fallow W.R.G.	Ploughed June 1919	27 bush.
Wheat (Marquis)	Ordinary summer-fallow sod	" " "	26 "
Barley (Duckbill)	Ordinary summer-fallow sod	" " "	26 "
Oats (Banner)	Ordinary summer-fallow sod	" " "	41 "
Peas (Early White)	Breaking	" " "	22 "
Sunflowers (Giant Russian)	Summer-fallow	" " "	11 tons–179 lbs.
Western rye grass seed	Oats seeded down	Hay 1919	775 "
Western rye grass hay	Oats seeded down	" 1918	1ton –1,000 "
Oats cut green silage	Barley	Ploughed June 1919	5 " 1,246 "

Crop Rotations

Many farmers on the prairie are finding that they have more land under cultivation than they can properly manage and at the same time they have not nearly sufficient hay or pasture for even their limited number of live stock. Enquiries received at the Station indicate that many are considering seeding down a part of their holdings to grass. Experimental work indicates that cultivated grass crops usually decrease in yield after the second or third cropping years. Because of this, reseeding or seeding down a fresh area at frequent intervals will be necessary. This is where a systematic rotation of crops is of value; by seeding down a portion of the farm each year, the balance between crops grown for feed and those sold for cash is more equally maintained. The grass roots add fibre to the soil and, in addition, weeds are more cheaply controlled by having grass in the rotation. Two varieties of grass have proven to be hardy and more drought-resistant than any others; these are western rye and brome grass. For short crop rotations the western rye grass has the advantage of being more cheaply eradicated, one ploughing being sufficient to destroy it. For eradicating brome grass, however, both breaking and backsetting are required. Four different arrangements of crops were started on the Scott Station in 1911; they varied from the arrangement of two crops of grain between summer-fallow years to a rotation that included two summer-fallow years, grass, peas, wheat, and oats. After nine years' experiments it has been found advisable to discontinue one rotation and to modify one of the others.

Rotation "C" (three years' duration)

First year—Summer-fallow.

Second year—Wheat.

Third year—Wheat.

This arrangement of crops establishes a fairly satisfactory division of labour as far as a grain-growing rotation is concerned. One field is summer-fallowed, the other is ploughed in the autumn. Operated on a large area this rotation with proper and timely tillage and clean seed should give fair returns until such a time as the soil fibre was destroyed and drifting commenced or the weeds became too numerous to permit profitable grain growing. Based on pre-war prices the average net profit for this rotation for a period of nine years amounted to $3.77 per acre.

Rotation "J" (six years' duration)

First year—Summer-fallow.

Second year—Wheat.

Third year—Oats.

Fourth year—Oats, seeded down with western rye grass 10 pounds, alfalfa 8 pounds per acre.

Fifth year—Hay.

Sixth year—Pasture.

This rotation was started on small fields but after four years' trial it was found to give more promise of success than any of the others. It was transferred to twenty acre fields. While this rotation might not prove satisfactory if started on weedy land, on comparatively clean soil it has given the highest returns.

It will be noted that one-half the area is in grain every year, one-third in hay and pasture, one-sixth is summer-fallow. In the division of labour, one field is summer-fallowed, one field autumn ploughed and the field to be sown to grass is ploughed in the spring very early. The moisture from the melted snow is turned under, the land

worked down as rapidly as ploughed and the oats and grass are sown after the wheat seeding is completed. The hay crop is removed early, so that it does not interfere with harvesting the grain. One-sixth of the land produces hay; this with the oat straw from two fields provides a good supply of roughage in most seasons. The aftermath on the hay field is pastured in the autumn, and the field summer-fallowed each year is pastured until broken up in June. This helps out the regular pasture by providing pasturage for the early spring and late summer months. The profits from the hay crops are usually small and the pasture scarcely pays expenses; on the other hand, weeds are more cheaply controlled and fibre is maintained in the soil.

The cost of breaking up and summer-fallowing the western rye grass is very little more than the cost of treating ordinary summer-fallow, amounting on an average to 59 cents per acre more. The average yield of wheat grown on western rye grass sod, summer-fallowed, is approximately 3¼ bushels more per acre than when grown on ordinary summer-fallow. This is the average increased returns from three fields each year for a period of eight years.

ROTATION "P" (EIGHT YEARS' DURATION)

First year.—Summer-fallow.

Second year.—Wheat.

Third year.—Wheat.

Fourth year.—Summer-fallow, manured and ploughed under fifteen tons per acre.

Firth year.—Sunflowers.

Sixth year.—Barley, seeded down with western rye grass, and sweet clover.

Seventh year.—Hay.

Eighth year.—Pasture.

Previous to 1920 peas were grown instead of sunflowers, and alfalfa and red clover were mixed with western rye grass in seeding down. This was the only rotation on which it was difficult to secure a catch of grass as weeds grew up in the peas and seeded. The weeds the following year not only smothered the young grass plants but extracted the moisture from the surface soil. Another difficulty that was found was that the barley threshed in dry years retained the awns sufficiently to make an uneven distribution of the grain when sown through the grain drill, consequently, grass seed mixed with the grain was also unevenly distributed. Sunflowers are grown as a hoed crop and this should aid in cleaning up this rotation, and Duckbill barley, a two-rowed sort, is being used as a nurse crop, as this variety does not retain the awns to any serious extent.

This rotation as arranged now will test out growing grain after sunflowers and the possibilities of western rye grass and sweet clover as a hay crop.

ROTATION "R" (NINE YEARS' DURATION)

First year.—Summer-fallow, manured and ploughed under fifteen tons per acre.

Second year.—Peas.

Third year.—Wheat.

Fourth year.—Oats.

Fifth year.—Summer-fallow.

Sixth year.—Wheat.

Seventh year.—Oats, seeded down with western rye grass, red clover and alfalfa.

Eighth year.—Hay.

Ninth year.—Grass for seed.

This rotation was discontinued at the end of 1920; the crop of peas had become a harbour for weeds, each year the weeds seeded and the seed blew to adjoining fields. In addition to this it was felt that the rotation was too lengthy and that a farm divided into nine fields would require too much fencing.

SUMMARY OF ROTATION EXPERIMENTS

COMPARATIVE COSTS, RETURNS AND NET PROFITS PER ACRE BASED ON PRE-WAR PRICES

Rotation	Average Yield per Acre 9 Years		
	Average Cost to Operate per Acre	Average Returns per Acre	Average Net Profit per Acre
"C" (Three years' duration)	$7·07	$10·84	$3·77
"J" (Six years' duration)	6·89	11·69	4·80
"P" (Eight years' duration)	8·31	11·70	3·37
"R" (Nine years' duration)	8·06	11·43	3·37

COST OF PRODUCTION OF FIELD CROPS, 1920

In computing the cost of production of field crops the following values have been used. These values are based on current prices paid during 1920:—

RETURN VALUES

Wheat (from the machine)	per bushel	$ 2.31
Barley (from the machine)	" "	.77
Oats (from the machine)	" "	.51
Mixed hay	" ton	12.00
Oat straw	" "	2.00
Barley straw	" "	2.00
Wheat straw	" "	1.00
Pasture, each horse or cow	per month	1.00
Pasture, each sheep	" "	.25

COST VALUES

Rent of land	per acre	$ 2.00
Barnyard manure (charged equally over all years of the rotation)	per ton	1.00
Seed wheat	per acre	3.75
Seed oats	" "	3.00
Seed barley	" "	4.00
Sunflower seed	" "	1.90
Western rye grass seed	" "	2.00
Sweet clover	" "	1.02
Alfalfa	" "	1.74
Twine	" "	.50
Machinery	" "	.90
Manual labour	per hour	.39
Horse labour (including teamster)		
Single horse	" "	.51
Two-horse team	" "	.63
Three-horse team	" "	.75
Four-horse team	" "	.87
Threshing (covering work from stook to granary)		
Wheat	per bushel	.15
Oats	" "	.10
Barley	" "	.12
Western Rye Grass	" "	.20

ROTATION "C"

Rotation Year	Crops		Items of Expense in Raising Crop										Value of Horse Labour
						Manual Labour		Horse Labour (including teamster)					
								Hours					
	Last Year	This Year	Area	Rent and Manure	Seed, Twine, Machinery	Hours	Cost	Single Horse	2-Horse Team	3-Horse Team	4-Horse Team	5 Horse Team	
			Acres	$ c.	$ c.	No.	$ c.	No.	No.	No.	No.	No.	$ c.
1	Wheat	Summer-fallow	1·5	4 80	1 35						$6\frac{7}{12}$		5 72
2	Summer-fallow	Wheat	1·5	4 80	7 72	$1\frac{1}{3}$	0 52				$4\frac{1}{3}$		3 77
3	Wheat	Wheat	1·5	4 80	7 72	$1\frac{1}{6}$	0 45		$1\frac{1}{3}$		$7\frac{2}{3}$		7 51
	Aggregate		4·5	14 40	16 79	$2\frac{1}{2}$	0 97		$1\frac{1}{3}$		$18\frac{7}{12}$		17 00
	Average per acre 1920			3 20	3 73	$\frac{5}{6}$	$21\frac{5}{6}$		$\frac{16}{27}$		$4\frac{7}{24}$		3 77

Cost of Threshing					Height of Stubble	Particulars of Crop						
						Weight						
	Total Cost	Cost for 1 Acre	Cost for 1 Bushel	Cost for 1 ton		Grain	Straw	Hay	Hoed Crop	Total Value	Value of Crop per Acre	Profit or Loss per Acre
$ c.	$ c.	$ c.	$ c.	$ c.	Inches	Lbs.	Lbs.	Lbs.	Lbs.	$ c.	$ c.	$ c.
	11 87	7 91										−7 91
3 90	20 71	13 80	0 79			1,560	2,200			61 16	40 77	26 97
4 10	24 58	16 38	0 90			1,640	1,940			64 11	42 74	26 34
8 00	57 16									125 27		
1 77		12 69									27 83	15 14

ROTATION "J"

Rotation Year	Crops		Items of Expense in Raising Crop										Value of Horse Labour
						Manual Labour		Horse Labour (including teamster)					
								Hours					
	Last Year	This Year	Area	Rent and Manure	Seed, Twine, Machinery	Hours	Cost	Single Horse	2-Horse Team	3-Horse Team	4-Horse Team	Engine	
			Acres	$ c.	$ c.	No.	$ c.	No.	No.	No.	No.	$ c.	$ c.
1	Pasture	Summer-fallow	20	64 00	18 00						123	67 50	107 01
2	Summer-fallow	Wheat	20	64 00	103 00	29	11 31			8	48		47 76
3	Wheat	Oats	20	64 00	88 00	45	17 55				122		95 14
4	Oats	Oats	20	64 00	88 00	30	11 70				53	59 00	46 11
5	Oats	Hay	20	64 00	65 60	77	30 03		81				51 03
6	Hay	Pasture	20	64 00	47 60								
	Aggregate		120	384 00	410 20	168	65 52		81	8	346	126 50	347 05
	Average per acre 1920			3 20	3 42	1·4	0 59		6·7	0·06	2·8	1 05	2 89

Cost of Threshing					Height of Stubble	Particulars of Crop						
	Total Cost	Cost for 1 Acre	Cost for 1 Bushel	Cost for 1 ton		Weight				Total Value	Value of Crop per Acre	Profit or Loss per Acre
						Grain	Straw	Hay				
$ c.	$ c.	$ c.	$ c.	$ c.	Inches	Lbs.	Lbs.	Lbs.		$ c.	$ c.	$ c.
	256 51	12 82						Pasture	18 00	18 00	0 90	−11 92
81 75	307 82	15 39	56 4		6	32,700	36,000	"	13 92	1,290 87	64 54	49 15
70 00	334 69	16 73	47 8		6	23,800	38,000	"	41 74	436 74	21 83	5 10
67 90	336 71	16 83	49 4		6	23,086	40,000	"	10 00	396 29	19 81	2 98
	210 66	10 53		7 10	3	Pasture	$27 00	59,500		384 00	19 20	8 67
	111 60	5 58				Pasture	86 75			86 75	4 33	−1 25
219 65	1,557 99									2,212 65		
1 83		12 98									21 77	8 79

ROTATION "P"

Rotation Year	Crops: Last Year	Crops: This Year	Items of Expense in Raising Crop: Area	Rent and Manure	Seed, Twine, Machinery	Manual Labour: Hours	Manual Labour: Cost	Horse Labour (including teamster): Hours: Single Horse	2-Horse Team	3-Horse Team	4-Horse Team	Cost of Ensiling	Value of Horse Labour
			Acres	$ c.	$ c.	No.	$ c.	No.	No.	No.	No.		$ c.
1	Oa[illegible]	Summer-fallow	1·5	7·61	1 35						$6\frac{2}{3}$		5 80
2	Summer-fallow	Wheat	1·5	7 61	7 72	$2\frac{1}{8}$	0 84		$2\frac{1}{4}$		$2\frac{2}{3}$		3 69
3	Wheat	Wheat	1·5	6 20	7 72	$1\frac{3}{4}$	0 68		$1\frac{1}{4}$		9		8 62
4	Wheat	Summer-fallow	1·5	4 80	1 35						$6\frac{5}{6}$		5 94
5	Summer-fallow	Sunflowers	1·5	7 61	4 9[illegible]	20	7 80	9	$18\frac{3}{12}$	3		24 70	18 44
6	Peas	Barley	1·5	7 61	8 10	$2\frac{1}{3}$	0 91		$1\frac{5}{6}$	$1\frac{1}{6}$	$4\frac{1}{12}$		5 54
7	Barley	Hay	1·5	7 61	4 38	6	2 34		$8\frac{1}{2}$				5 35
8	Oats	Oats for silage	1·5	7 61	6 60				$\frac{5}{6}$		8	15 60	7 58
	Aggregate		12	56 66	42 17	$32\frac{1}{4}$	12 57	9	$33\frac{1}{12}$	$4\frac{1}{6}$	$35\frac{1}{6}$	40 30	60 96
	Average per acre 1920			4 71	3 51	$2\frac{7}{10}$	1 05	$\frac{3}{4}$	$2\frac{3}{8}$	$\frac{1}{3}$	$2\frac{3}{4}$	3 36	5 08

Cost of Threshing	Total Cost	Cost for 1 Acre	Cost for 1 Bushel	Cost for 1 ton	Height of Stubble	Particulars of Crop: Weight: Grain	Straw	Hay	Hoed Crops	Total Value	Value of Crop per Acre	Profit or Loss per Acre
$ c.	$ c.	$ c.	$ c.	$ c.	Inches	Lbs.	Lbs.	Lbs.	Lbs.	$ c.	$ c.	$ c.
	14 76	9 84			6							− 9 84
4 20	24 06	16 04	0 86		6	1,670	2,390			65 87	43 91	27 87
3 82	27 04	18 02	1 06		6	1,535	2,155			58 90	39 26	21 24
	12 09	8 06										− 8 06
	63 50	42 33		4 75	6				26,690	80 07	53 38	11 05
5 40	27 56	18 37	0 61		6	2,160	2,235			42 23	28 18	9 81
	19 68	13 12		9 92	3			3,965		23 79	15 86	2 74
	37 39	24 92		4 43	6			16,870		50 61	33 74	8 82
13 42	226 08									321 52		
1 12		18 83									26 79	7 96

ROTATION "R"

Rotation Year	Crops: Last Year	Crops: This Year	Items of Expense in Raising Crop: Area	Rent and Manure	Seed, Twine, use of Machinery	Manual Labour: Hours	Manual Labour: Cost	Horse Labour (including teamster): Hours: Single Horse	2-Horse Team	3-Horse Team	4-Horse Team		Value of Horse Labour
			Acres	$ c.	$ c.	No.	$ c.	No.	No.	No.	No.		$ c.
1	Pasture	Summer-fallow	2⅓	7 46	2 10						14⅙		12 32
2	Summer-fallow	Peas	2⅓	11 34	23 10				3½		12		12 64
3	Peas	Wheat	2⅓	11 34	12 01	2⅝	1 10		3		11½		11 89
4	Wheat	Oats	2⅓	11 34	10 26	3½	1 36		3 1/12		12⅝		11 16
5	Oats	Summer-fallow	2⅓	11 34	2 10						12 1/12		10 51
6	Summer-fallow	Wheat	2⅓	11 34	12 01	3⅓	1 30				6¼		5 84
7	Wheat	Oats	2⅓	11 34	10 26	3¼	1 26		4⅔		8½		10 33
8	Oats	Hay	2⅓	11 34	6 86	20	7 80		14				8 82
9	Hay	Grass seed	2⅓	9 40	6 86	1½	0 58		3				2 61
	Aggregate		21	96 24	85 56	16½	13 40		31⅛		77⅝		86 12
	Average per acre 1920			4 58	4 07	0·8	0 63		1·5		3·7		4 10

Cost of Threshing	Total Cost	Cost for 1 Acre	Cost for 1 Bushel	Cost for 1 ton	Height of Stubble	Particulars of Crop: Weight: Grain	Straw	Hay	Hoed Crops	Total Value	Value of Crop per Acre	Profit or Loss per Acre
$ c.	$ c.	$ c.	$ c.	$ c.	Inches	Lbs.	Lbs.	Lbs.	Lbs.	$ c.	$ c.	$ c.
	21 88	9 37										− 9 37
	47 08	20 17				Crop de	stroyed by	Sugar Beet	Webworm			−20 17 (burnt)
5 85	42 19	19 08	1 08			2,340	3,165			91 67	39 28	21 23
5 55	39 67	17 00	0 71			1,890	3,930			32 23	13 81	− 3 19
	23 95	10 26										−10 26
4 25	34 74	14 88				1,700	2,820			66 86	28 65	13 77
10 00	43 10	18 51				3,400	5,700			56 70	24 30	5 79
	34 82	14 92						5,725		31 35	14 72	− 0 20
24 40	43 85	18 79				1,810	(W. R. G. Seed)	5,040		232 32	99 56	80 77
50 05	331 37									514 13		
2 38		15 77									24 47	8 70

OTHER CROP MANAGEMENT EXPERIMENTS

Time of seeding.—Each year for several seasons, wheat, oats, and barley have been sown as early in the spring as weather and soil conditions would permit, and at weekly intervals thereafter for a period of five weeks.

TIME OF SEEDING MARQUIS WHEAT ON SUMMER-FALLOW

Time of Seeding	Average Number of Days to Mature 7 years	Average Yield per Acre 7 years	
	Days	Bush.	Lbs.
1st Seeding	122·8	25	24
2nd "	119·7	27	25
3rd "	115·1	27	25
4th "	117·2	27	36
5th "	112	24	47

TIME OF SEEDING BANNER OATS ON SUMMER-FALLOW

Time of Seeding	Average Number of Days to Mature 8 years	Average Yield per Acre 8 years	
	Days	Bush.	Lbs.
1st Seeding	126·2	61	9
2nd "	123·7	63	25
3rd "	117·7	64	21
4th "	114·7	65	10
5th "	110·8	58	35

TIME OF SEEDING BARLEY ON SUMMER-FALLOW

Time of Seeding	Average Number of Days to Mature 8 years	Average Yield per Acre 8 years	
	Days	Bush.	Lbs.
1st Seeding	128·3	27	10
2nd "	117·5	23	21
3rd "	113	24	39
4th "	110·5	25	33
5th "	106·2	22	45

SOIL MANAGEMENT EXPERIMENTS

PRAIRIE BREAKING

This experiment was commenced in 1913, five plots were broken each season, three plots were cultivated the same year they were broken; of the remaining two, the one was broken deep and kept cultivated, the other was broken shallow and backset late in the summer.

PRAIRIE BREAKING; AVERAGE YIELD PER ACRE, PERIOD OF 5 YEARS

Crop or Treatment Year	Yield per Acre, 1st year	Yield per Acre, Wheat Following year	Yield per Acre Wheat, 3rd year	Yield per Acre Wheat, 4th year
	Bush. Lbs.	Bush. Lbs.	Bush. Lbs.	Bush. Lbs.
Green feed (oats and peas), Spr. Bkg.	.. 2,170	19 36	9 46	6 56
Flax (extra cultivation), Spr. Bkg.	7 48	18 21	10 58	9 3
Flax (ordinary cultivation), Spr. Bkg.	7 23	18 31	10 36	9 43
Broken June, cultivated remainder season	No Crop	23 16	10 41	8 18
Broken June, backset September	"	23 23	11 36	5 41

It will be noted that the flax crop had a much less detrimental effect on succeeding crops than is commonly believed. This may be due in part to the use of clean seed and to weeds playing no part in the subsequent crop yields. Backsetting the same year as broken does not appear profitable where the grass roots can be nearly all destroyed by once ploughing. If stubbling in is to be practised for the succeeding year then backsetting may be necessary but it would appear more profitable to backset the land for the second crop.

DEPTH OF PLOUGHING

In this experiment the summer-fallowing was done early in June. The subsoil attachment consisted of an extra large cultivator tooth with a sharp point, this was attached to the plough and dug up the soil to a depth of four inches below the sole of the furrow.

DEPTH OF PLOUGHING

Plots	Depth of Ploughing	Yield of Wheat, After Fallow, 6 year average	Yield of Oats following Season, 5 year average
		Bush. Lbs.	Bush. Lbs.
1	Ploughed 3 inch. deep on fallow and 3 inch. on stubble	21 58	47 5
2	" 4 " " " 4 " "	23 15	48 29
3	" 5 " " " 5 " "	22 2	45 23·8
4	" 6 " " " 5 " "	22 5	44 ..
5	" 7 " " " 5 " "	22 28·8	43 23·8
6	" 8 " " " 5 " "	21 22	42 ..
7	Ploughed 5" and subsoil 4" on fallow and 5" on stubble	23 7	46 2
8	" 6" " 4" " 5" "	22 24	47 9
9	" 7" " 4" " 5" "	23 5	47 25
10	" 8" " 4" " 5" "	22 40·8	37 21

Notes.—It is possible that plots one and two received some additional moisture from the snow that collected close to the fence and on these plots. The yield from oats on plot ten is an average for only a four-year period, consequently it is much lower than as though the yields for the 1916 crop had been available.

Conclusions.—There appears to be very little gain from ploughing deeper than five inches for the first years after breaking up new land. There is very little gain from subsoiling for the first crop but the increase in yield is marked in the second crop of grain after summer-fallow.

PLOUGHING SUMMER-FALLOW ONCE *VS.* PLOUGHING TWICE FOR WHEAT

Depth of ploughing	Average Yield per Acre, 6 Years			
	Ploughed in June		Ploughed June and again September	
	Bush.	Lbs.	Bush.	Lbs.
Ploughed 4 inches deep	28	12	26	6
" 6 "	23	35	22	51
" 8 "	23	41	22	11

SUMMER-FALLOW TREATMENT

The average for a six-year period shows that once ploughing gave an increased yield of 1 bushel 27 pounds over where the plots had been ploughed twice.

INFLUENCE OF ONCE *VS.* TWICE PLOUGHING SUMMER-FALLOW ON OATS FOLLOWING THE WHEAT

Depth of Ploughing	Average Yield per Acre, 5 Years			
	Ploughed in June		Ploughed June and again September	
	Bush.	Lbs.	Bush.	Lbs.
Ploughed 4 inches deep	47	3	54	27
" 6 "	44	26	54	18
" 8 "	48	13	51	17

In the succeeding crop of oats the average yield from the plots ploughed twice in the summer-fallow year amounted to 6 bushels 30 pounds more than where the plots had only been ploughed once.

Twice ploughing is undoubtedly beneficial where grass prevails but there is always a danger in weedy soil of turning up weeds late in the summer that may not germinate until the following year.

It has also been noticed that where the land was ploughed twice the straw was coarser. In wet seasons this straw might be more susceptible to rust.

TIME OF PLOUGHING SUMMER-FALLOW

Time of Ploughing	Yield of Wheat		Yield of Oats following Wheat	
	Yield per Acre, 6 years		Yield per Acre, 5 years	
	Bush.	Lbs.	Bush.	Lbs.
May 15	26	16	47	8
June 15	24	13	42	6
July 15	22	40	44	17

The cost of summer-fallowing the May-ploughed plot is the highest but the crop returns were correspondingly greater.

The crop on the July-ploughed plot has usually been considerably more weedy than on any of the others.

FALL CULTIVATION BEFORE SUMMER-FALLOWING

The plots on which this experiment was conducted were comparatively free from weeds, consequently the only advantage from fall cultivation that could be looked for was the conservation of moisture by forming a mulch on the soil in the fall of the year.

FALL CULTIVATING STUBBLE LAND PREVIOUS TO SUMMER-FALLOWING

Method of Cultivation	Wheat		Oats following Wheat	
	Yield per Acre 6 year average		Yield per Acre, 5 year average	
	Bush.	Lbs.	Bush.	Lbs.
Fall Cultivate	23	40	46	12
Plow 4" deep autumn	23	47	45	8
No fall cultivation	23	35	44	26

It would appear as though the moisture conserved by the soil mulch was equalled by the moisture that formed from the snow collected by the stubble. In addition there may have been less winter evaporation taking place on the unploughed plot.

GROWING RAPE ON SUMMER-FALLOW AS A PASTURE CROP

In this experiment the plot was ploughed in June and the rape was sown immediately. Later in the summer the crop was pastured off. The average for a six-year period shows a decreased yield of 4 bushels and 16 pounds of wheat per acre from the wheat crop grown the following seasons.

STUBBLE TREATMENT

The practice of stubbling in grain crops in the West is largely responsible for the rapid increase in weeds. In the experiment listed in the following tables, weeds or grass were not controlling factors, first, because the summer-fallow was planned to destroy all weed seeds in the surface of the soil, and this was accomplished every third year. Second, the land was new and the seed grain free from weed seeds; third, there were practically no weed plants near the plots, consequently little difficulty was experienced from drifting weed seeds. The treatment outlined was used on first year stubble after summer-fallowing. The figures obtained were for a five-year period 1915 to 1920 inclusive.

Treatment of Wheat Stubble for Wheat	1915–1920	
	Average Yield of Wheat per Acre	
	Bush.	Lbs.
Burn stubble in spring, seed at once	24	52
Plough stubble in spring, seed at once	23	42
Burn stubble, then plough autumn	21	2
Disc at cutting time, spring plough	20	52
Disc harrow autumn	19	55
Disc at cutting time, autumn plough	18	44
Burn stubble, then disk autumn	17	13
Plough autumn, work down in spring before seeding	16	54

NOTE.—Records from 1918 not included.

It will be noted that with any method whereby the stubble was destroyed in the autumn, either by burning, discing or ploughing, the yield the following year was decreased.

Spring ploughing has given heavier yields than fall ploughing and it will also be noted that discing before ploughing in the fall has increased the yields over where no discing was done and the land fall ploughed.

TREATMENT OF WHEAT STUBBLE FOR SOWING TO OATS

Treatment	1915-1920 Average Yield Oats per Acre, 6 years	
	Bush.	Lbs.
Ploughed spring, sown, subsurface packed	49	24
Cultivated autumn, spring ploughed, sown	43	12
Plough autumn, subsurface pack at once	39	12

It will be noted that breaking down stubble in the autumn decreases the average yield of oats by six bushels per acre.

Spring ploughing and packing gave over ten bushels per acre more than fall ploughing and packing.

SEEDING DOWN TO GRASS AND CLOVER

This experiment was outlined primarily to determine the possibility of seeding down with a nurse crop and to ascertain how far removed from the summer-fallow year a successful crop of grass could be secured. The summer-fallow was ploughed in June and cultivated for the remainder of the season. The hoed crop most commonly used was turnips. The stubble land was fall ploughed and worked down into seed bed condition as soon as ploughed. While red clover seed was mixed with the western rye grass the clover owing to winter-killing and to lack of sufficient moisture, made but a small percentage of the hay even in the most favourable season. In the seven years a total of seventy-seven plots were seeded down. Crops of grass were obtained on all the plots, although in some seasons, particularly 1918, the hay crop was very light.

The following table gives the average returns of cured hay for a seven-year period. The seeding was done with a double disc grain drill:

Treatment	Average Yield per Acre 1914-1920			
	Yield of Hay Sown Alone		Yield of Hay Sown with Nurse Crop	
	Tons	Lbs.	Tons	Lbs.
Sown on summer-fallow	1	1,737	1	520
Sown after turnips	1	1,057	.....	1,840
Sown with second crop of grain after summer-fallow	1	691	.....	1,451
Sown with third crop of grain after summer-fallow	1	1,017	.....	1,811

Average yield per acre seeding down alone	3,125 lbs.
" " " with nurse crop	1,905 "
" " in favour of seeding down alone	1,225 "

While the increased yield in favour of seeding down alone averaged 1,225 pounds of hay per acre, there was the decreased cost of seeding and the value of the nurse crop which was used to be considered. If the main object in view in seeding down is to secure a dependable crop of hay, then the seeding down alone on summer-fallow is the most likely to ensure success, but if the main objects are to put fibre back into

the soil and to control weeds as well as to provide some hay, then seeding down with a nurse crop is more economical. In order to find more accurately the influence of the nurse crop in seeding down, a number of plots were left and cut for hay again the second year. The following table gives the average yield for a period of seven years:

YIELD OF CURED HAY PER ACRE, SECOND CROPPING YEAR

Treatment in Seeding Down	Average Yield per Acre, 7 years			
	Yield per Acre from Seeding down alone		Yield per Acre from Seeding down with Nurse Crop	
	Tons	Lbs.	Tons	Lbs.
Seeding with wheat on summer-fallow	1	382	1	1,022
Seeding with wheat after roots	1	165	1	577
Seeding with wheat after one crop grain	1	588	1	325

Average yield per acre when seeded down with nurse crop	2,641 lbs.
" " " without nurse crop	2,378 "
Average yield per acre in favor of seeded down with nurse crop	263 "

This experiment goes to prove that the crop in the second year is more dependent on the precipitation than on the method of seeding down.

One other conclusion may be drawn from this experiment, namely, that it is possible to secure a catch of grass by seeding down with a nurse crop in the third crop of grain after summer-fallow. This is possible providing there are not too many viable weed seeds present in the soil and the seed is sown in good season. In a very dry and unfavourable season, such as in 1918, the crop of hay harvested may be unprofitably low, but in good seasons fair crops are secured.

SEEDING DOWN WITH OATS CUT FOR GREEN FEED

The practice of seeding down with oats and then cutting the oats for hay has not proven as satisfactory as expected. The oats usually make a vigorous growth and their leaves shade the young plants. The oat crop is, as a rule, removed during the warm weather, consequently, in a number of seasons, the grass plants have suffered from the sudden change from too much shade to none at all.

PLOUGHING UNDER BARNYARD MANURE—FOR GRASS

The rotted manure was spread on at the rate of eight tons per acre and ploughed under in the autumn previous to sowing grass. Increase yields of hay have resulted from this practice.

Applying Barnyard Manure for Cereal Crops

The profitableness of applying barnyard manure on the prairie farm is a much-debated subject. Experiments to determine this point were started on the Scott Station in 1914 and now five or six years' results are available. The manure was applied at the rate of 12 tons per acre and at such times and in the different ways specified in the following table. All the plots with the exception of plots 2, 4 and 7, were autumn ploughed six inches deep. Discing and stubble burning were done immediately before ploughing.

APPLICATION OF BARNYARD MANURE FOR WHEAT, OATS AND BARLEY

	Application of Manure	Average Yield per Acre 1915–1920					
		Wheat		Oats		Barley	
		Bus.	Lbs.	Bus.	Lbs.	Bus.	Lbs.
1	Applying green manure in winter on fall ploughing, disc before seeding	19	54	53	2	22	43
2	Applying rotted manure after seeding on fall ploughed land	19	30	49	10	15	5
3	Applying green manure in winter on summer-fallow disced before seeding	21	3	47	25	22	3
4	Applying rotted manure after seeding on summer-fallow land	22	20	48	9	24	7
5	No manure fall ploughed	20	12	45	19	17	5
6	Apply rotted manure in autumn, ploughing immediately after	24	29	54	.....	27	26
7	Apply rotted manure in spring, ploughing immediately after	26	35	61	2	28	46
8	No manure, disc stubble, autumn plough	21	45	49	26	21	13
9	No manure, burn stubble, autumn plough	20	54	54	28	25	9

CONCLUSIONS

The application of green manure from the barn increased weeds and volunteer growth.

Spring ploughing rotted manure under is the most profitable method.

A comparison of manured and unmanured fall-ploughed plots shows an increase of 4 bushels and 17 pounds of wheat, 8 bushels and 15 pounds of oats, and 10 bushels and 21 pounds of barley per acre in favour of applying the manure.

Top-dressing autumn-ploughed plots with rotted manure only shows an increase of 42 pounds of wheat, 3 bushels and 25 pounds of oats, and 2 bushels of barley.

Discing the stubble before ploughing in order to aid its decomposition has increased the wheat yield by 1 bushel 35 pounds, oats 5 bushels 7 pounds, and barley 4 bushels and 8 pounds. This may be due in part at least to the over-turned furrow slice making a more complete connection with the subsoil. Burning stubble off before ploughing increased the yield of wheat by 42 pounds per acre, oats by 9 bushels 9 pounds, and barley by 8 bushels 4 pounds.

Stubble-burning experiments should be conducted for a further period to determine the loss of fertility caused by the destruction of the stubble.

GREEN MANURING

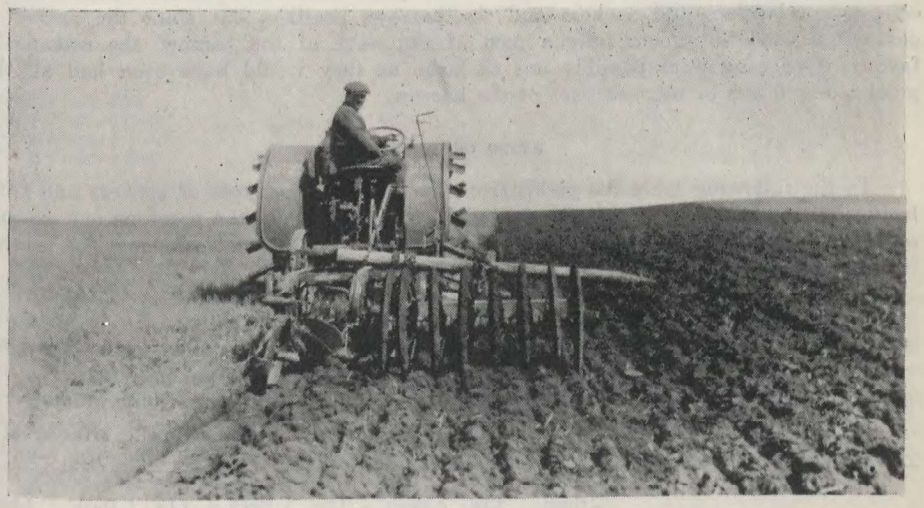
In the green manuring experiment the check plots and the plots that were manured were ploughed early in June and kept cultivated for the remainder of the season. The plots on which the green crops were grown were ploughed early in June and sown to the crops listed in the following table. The barnyard manure was applied on the surface of the summer-fallow in September and disced in immediately.

Treatment	Average Yield per Acre 1915 to 1920			
	Average Yield Wheat on Summer Fallow		Average Yield Oats following Wheat	
	Bus.	Lbs.	Bus.	Lbs.
Applying barnyard manure on summer-fallow 12 ton per acre applied in September	23	47	45	.....
Peas sown at rate of 2 bush. per acre, ploughed under early July	21	57	50	1
Peas sown at rate 2 bus. per acre, ploughed under when in bloom	20	49	45	17
Summer-fallow, average of two plots	20	40	42	20
Tares, 1 bus. per acre ploughed under late July	19	3	46	16.

The practice of ploughing under green crops appears to be unprofitable, since the cost of seed and labour involved by extra ploughing and seeding is no small item.

It will be noted that there was an increase in yield in the second crop of grain from the green manuring.

Applying rotted barnyard manure appears to be the most practicable and profitable plan.



Tractor with three furrow plough and section off a packer behind to prevent soil drying too rapidly.

Soil Packers

Seventy-five plots have been devoted to this work and during the past season twelve more plots were added in order to determine the value of the culti-packer. Previous to this the three types of packers were used, surface, subsurface, and combination. They weighed respectively 162, 195 and 220 pounds per lineal foot. The soil is a chocolate clay loam that does not bake readily. The experiments were conducted on summer-fallow, fall, and spring ploughing. The crop used was wheat.

USE OF PACKER IN PREPARING SUMMER-FALLOW FOR WHEAT

Time of Packing

Treatment	Average Yield per Acre 1914–1920					
	Summer-fallow		Spring Ploughing		Autumn Ploughing	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Packed as soon as ploughed	25	26	20	56	17	29
Packed in spring before sowing	22	21	20	56	18	7
Packed in spring after sowing	23	21	21	39	18	42
Packed after ploughing and after sowing	23	45	23	52	20	7
No packer	22	26	20	28	19	8

Conclusions.—Packing summer-fallow as soon as ploughed appears to be the best time; by spring the harrowing and cultivating necessary to destroy weeds usually make the seed bed sufficiently firm.

The best returns were secured from packing the spring ploughing immediately after the plough and again after the drill. In this experiment the plots were ploughed early in the spring when the soil was moist, consequently the harrows would compact the soil more readily than as though the ploughing had been done at a later date or the seed bed allowed to dry out by delaying harrowing.

As with spring ploughing, packing after ploughing and again after seeding has shown the best results on fall ploughed land. According to the plan of this experiment no harrowing was done on any of the plots that were packed. This made a comparison between the packers and the harrows possible, but since the packer is commonly used to replace only a part of the work of the harrow, the returns in favour of packing were possibly not as large as they would have been had all the plots received one or more strokes of the harrow.

KINDS OF PACKERS

In the following table the yields from the use of three types of packers and from harrowing are given. The results quoted in this table as in the previous one are not only for a period of several years but they are the averages made up from the returns for two or more plots each season.

TYPE OF PACKER

When used	Average Yield per Acre 1914–1920							
	Surface Packer		Subsurface Packer		Combination Packer		Harrowing	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
On summer-fallow	24	.....	22	48	22	35	22	26
On spring ploughed land	22	42	21	41	21	45	20	20
On autumn ploughed land	18	33	17	42	18	36	19	8
The average yield per acre from the surface packer							21	31
The average yield per acre from the combination packer							20	43
The average yield per acre from the subsurface packer							20	45
The average yield per acre from the harrow							20	27

HARROWING VS PACKING GROWING GRAIN

Three plots were used to determine the value of harrowing and packing the grain when it was six inches high.

Treatment	Average Yield per Acre 1914–1920	
	Wheat Grown on Summer-fallow	
	Bush.	Lbs.
Harrowed in spring, seeded, packed when crop was six inches high	22	54
Harrowed in spring, seeded, harrowed when crop was six inches high	22	48
Harrowed in spring, seeded	21	48

These experiments were conducted on land that was comparatively free from weeds, and on soil that did not cake or crust readily. Had more weeds been prevalent no doubt the harrows would have been the more useful implement to use.

DEPTH OF SEEDING

This experiment was tried out for seven years for wheat and six years for oats. As the data appeared fairly conclusive this experiment was dropped at the end of 1919.

Depth of Seeding	Average Yield per Acre 1913-1919			
	Wheat on Summer-fallow		Oats on Fall ploughing	
	Bush.	Lbs.	Bush.	Lbs.
Sowing 1 inch deep	23	53	43	8
Sowing 2 inches deep	24	5	44	31
Sowing 3 inches deep	25	23	45	7
Sowing 4 inches deep	24	46	42	29

FORAGE CROPS

Experimental work with forage crops has consisted in testing out varieties of corn, field roots, grasses, and annual hay crops. The growing of crops for silage is now part of the regular farm work and in addition experiments have been started to determine the best dates for seeding sunflowers and the proper quantities of seed to use. Another line of experimental work of particular importance is that of testing out the kinds of grain and the quantities to use as nurse crops for sweet clover. During the past two seasons field roots from the several seed-houses selling seed in Western Canada has been grown in the comparative test plots in order to ascertain the purity and viability of the seeds.

Field Corn at Scott, 1920.

CROPS FOR ENSILAGE

Indian corn has been grown on the Station each year since 1911; it has not produced crops that would warrant growing it for ensilage. In order to test out the productiveness of sunflowers for this purpose, three acres were sown to this crop in the spring of 1919. The season was unusually dry but sunflowers made good growth. Late in the summer an eighty-ton silo was erected and the sunflowers ensiled and

later used in a steer feeding experiment with very creditable results to the sunflower ensilage. In addition to the corn and sunflowers, oats have been grown for the purpose of making into ensilage. While it is usually recommended to grow oats and peas for this purpose the high cost of seed peas makes this mixture prohibitive at the present time. The following table gives the comparative yields of these three classes of ensilage crops. The weights given are those taken immediately after cutting.

CROPS FOR ENSILAGE

	Date sown	Harvested	Yield per Acre 1920	
			Tons	Lbs.
Sunflowers	May 17	Sept. 8	13	690
Oats	June 18	Sept. 9	8	870
Corn	June 4	Sept. 7	6	1050

INDIAN CORN

The plots of Indian corn were planted in duplicate. The land had been summerfallowed in 1919 and previously was down to alfalfa for several years. The seed was planted on June 3, which is about one week later than usual, and the crop harvested on September 7. The yields in the following table were the green weights and are about the average yields for corn at this Station.

INDIAN CORN—TEST OF VARIETIES

	Average Height	Stage of Maturity	Average Yield per Acre	
	inches		Tons	Lbs.
Comptons Early	50	Commencing to tassel	8	27
Yellow Flint	54	Very early silk	7	1231
Longfellow	60	Commencing to tassel	7	476
North Western Dent	54	Tassel	6	1472
Twitchell	50	Very early silk	6	314
Quebec 28	48	Early silk	5	716
Yellow Flint (Ewing)	52	Very early silk	4	1118

DATES OF PLANTING SUNFLOWERS

The spring of 1920 was unusually late, consequently the first seeding of sunflowers was delayed later than was originally planned. The plots were all harvested on September 7.

DATES OF SEEDING

Date	Yield per acre 48 hours after cutting	
	Tons	Lbs.
May 10	8	1859
May 17	9	1166
May 24	7	897
May 31	7	1158

DISTANCES APART TO PLANT SUNFLOWERS

The Giant Russian variety of sunflower was sown in the test rows on May 17 and cut September 8. The rows were planted at the distances given in the following table and the yields are the averages from three plots. In each test the plots were weighed up forty-eight hours after cutting.

SUNFLOWERS—DISTANCES APART

Spacing Between Rows	Average Yield per Acre	
	Tons	Lbs.
24 inches	10	1759
30 inches	10	1120
36 inches	9	333
42 inches	8	1041

In these tests the plants were thinned out to three distances apart in the rows, namely, six, nine, and twelve inches. It is noted that the stalks increased in size as the spacings were increased but no particular difference in maturity was noted between the closer planting and the wider spacing. Where the rows were thirty-six inches or more apart the two-horse cultivator was used but where the rows were closer than this it was necessary to use the one-horse cultivator. Where it is planned to grow grain after sunflowers it may be found advisable in dry districts to have the sunflower rows fairly wide apart so that less moisture will be used by this crop and thus leave more for the succeeding crop.

SHRINKAGE IN SUNFLOWERS AFTER CUTTING

In order to determine the loss of moisture between the time the sunflowers were cut and the time they were usually put in the silo, representative lots were weighed up immediately after cutting and again after forty-eight hours, with the following results:—

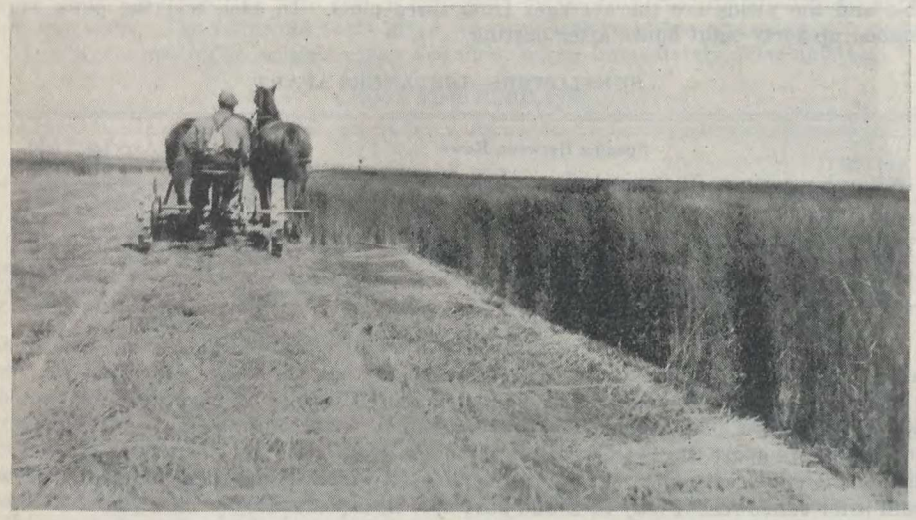
	Lbs.
Weight of sheaves at time of cutting	332
Weight of sheaves after drying on the ground forty-eight hours	226
Loss of moisture in forty-eight hours	106
Per cent of loss	31·9

This loss of moisture made the sheaves that much lighter to handle and since there was a considerable quantity of moisture that seeped out from the doors of the silo after the sunflowers were put in, it would appear advisable to leave the green immature sunflower sheaves to dry at least forty-eight hours. The surplus moisture seeping down through the freshly cut sunflowers in the silo must carry out some plant food that would be saved if this moisture was allowed to escape by evaporation while the sheaves were lying on the field.

ANNUAL HAY CROPS

Comparative tests of annual hay crops have been under way on the Scott Station since 1916. When cut at the proper season and properly cured almost any of the crops listed in the following table makes a fair quality of hay. Oats and peas have made one of the most palatable hay crops grown in these experiments. In recent years peas have been too expensive to recommend for this purpose. The millets and

Sudan grass have never thrived well during the early summer and in some seasons the young plants have been destroyed by frost early in June. The first autumn frosts end the usefulness of either of these crops. Considering the danger of loss of crop



Cutting Western Rye Grass for Hay, Scott, 1920. Sown in 1919 with nurse crop with third crop of grain after summerfallow.

from frost and the slow growth during the early summer months, these crops are not to be recommended for northwestern Saskatchewan. It has also been found that the millets have been difficult to cure. Spring rye has shown an advantage over the other crops in that it grows rapidly during the cool weather and makes hay in less time than any of the other annual crops tested. The hay from the spring rye is inclined to be stiff and woody, not containing nearly the same quantity of leaves as the oat hay. It will no doubt thrive better on poor land than will oats, the other crop that is usually grown for hay in northwestern Saskatchewan.

ANNUAL HAY CROPS

	Yield per acre			
	5 year Aver.		1920	
	Tons	Lbs.	Tons	Lbs.
Oats and peas	2	1264	2	1400
Oats	2	896	2	1600
Spring rye	2	380	2	800
Japanese millet (average 3 years)	2	840	2	1000

HAY AND PASTURE CROPS

During recent years the demand for information regarding hay and pasture crops has increased rapidly. In the early years of settlement the native grasses provided an abundance of feed but in the well-settled districts most of the land has been broken up and as a result many farmers find that they have very little pasture and practically no hay land. Experimental work with grasses has been under way on the Station for a number of years. The two kinds of grasses that have proven the hardiest and most drought resistant are western rye grass and brome. Owing to its habit of spreading and to the difficulty of eradicating, brome grass has not been as

extensively experimented with as has western rye. The rye grass has thrived particularly well and has given good crops of hay when timothy failed completely. Brome grass has been quite extensively introduced into the experiments during the past two years, as has the sweet clover. Alfalfa has been grown for several years but has not proven a dependable crop.

The following table gives the comparative yields of the grasses and grass mixtures secured during 1920 from plots sown in early July, 1919. The yields quoted are the weights of the cured hay.

GRASSES AND GRASS MIXTURES CUT FOR HAY, 1920

Variety	Yield	Remarks
	Lbs.	
Western rye grass	4,440	
Brome grass	2,000	
Timothy	.....	Winter killed.
Kentucky blue grass	.....	"
Meadow fescue	.....	"
Western rye and timothy	3,960	Nearly all western rye.
Western rye and Kentucky blue	3,080	Very little Kentucky blue.
Western rye and sweet clover	2,920	Sweet clover stronger on aftermath.
Western rye and meadow fescue	2,600	Nearly all western rye.
Western rye and red clover	2,360	All western rye.
Western rye and alfalfa	1,840	Nearly all western rye.
Brome and western rye	1,840	Mixed fairly well.
Brome and alfalfa	1,840	All Brome.
Brome and sweet clover	1,280	"

Note:—The winter-killing may be due in part to the plots having been sown late in 1919.

It will be noted that western rye and mixtures containing western rye outyielded brome and mixtures containing brome; this may be due in part to the late seeding, and the brome requiring a longer period to become established.

SWEET CLOVER

While sweet clover has been grown on the Station for several years it is only during the past two seasons that a systematic attempt has been made to determine the best method of growing this crop. Previous to this, the plan has been to sow the sweet clover alone on summer-fallow; this proved too expensive a method to recommend to farmers. During the past two years the sweet clover has been sown with a nurse crop. In the past season different rates of seeding the nurse crop have been tried out. The results from this experiment will not be available till 1921. It was observed, however, that the sweet clover plants made a much more vigorous growth where only one bushel of oats or barley was used than where heavier seeding was practised.

The following table gives the comparative yields of cured hay from plots seeded on July 3, 1919, on summer-fallow land during the past season. Two cuttings were taken from each plot:—

SWEET CLOVER, 1920

How sown	Yield per Acre, 2-cuttings
	Lbs.
Sown alone rows 24 inches apart cultivated	7,120
" " " 30 " " "	6,559
" " " 36 " " "	6,229
" " " 12 " " not cultivated	6,000
" " " 6 " " "	4,400
" with nurse crop, rows 6 inches apart not cultivated	4,480

Note:—Where the rows were 12 inches apart the hay was finer than on any other plots. There was some winter-killing in both the plots where the rows were 6 inches apart.

ALFALFA

Alfalfa plots sown four years previous winter-killed so badly during the winter 1919-20 that they were ploughed up. A fresh set of plots was included with 1920 seeding, in addition half of one of the paddocks was sown to alfalfa and the balance to sweet clover. Good stands of both alfalfa and sweet clover were secured. It was noted that all classes of animals turned into the paddock for a short time during the late summer passed over the sweet clover and pastured on the alfalfa. As a pasture crop alfalfa has always started away quite early in the spring but in dry years there has not been sufficient moisture to provide pasture during the midsummer months.

PRODUCTION OF GRASS SEED

Two fields of western rye grass were cut for seed. Good crops of seed were secured from both fields. One yielded at the rate of about 879 pounds of seed per acre and the other at the rate of 776 pounds per acre. In order to avoid loss of grass seed through shattering, the rye grass was cut earlier than has been customary on the Station, this proved helpful as very little seed was lost and the threshed sample weighed 18 pounds to the bushel. The production of grass seed proved profitable. The surplus seed after it was fanned was sold at twelve cents per pound.

Field Roots

TURNIPS

Twenty-five plots of turnips were planted in duplicate on May 31 and harvested October 11. The rows were 2½ feet apart and the plants were thinned to 12 inches apart in the rows. The following table gives the names of the seedsmen from whom the seed was secured and the yields secured:—

TURNIPS—TEST OF VARIETIES

Variety	Seedsmen	Total Yield per Acre			
		Tons	Lbs.	Bus.	Lbs.
Greystone	McKenzie	14	540	570	40
Northwestern	"	10	460	409	10
Bangholm	"	8	1,820	356	20
Monarch	"	8	500	330	..
Kangaroo	"	7	520	290	20
Sutton's Champion	Rennie	10	460	409	10
Jumbo	"	8	1,820	356	20
Bangholm	"	8	1,820	356	20
Greystone	"	8	1,820	356	20
Kangaroo	"	8	500	330	..
Prize Purple Top	"	8	500	330	..
Greystone	Steele Briggs	13	760	555	10
Perfection	"	10	460	409	10
Good Luck	"	8	1,556	351	6
Select Purple Top	"	8	500	330	..
Kangaroo	"	7	1,180	303	30
Jumbo	"	7	256	285	6
Purple Top	McFayden	8	1,160	343	10
Champion	Charlottetown	6	600	252	..
Good Luck	Fredericton	10	460	409	10
Green Top	Kentville	12	420	488	20
Delmas	"	9	480	369	30
Canadian Gem	"	8	1,820	356	20
Monarch	Nappan	8	1,820	356	20
Good Luck	St. Anne	7	520	290	20
Average		9	349	367	40

SUGAR BEETS

Three strains of sugar beet seed were tested and were sown on June 1 and harvested October 12. Samples of each sent to the Dominion Chemist for test for sugar content.

SUGAR BEETS—TEST OF VARIETIES

Variety	Total Yield per Acre			
	Tons	Lbs.	Bus.	Lbs
British Columbia	7	1,312	306	12
Kitchener	6	1,200	264	..
Chatham	5	32	200	32
Average	6	848	256	46

In as far as this season's work is concerned the tests of field roots go to show that Canadian-grown seed is quite equal to imported seed, and in the case of mangels particularly it is superior.

MANGELS

Twenty-two plots of mangels were planted in duplicate on June 1, and harvested on October 11. The rows were 2½ feet apart and the plants were thinned to twelve inches in the rows.

MANGELS—TEST OF VARIETIES

Variety	Seedsmen	Total Yield per Acre			
		Tons	Lbs.	Tons	Lbs.
Monarch	McKenzie	12	1,740	514	40
Giant Yellow Globe	"	11	440	448	40
Giant Long Red	"	7	784	295	34
Sel. Golden Tankard	"	6	540	250	40
Alfa Half Sugar White	McFayden	11	968	459	18
Giant Red Eckendorffer	"	8	1,424	348	24
Yellow Eckendorffer	"	7	1,180	303	30
Golden Tankard	Rennie	13	1,060	541	10
Giant White Sugar	"	10	1,780	435	30
Giant Yellow Globe	"	10	1,780	435	30
Perfection Mammoth	"	7	1,840	316	40
Giant White Sugar	Steele Briggs	11	1,760	475	10
Giant Yellow Globe	"	10	1,780	435	30
Golden Flesh Tankard	"	10	1,780	435	30
Prize Mammoth	"	8	764	335	14
Yellow Leviathan	Agassiz	15	1,020	620	20
Half Sugar White	Charlottetown	16	980	659	30
Yellow Intermediate	"	9	1,568	391	18
Yellow Intermediate Sel	"	9	480	369	30
Yellow Intermediate	C. E. F	11	1,100	462	..
Danish Sludstrup	Kentville	13	4	520	4
Danish Sludstrup	Summerland	13	1,040	540	40
Average		10	1,800	436	9

CEREALS

TEST OF VARIETIES

The duplicate system of test of varieties has been used at Scott for several years. The plots are one-fortieth acre in size and the soil is a chocolate clay loam and this section of the experimental fields was summer-fallowed in 1919.

There were seven named varieties of spring wheat and eight unnamed sorts originated by the Dominion Cerealist tested out. There were nine varieties of oats, eleven varieties of barley, six varieties of field peas, two of flax, two of spring rye, and one of beans grown in the comparative test plots.

SPRING WHEAT

In the comparative tests of varieties of wheat, later maturing sorts have again given the heaviest yields. The exception to this is the Early Red Fife. This variety matured in the same time as Marquis and was second in point of yield. This is the first year that this variety has been tried out at this Station. It proved longer in the straw which is a decided advantage in dry districts but appeared to shatter easily. It proved more susceptible than other varieties to a disease attacking the head. This was pronounced by the Dominion Plant Pathologist at Saskatoon to be Basal Glume rot (*Bacterium atrofacium*). It will be noted that Kitchener and Red Fife were unusually short strawed, this was due to the peculiar weather conditions as they are usually longer in the straw than the other varieties.

WHEAT—TEST OF VARIETIES

Variety	Date of Sowing	Date of Ripening	Days	Average Length of Straw including Head	Strength of Straw on a Scale of 10 Points	Average Length of Head	Yield of Grain per Acre		Weight of Measured Bushel after Cleaning
				Inches		Inches	Bush.	Lbs.	Lbs.
Kitchener	April 30..	Aug. 24..	116	27	9	2·6	36	50	65·5
Early Red Fife (Ottawa 16)	" 30..	" 21..	113	33	9·6	2·8	35	10	65·5
Red Fife (Ottawa 17)	" 30..	" 21..	116	28·5	9·8	2·7	33	50	65·5
Marquis D.C.	" 30..	" 21..	113	31	9·8	2·6	31	20	65·0
Marquis (Ottawa 15)	" 30..	" 21..	113	31	9·8	2·6	30	20	66·0
Red Bobs	" 30..	" 18..	110	30	9·8	2·7	29	20	66·0
Pioneer (Ottawa 195)	" 30..	" 18..	110	32	9·8	2·5	26	45	65·0
Ruby (Ottawa 623)	" 30..	" 13..	105	31	9·8	2·4	25	..	66·0

The following table gives the average number of days required to mature the more popular varieties of wheat and also gives the average yields. It will be noted that in a period of eight years Marquis has outyielded Red Fife; whereas during the past three years Kitchener and Red Fife have outyielded Marquis. This may be due to dry weather conditions and to the absence of early autumn frosts.

SPRING WHEAT—AVERAGE YIELDS

Variety	Average Number of Days Maturing	Average Yield per Acre, 8 years	
		Bush.	Lbs.
Marquis	125	28	24
Red Fife	130	27	29
		3-year	Average
Kitchener	120	17	8
Red Fife	120	16	3
Marquis	116	15	38
Red Bobs	113	15	33
Ruby	105	10	58

OATS

Nine varieties of oats were sown on May 7. The seed was used at the rate of 2½ bushels per acre for all varieties excepting for the hulless oat "Liberty." This variety was sown at the rate of one bushel per acre. For a hulless oat it has given very satisfactory yields for the two seasons it has been under test at Scott. The Leader and Russian Yellow varieties are two sorts sold by western seedsmen. The former did not give very satisfactory yields but the latter has given good returns. This is the first year these have been under test here at Scott.

OATS—TEST OF VARIETIES

Variety	Date of Sowing	Date of Ripening	Days	Average length of straw including Head.	Strength of Straw on a scale of 10 Points	Average length of Head.	Yield of Grain per Acre	Weight of measured bushel after Cleaning
				Inch.		Inch.	Bus. Lbs	Lbs.
Banner (Ottawa 49)	May 7	Aug. 23	108	34	9·8	7·5	58 18	35·5
Russian Yellow	May 7	Aug. 21	106	30·2	9·8	6·5	56 26	37·5
Victory	May 7	Aug. 22	107	30·2	9·8	6·9	55 —	40
Ligowo	May 7	Aug. 21	106	30·2	9·8	7	53 18	33·5
Gold Rain	May 7	Aug. 21	106	31·5	9·8	6·2	51 16	42
Leader	May 7	Aug. 23	108	30	9·8	7·8	46 21	34·5
Daubeney (Ottawa 47)	May 7	Aug. 12	97	27	9	5	43 33	36
Tartar King	May 7	Aug. 22	107	28	9·8	7·5	39 14	30
Liberty (Ottawa 480)	May 7	Aug. 18	103	30·2	9·8	6·2	36 1	50

Six varieties of oats have been under test for a period of eight years. The average number of days in maturing and the average yields are given in the following tables. It will be noted that the Banner variety although it has given the heaviest yields in the past three years is fourth in the list and the last to mature.

OATS—AVERAGE YIELD

Variety	Average Number of Days Maturing	Yield of Grain per Acre 8 year Average	
		bush.	Lbs.
Victory	120	83	11
Gold Rain	120	78	26
Ligowo	120	75	17
Banner	122	75	6
Tartar King	121	68	13
Daubeney	113	58	13

BARLEY

Six varieties of two-rowed barley and five of six-rowed were grown in the comparative test plots. Three of the two-rowed sorts from the standpoint of yield are at the top of the list. The strain of Duckbill is a selection from this old variety and was made by the Dominion Cerealist. The Hannchen is a reselection of this variety made by the Field Husbandry Department at the University of Saskatchewan. It outyielded Duckbill in 1919 and this year has given slightly less. The Charlotte-

town No. 80 was received from the Experimental Station at Charlottetown, but in the four years it has been under test it has not proven as heavy a yielder as Duckbill. The Albert is an unusually early maturing sort and gave the heaviest yields of the six-rowed varieties; it has been under test three years but in the two previous seasons did not give satisfactory returns. Several varieties shattered badly while quite green, particularly the Manchurian; owing to its having shattered several seasons it cannot be recommended for northwestern Saskatchewan. As several varieties shattered this year while green the sudden access to large quantities of moisture furnished by the late July rains may have been responsible.

BARLEY—TEST OF VARIETIES

Variety	Date of sowing	Date of ripening	Days	Average length of straw including head	Strength of straw on a scale of 10 points	Average length of head	Yield of grain per acre	Yield of grain per acre	Weight per bushel after cleaning
				Inch.		Inch.	Lbs.	Bush. Lbs	Lbs.
1 Duckbill (Ottawa 57)	May 13	Sept. 2	112	31	9·7	2·6	1445	30 5	49
2 Hannchen	May 13	Aug. 22	101	26	9·6	2·5	1425	29 33	52
3 Charlottetown, 80	May 13	Aug. 21	100	27·5	9·6	2·8	1275	26 27	52
4 Albert (Ottawa 54)	May 12	Aug. 13	93	28	9·65	1·8	1250	26 2	44
5 Gordon A-1	May 13	Aug. 21	100	28	9·6	2·7	1220	25 26	54·5
6 O.A.C. 21	May 13	Aug. 21	100	28	9·6	2·	955	19 43	50
7 Gold	May 13	Aug. 25	104	24	9·6	2·3	885	18 21	48·5
8 Early Chsvalier (Ottawa 51)	May 13	Aug. 21	100	27	9·6	2·7	735	15 15	54
9 Stella (Ottawa 58)	May 12	Aug. 22	102	29	9·6	2·5	735	15 15	47·5
10 Manchurian	May 13	Aug. 21	100	28½	9·6	2·	585	12 9	47
11 Odessa C	May 13	Aug. 23	102	30	9·6	2·2	575	11 47	48

The following table gives the average yields and number of days required for maturing two two-rowed, and two six-rowed barleys. These have been under test for nine years. It will be noted that the two-rowed sort Duckbill has given considerably higher yields than any other variety; on the other hand, it has required on an average ten days longer season than O.A.C. No. 21. The Duckbill has one advantage over all other varieties tested out at Scott, in that it has longer straw, this makes it easier to harvest than any other sort. The kernels are large and a large percentage of the awns drop off in the field.

Variety	Average Number of days maturing	Average Yield per Acre 9 years	
		Bush.	Lbs.
Duckbill (two row)	122	40	.....
O.A.C. No. 21 (six-row)	112	31	22
Manchurian (six-row)	109	30	38
Early Chevalier (two-row)	109	29	32

PEAS

The season was unusually favourable for field peas, but unfortunately the variety plots of field peas were attacked by the sugar beet webworm. With the exception of the Prussian Blue all varieties were injured equally. The Prussion Blue were not so far advanced and, consequently, recovered more completely from the attack of the webworm than did the earlier maturing varieties that were in flower at the time the damage was done. The early White Peas were secured two years ago from the University at Saskatoon; they have given good yields. A field of this variety yielded twenty-two bushels per acre. They are a small white pea, short vined, and early maturing.

PEAS—TEST OF VARIETIES

Plot	Variety	Date of sowing	Date of ripening	Days	Average length of vine	Average length of pod	Actual Yield of grain per acre	Yield of grain per acre	Weight per measured bushel
					Inch.	Inch.	Lbs.	Bus. lbs.	
1	Prussian Blue	May 1	Sept. 25	148	31	2·5	1320	22 0	65·5
2	Early White	" 1	Aug. 22	113	24	1,4	960	16 0	63·5
3	Gold Vine	" 1	Aug. 22	113	25	1·6	780	13 0	63.5
4	Arthur (Ottawa 18)	" 1	Aug. 22	113	26	1·7	740	12 20	66
5	Chancellor	" 1	Aug. 22	113	24·5	1·5	730	12 10	63
6	Solo	" 1	Aug. 22	113	24	2·1	455	7 35	64·5

In the eight-year averages it will be noted that the Prussian Blue peas have given the heaviest yields but that they required ten days longer than Arthur to mature. In some seasons this variety is caught by frost. The Arthur is the second highest yielding variety taken over a period of years, with Golden Vine third.

PEAS—TEST OF VARIETIES—(7 years)

Variety	Average Number of days maturing	Average Yield per Acre 7 years	
		Bush.	Lbs.
Prussian Blue	142	25	6
Golden Vine	135	20	24
Arthur	132	22	47
Chancellor	130	17	59

FLAX

The crop has never done well on the Station, the soil apparently being too light. Premost and Novelty are the two varieties now under test. The following table includes the average yields for four years:—

FLAX—TEST OF VARIETIES

Variety	1920		Average Yield per Acre 4 years	
	Bush.	Lbs.	Bush.	Lbs.
Premost	13	7	8	12
Novelty	12	3	7	41

SPRING RYE

The Ottawa Select spring rye No. 12 has been under test here for eight years. In the comparative test plots it has an average yield of 1,448 pounds per acre compared with 1,310 pounds for O.A.C. No. 21 barley, 2,257 pounds for Banner oats and 1,653 pounds for Marquis wheat. During the past year there has been a marked increase in the acreage of spring rye grown in northwestern Saskatchewan.

The following table shows the comparative yields of the Ottawa Select No. 12 and the Prolific. The latter variety was secured from the Field Husbandry Department at Saskatoon and during the two years it has been under test it has out-yielded the Ottawa Selected variety.

SPRING RYE—TEST OF VARIETIES

Variety	Date of Sowing	Date of Ripening	Days	Average length of Straw including Head	Strength of Straw on a scale of 10 Points	Average length of Head	Yield of Grain per Acre	Weight per measured bushel
				Inch.		Inch.	Bush. lbs.	Lbs.
Prolific	May 13	Aug. 23	102	44·5	8	2·8	42 8	61
Ottawa Sel. (12)	May 13	Aug. 21	100	46·5	9	3·0	36 34	56·5

WINTER RYE

Four varieties of winter rye were sown in the autumn of 1919; winter-killing was again experienced. Two fields of rye sown on different parts of the Farm also winter-killed. Of the four varieties tested the North Dakota No. 959 was the only variety in which individual plants survived. Experiments to determine the most suitable date for sowing, the advisability of pasturing and the value of covering the crop with a thin layer of straw to help hold the snow have been started.

BEANS

Norwegian (Ottawa 710) beans have been grown for two years but have not produced profitable crops. Seed saved from the 1919 crop germinated but a number of the plants appeared weak. This was attributed to frost injury.

SEED GRAIN

Seed grain was grown for use on the Station and for selling in limited quantities. The foundation stock for the Marquis Ottawa 15 and Banner Ottawa 49 was secured from the Dominion Cerealist in the spring of 1919. The Duckbill Ottawa 57 was secured from the same source in the spring of 1917. The Early White Peas were secured from the Field Husbandry Department at the University of Saskatoon in the spring of 1919. The following table gives the areas devoted to each kind of crop and the yields secured:—

Variety	Area	Previous treatment given field	Total yield	Yield per acre	
	Acres	1919	Lbs.	Bush.	Lbs.
Marquis Ottawa 15 (wheat)	5·21	Breaking	6200	19	48
Banner Ottawa 49 (oats)	10·44	Summer-fallow	14,620	41	—
Duckbill Ottawa 57 (barley)	7·93	Summer-fallow	9,936	26	—
Early White Peas	3·38	Breaking	4,474	22	30

HORTICULTURE

One noticeable feature of the weather was the absence of the usual early summer frosts, consequently, the small fruits set well and the young plum trees produced a good crop. A few of the more tender flowers were slightly frosted on August 20. The first severe frost occurred on September 28.

TREE FRUITS

Up to the present no success with apple trees can be reported. In 1915 a few hybrid apples fruited but twenty-three degrees of frost in September of that year coming at a time when the wood had not ripened, completely destroyed the trees in the one orchard and weakened the trees in the more protected orchard so that most of them have died. Quite a number of cross-bred apples have been planted out since then but the seasons have been dry and growth slow. The most hardy apple at present appears to be the Osman, but none of these trees has fruited. A large number of seedlings of standard apples were planted in 1914; most of these are still in the nursery rows; should any prove outstandingly hardy they will be transplanted to the main orchard.

Native Manitoba plums have thrived notwithstanding the adverse weather conditions. Approximately 1,000 seedlings from some of the selected plums grown on the Brandon Experimental Farm were set out in the nursery and in the orchard at Scott in the spring of 1914. Many of these young trees are now several feet high; they have never been pruned and are quite bushy in appearance. A number fruited in 1919 and during the past summer a still larger number bore fruit. While the fruit on a few of the trees was quite astringent the greater number produced fruit that was pleasant to eat from the tree and made excellent preserves. No doubt part of the success with plums is due to the shelter belts provided by the Caragana hedges. These hedges are now some seven to nine feet high.

BUSH FRUITS

The bush fruit garden is protected by the Caragana hedges. Not only do these hedges afford protection from the winds during the summer but they retain a protecting blanket of snow during the winter and in addition moisture supplied by the melted snow has been most useful during the dry seasons. There are eighteen varieties of black currants, seventeen of red and three of white under test. All varieties of white and a number of the varieties of red have shown some winter injury. During the past few seasons the raspberry canes and gooseberry bushes have not been protected by covering with soil as there has been a good covering of snow from early winter until fairly late in the spring.

The following table is a list of the most productive varieties of currants under test:—

CURRANTS—TEST OF VARIETIES

Variety	Growth of Bushes	Size of Fruit	Yield per Acre 1920
			Lbs.
Black Currants—			
Eclipse	Vigorous (large)	Large	16,552
Topsy	Vigorous (large)	Large	15,354
Magnus	" "	"	12,196
Eagle	" "	"	11,525
Red Currants—			
Red Cross	Vigorous	Very large	9,111
Raby Castle	"	Medium	8,820
North Star	"	Small	5,245
Red Grape	"	Medium	4,737
White Currants—			
White Cherry	Vigorous	Large	4,936
Large White	"	Medium	2,795

Out of the four varieties of black currants listed the Eclipse, Magnus and Eagle are all seedlings from Naples. The Topsy is a cross between a black currant and a gooseberry. All these varieties were originated by the late Dr. William Saunders. The first two varieties on the list produce fruit which is comparatively sweet and of good flavour. An attempt is being made to increase several of the varieties of black currants with a view to having them placed on the market in a commercial way. The fruit of the Red Cross is unusually large, it also is a crossbred variety, its parents being the Cherry, a red sort, and the White Grape.

Gooseberries.—The Houghton and Downing varieties have been under test for several years and the former has always given fair yields every season. The latter has never produced a crop worth harvesting. A new plantation of gooseberries of eight varieties was set out in the spring of 1919. The young bushes have thrived well and there has been no loss of young plants.

Raspberries.—Of the three varieties of raspberries that have been under test for several years the Sunbeam has produced the heaviest crops. The fruit is rather small but this variety is undoubtedly one of the most satisfactory for severe climatic conditions. The King is the second highest yielding sort and the fruit is larger than that of the Sunbeam. The Herbert is the most tender variety but with careful attention in thinning out the canes early in the autumn and covering the canes during the winter, fair crops can be secured. A new plantation of raspberries including several varieties was set out in the spring.

Strawberries.—The Dakota variety of strawberries again came through the winter with little damage from winter killing. The Senator Dunlap bed was thinned out considerably by winter losses. Fair crops of the Dakota variety were obtained. One summer-bearing variety and two everbearing varieties were added to the plantation during 1920.

VEGETABLES

POTATOES

The field in which the potatoes were grown has a deep chocolate clay loam soil; it was summer-fallowed in 1919 after having been in alfalfa for several years. The field was reploughed early in the spring of 1920 to destroy the alfalfa more completely. The varieties of potatoes were planted with the plough on May 22 and harvested on September 29.

POTATOES—TEST OF VARIETIES

Variety	Maturity	Yield per Acre 1920		Average Yield per Acre 6 years	
		Bush.	Lbs.	Bush.	Lbs.
Dreers Standard	Late	218	54	243	42
Early Northern	Medium early	199	6	243	35
Wee MacGregor	Medium late	165	0	241	23
Morgan Seedling	Late	180	24	234	24
Rochester Rose	Medium early	188	6	228	35
Gold Coin	Medium late	166	3	228	28
Everett	Early	121	44	216	20
Irish Cobbler	Medium early	154	0	215	20
New Queen	Medium early	196	54	210	28
Houlton Rose	Medium early	223	18	209	25
Table Talk	Late	173	48	206	29
Rawlings Kidney	Medium late	206	48	201	45
Empire State	Late	181	30	198	38
Reeves Rose	Medium early	159	3	196	24
Early Hebron	Medium early	215	36	195	25
Vick Extra Early	Early	224	57	191	30
Dalmeney Beauty	Late	105	42	177	34
Money Maker	Medium late	173	48	175	27
Early Ohio	Very early	144	6	166	27
Hard to beat	Medium late	170	30	152	32
Bermuda Early	Medium early	99	0	152	23

While some of the later maturing varieties gave the heaviest yields it is found that they seldom ripen properly owing to the short summer season. For this reason it is advisable to grow some early maturing sorts for use early in the season and they will usually make better table potatoes for the greater part of the winter. A very early sort, Early Ohio, and another summer sort, Vick's Extra Early, were tested at weekly intervals during the summer. It was found that the Early Ohio were ready for use quite early and until the season was well advanced gave heavier yields than the Vick's Extra Early, but by harvesting time the latter had increased in size so that it gave approximately twenty-five bushels per acre more.

Cultural Experiments with Potatoes

Date of Planting.—Potatoes were planted at weekly intervals from May 1 to June 4. The rows were thirty inches apart and the sets were twelve inches apart in the rows. The tests were conducted on garden soils inside the shelter belts, consequently the potatoes in this experiment were benefited by the moisture from the melted snow and in addition there was less damage from the effects of the wind.

The following table gives the average returns for a period of six years:—

POTATOES—DATE OF PLANTING

Date of Planting	Yield per Acre 6 yr. Average			
	Early Maturing Variety		Late Maturing Variety	
	Bush.	Lbs.	Bush.	Lbs.
May 1st	308	17	343	13
May 8th	308	48	360	22
May 15th	316	33	321	24
May 22nd	308	4	324	16
May 29th	266	31	293	33
June 4th	246	27	265	13

It will be noted that the best yield was obtained by planting the late maturng sort in the second week while the early maturing sort can be planted a week later.

Kinds of Sets.—Two types of potatoes were used in this experiment, one variety had most of the eyes at the end of the tubers, in the other variety the eyes were more uniformly distributed. The following table gives the average of the yields from the two varieties for a six-year period.

POTATOES—KIND OF SETS

Kind of Sets	Total Yield per acre Average 6 years			
	Eyes Uniformly Distributed		Eyes mostly one end of tuber	
	Bush.	Lbs.	Bush.	Lbs.
Whole medium sized potatoes	212	23	206	20
Cut with three eyes in each set	200	25	233	23
Cut with two eyes in each set	192	29	205	30
Cut with one eye in each set	174	21	176	35

The whole potatoes used as seed would measure approximately 2½ inches in length and 1¾ inches wide. While larger sized sets add to the cost of the seed, nevertheless, the large sets are beneficial particularly in districts where the late spring weather conditions may be adverse to continued growth. The large sets will provide food for the young plants during unfavourable weather.

Distances Apart.—In this experiment both 30 and 36 inches between the rows were tested out. The results have never been conclusive as returns vary in the different years. The average returns for the six-year period shows that where the rows were 30 inches apart there is an average increase of 2 bushels and 53 pounds more than where the rows were 36 inches apart. Twelve-inch spacing in the rows has during the same period given an increased yield of 2 bushels and 8 pounds.

Hilling vs. Level Cultivation.—A comparison of the average returns for a five-year period from hilling up potatoes with the plough at the time when they were commencing to flower shows an increased yield of 14 bushels and 45 pounds over where the crop was not hilled up. There is another advantage in hilling and that is, there are fewer sunburnt potatoes and the crop is not so easily damaged by early autumn frosts.

Cost of Production.—The experiment to determine the cost of production of potatoes has been continued. The prices charged and the values allowed are higher than usual but correspond to the rates for this district for the past season.

ESTIMATED COST OF GROWING ONE ACRE OF POTATOES

Rent for 1 acre land, one year	$ 3.00
24 bushels seed at $2	48.00
43 hours manual labour at 38c., planting	16.34
10 hours manual labour and 2 horses (horse labour at 20c per hour) planting	7.80
1 hour manual labour and 2 horses packing	.78
Cultivating 3 times, 1 man and 1 horse, 6 hours	3.48
Hilling up, 1 man and 1 horse, 2 hours	1.16
Weeding, 1 man, 4 1-2 hours	1.71
Horse labour digging and storing, 48 hours at 20c.	9.60
Manual labour digging and storing, 71 hours at 43c.	30.53
Total cost	$ 122.40

RETURNS PER ACRE—POTATOES

120 bushels Gold Coin at 75c 116 bushels Everett at 75c Total	$ 177.00
Less cost of production	122.40
Profit per acre	$ 54.60

Cost of Production—Potatoes, six-year Average.—One-half acre plots each of Gold Coin and Everett varieties have been planted each season for six years. The former is a late maturing sort, the latter maturing earlier in the season. The following table gives the average cost and return values per acre for a six-year period:—

POTATOES—COST OF PRODUCTION

Cost of Production	Yield from Acre Gold Coin	Yield per Acre Everitt	Sale price per Bush.	Value of crop one Acre	Profit per Acre
$82·40	182	172	78cts.	$127·10	$44·43

OTHER VARIETIES OF VEGETABLES

Asparagus.—The asparagus bed was set out in 1916 and each season since then some crop has been harvested. During the past year the first cutting was made on May 26 and the last on June 15. From a small bed about thirty feet square sufficient stalks were secured to supply three families.

Beans.—Fourteen varieties of beans were planted on June 4. The first green beans from eleven of the varieties were harvested on August 4. The heaviest yields

were obtained from Pencil Pod Black Wax, Masterpiece O8957, Davis White Wax, and Wardwell's Kidney Wax. The following varieties were only fit for use on September 2 which is too late for this district: Hodsons Long Pod, Refugee, and Kentucky Wonder. Beans planted later than June 4 did not give satisfactory crops. Seed was saved from nine varieties.

Beets.—Seven varieties of beets were sown on May 27. Yields secured ran from at the rate of 1,161 to 1,741 bushels per acre. The Detroit Dark Red O-8886, a selection made by the Horticultural Division at the Central Experimental Farm, yielded at the rate of 1,323 bushels per acre; the beets were of excellent quality. Crosby's Egyptian gave a lower yield of good quality beets. The flesh of several other varieties was pale in colour and a number were woody. Thinning the beets to three inches apart produced better table beets than where the spacing was closer or wider.

Vegetable garden, Scott.

Brussels Sprouts.—With the exception of one or two wet seasons this vegetable has not produced satisfactory crops on this Station. Of the three varieties tested this year, the Paris Market appeared the most promising.

Cabbage.—Usually good crops of cabbage have been grown each year but this year only moderate success can be reported. Good healthy plants were grown but the ravages of the insects stunted the growth. Of the early maturing sorts Early Paris Market gave the best returns. The heads of the early Jersey Wakefield were more compact but the yield was lower. Of the late sorts Marble Head Mammoth, closely followed by Enkhuizen Glory, gave the best yield, the former produced the more uniform heads. Copenhagen Market, a variety that has usually given good crops was fifth in the list from the standpoint of yield

Cauliflower.—Early Snowball and Extra Early Dwarf Erfurt were tested, the former gave the heaviest yields and in addition more compact heads.

Carrots.—Five varieties of carrots were sown on May 4. A selection of Danvers made at Kentville, Nova Scotia, gave a yield of 836 bushels per acre. Commercial seed of the Improved Danvers was second highest with a yield of 679 bushels. Chantenay, which is usually one of the best varieties, did not do so well this year.

Celery.—Owing to the comparatively light precipitation heavy crops of celery have never been produced at Scott. Seven varieties were sown during the past year. Of these Evans Triumph gave the heaviest crop. While most of the other varieties showed a tendency to go to seed, this variety continued to grow strong and vigorous. In the test to determine the best method to employ in blanching, hilling up with earth was compared with wrapping the stalks with paper and with putting boards along the side of the rows of plants. It was found that the best blanched celery was secured from the plants hilled up with earth. There appeared to be very little difference between wrapping the plants with paper and protecting with boards. Hilling up with earth has another advantage in that it protects the plants in some measure from the autumn frosts.

Corn.—The work with garden corn has consisted mainly with testing out early maturing varieties. Twenty-one varieties were planted on May 29; of these ten reached the roasting stage and from three varieties ripened ears were harvested. The Pickaninny and No. 74, two dwarf varieties, produced the largest number of ears. Early Malcolm, Assiniboine, and Sweet Kloochman were among the best producers. It was noted that plants from home-grown seed made more vigorous growth and produced more ears than the same varieties from commercial seed.

Cucumbers.—Cucumbers have not proven satisfactory here. The seed has to be sown late so that the young plants will escape the June frosts. The wind does considerable damage to the young plants by whirling them around, and, in the absence of bees hand pollination has to be carried on. In addition the early autumn frosts destroy the vines comparatively early in the season. During the past season the vines were badly injured by frost on August 20. Of the six varieties under test the Early Russian appeared to be one of the earliest and best producing sorts.

Lettuce.—The season was favourable for lettuce, seven varieties were grown in the test rows. Of these Iceberg continued fresh and crisp for a long season. Hanson's Improved and Salamander are two other useful sorts. Selections of the Grand Rapids and the Earliest Wayahead went to seed early and produced only light crops.

Onions.—The experiments with onions at Scott have consisted in testing varieties for early maturity and yield, comparing seed onions with those produced from sets, growing onions for sets, and determining the best distances apart to thin out the plants. The Extra Early Flat Red has usually given the most mature bulbs of the seed onions tested. Prizetaker gave the heaviest yields but about 20 per cent of the onions had thick necks. Mammoth Silver King had about 80 per cent thick necks. In testing distances apart to thin the onions one-inch spacing gave the heaviest yields with two-inch spacing second and three-inch spacing third.

Owing to the onions grown for sets not properly maturing before being pulled, a number of the sets did not keep well during the winter; this occurred although precautions were taken to dry the sets before they were stored away. Onions grown from sets have usually ripened early but the crops have been rather light.

Peas.—Only fair crops of peas were secured as the hot, dry weather during July came at an unfortunate time for green peas. Fifteen varieties were sown on May 15.

The English Wonder O 9384, a strain selected from this variety by the Horticultural Division at the Central Experimental Farm, proved to be one of the earliest varieties and in addition gave good yields. Gregory's Surprise is another early sort that produced fair crops. The Laxton and Pioneer gave heaviest yields of green peas; the former is the better variety for table use. Experiments conducted during the past few years prove that in order to secure a continuous supply of green peas it is advisable to sow three or four varieties that mature at different seasons, early in the spring. This plan has been compared with sowing one variety at intervals, but the latter plan has not proven satisfactory nor have good crops been secured.

Parsnips.—Only one variety of parsnips was grown; this was the Hollow Crown. A test was made to determine the best distances apart to thin the young plants. Two inches apart gave the heaviest crop, three inches second and four inches third. The average yield from these three spacings amounted to 512 bushels per acre.

Parsley.—Four varieties of parsley were sown on May 5. The Triple Curled and Extra Curled gave the best yields.

Peppers.—The peppers were started in the hotbed on April 26 and transplanted to the garden on June 25. The two varieties grown were Harris Early and Neapolitan. Both varieties produced an abundance of peppers although the greater part of the fruit had to be taken inside to ripen. The Harris Early appeared to be the earliest of the two sorts.

Radish.—Five strains of Scarlet Turnip White Tipped radish were sown in a test. All these strains produced good crops of good radish and no difference could be noted in any of the strains.

Salsify.—Mammoth Sandwich Island and two strains of Long White salsify were tested. The seed of the first-named variety was secured from the Central Experimental Farm and gave approximately one-third more crop than either of the other two plots and the roots were comparatively free from side shoots.

Spinach.—The Victoria variety of spinach was sown, it grew rapidly during the early summer months. Later in the season it was used as a trap crop with which to poison the sugar beet webworm.

Swiss Chard.—The variety of this vegetable grown was Giant Lucullus. The plants were taller growing than the spinach and the leaves made good greens. This crop was also used as a trap crop after the first leaves were taken for greens.

Turnips.—Four varieties of turnips were grown, good yields were obtained from all four but it has been found that almost invariably summer turnips prove too strong flavoured. For winter use the swedes are much to be preferred.

Tomatoes.—Excellent crops of tomatoes were harvested from most of the ten varieties grown in the tests. The selection of Danish Export made by the Horticultural Division at Ottawa gave the heaviest yields of fruit. Earlibell was second highest, but the former produced the most uniform fruit.

Alacrity "A" and Bonny Best were used in the cultural experiments. The Alacrity gave much the heavier crop.

In comparing pruned and unpruned plants it was found that unpruned plants produced the heaviest yields but more ripe fruit was harvested on plants pruned to a single stem. Where two stems were left on each plant the fruit was not as uniform in size. A comparison was made between tying plants to stakes and tying to cross wires. The wires were held in place by stakes at the end of the rows. Plants were easier to tie up when the stakes were used since they could be tied at several places; this prevented blowing about in the wind. Where the plants were fastened to the wires they were sometimes cut and seriously damaged by rubbing against the wire. The stakes used were two laths nailed together and driven into the ground, this left three feet of the stakes above ground to which the plants were fastened by tying with raffia.

In addition the following vegetables were grown but did not produce a satisfactory crop: citron, pumpkin, squash and watermelon. Part of the failure of these crops may be attributed to the soil not being suitable. The area that has usually been devoted to the garden was summer-fallowed during the past year and some difficulty was found in securing suitable land for all the vegetable crops.

Ornamental Gardening

The test of trees and shrubs is one of the most useful lines of work conducted on the Station. Too much emphasis cannot be laid on the importance of encouraging the growing of the hardiest kinds and varieties

DECIDUOUS TREES

Acer—Maple.—Four varieties of maple are under trial, of these Acer Negundo, the Manitoba Maple or Box Elder, is the hardiest. There has only been one season when this variety suffered severely from frost injury. The Tartarian and Ginnalian maples did not thrive well for several years but are now becoming established and making more growth.

Fraxinus—Ash.—The only variety of ash grown is the Green ash, it is slow growing and the leaves come out late in the spring and drop off early in the autumn. In addition it has been found that the early summer frosts frequently blacken the leaves.

Populus—Poplar.—Six varieties of poplars are grown in the arboretum. The Populus Petrowskyana has proven to be the hardiest and most rapid growing tree under test on the Station. This variety can well be recommended for prairie conditions. The *populus berolinensis* has proven slightly less hardy and does not grow quite as rapidly. The Alberta Cottonwood and Norway Poplar were both badly winter-killed during the winter of 1915-16. The latter was completely winter-killed since that time, the cottonwood has been injured by frost in some seasons but still survives.

Salix-Willow.—Eighteen varieties of willow are under trial. Most of the varieties have suffered from winter-killing. *Salix vitellina,* a yellow barked willow, has suffered the least of any. The *Salix pentandra,* the Laurel-Leafed willow, has made good growth and with its dark coloured leaves makes a handsome hedge during the first years after it is planted out.

ORNAMENTAL SHRUBS

Amelanchier—Saskatoon Berry.—Native Saskatoon bushes transplanted from the woods have thrived well and produced flowers and fruit.

Artemesia—Southernwood.—The *Artemesia Abrotanum,* or Old Man, usually winter-kills badly but makes a luxuriant growth during the summer.

Clematis—Virgin's Bower.—A number of plants of the native clematis were secured from Alberta. These were planted around the balcony of the superintendent's house and have thrived well. Although the vines winter-kill to some extent they make a strong growth each summer and are proving to be useful and ornamental climbers. The flowers are quite attractive against the dark green foliage. A quantity of the clematis seed was saved during the past season.

Cornus—Dogwood.—Two varieties are grown, the Varegated Siberian and the Native Red Osier. The latter is the hardiest and more vigorous growing, although its leaves are not so ornamental or the bark quite so bright in colour as that of the Siberian variety.

Cotoneaster.—Four varieties have been tried out, of these *Cotoneaster tomentosa* has made the most growth. These shrubs are now approximately five feet high, the leaves are a dark green colour and the black berries during the latter part of the summer show up well against this background.

Elaeagnus—Olive.—Both the Russian Olive and Wolf Willow are growing, the former is six feet high and with its silvery leaves adds a variety of colour. The Wolf Willow has only recently been introduced from the woods.

Lonicera—Honeysuckle.—The honeysuckle is one of the hardiest and most promising of all the flowering shrubs. Eight varieties are grown in the arboretum and one variety, Lonicera Morrowi, winter-killed a few years ago. The Albertii is a low growing bush; when in full leaf the bushes have a mound-like appearance. The Tartarian honeysuckle is probably the most satisfactory, it is very hardy, and it can be secured with either the white or reddish coloured flowers.

Prunus—Cherry.—This class includes *Prunus Mackii and Prunus Grayana,* the latter flowered and fruited during the past season.

Pyrus—Mountain Ash.—Both the European and American varieties of Mountain Ash are under test. The former has been grown for a number of years; the latter was introduced more recently. Both have flowered and produced fruit.

Ribes—Currant, Gooseberry.—The Missouri currant is one of the most promising of this family. It is hardy, thrives well, and in addition to the yellow fragrant flowers in the spring there is usually a good crop of large currants late in the summer. Native red and black currants, and gooseberries have been added to the collection.

Rosa—Rose.—During the past season a collection of roses was secured from one of the nursery houses. A number of the bushes bloomed late in the summer. *Rosa rubifolia,* a variety with purple coloured canes and leaves, has also thrived well. The foliage ir ornamental, but the flowers are small and not especially attractive. *Rosa rugosa* or Japanese rose has made a good growth and usually blooms freely.

Shepherdia.—The *Shepherdia argentea,* Buffalo Berry, makes quite a handsome addition to the arboretum. It has grown well and proven quite hardy.

Spiræa.—The *Spiræa arguta* is one of the earliest of the flowering shrubs. These bushes are now approximately two feet high. While the ends of the branches winter-kill, the bushes are usually a mass of white when in full bloom about the last of May. *Spiræa Oblongifolia* is another early flowering Spiræa, the bushes are from four to five feet high and suffer very little winter injury. They bloom freely usually about June 1. This variety is well worthy of multiplying for the nursery trade. The *Spir a Van Houttei* has never proven sufficiently hardy; each winter a considerable part of the previous season's growth has winter-killed. The *Spiræa Sorbifolia* winter-kills badly but as its growth is rapid and the flowers are produced on the new wood it makes a useful addition to the collection of ornamental shrubs. Six other varieties were grown but none of them are as promising as the *arguta* or *oblongifolia.*

Syringa—Lilac.—Lilacs have winter-killed very badly some seasons while in other years they have escaped with little injury. There are sixteen varieties of *Syringa Vulgaris* in the arboretum. The common lilac, *Mad Alba Grandiyora,* a white lilac, has proven hardy and flowers freely. The Congo, a double purple sort, has also bloomed freely. In addition to the common lilac, four other sorts, the Josikala, Villosa, Chinensis, and Amurensis were tested. All of these are later flowering than the common sort and the flowers have less perfume, but usually escape the spring frosts. Both the Josikala and Villosa varietiese can be safely grown. The Chinenses is a low-growing bush, and in favourable seasons one bush will carry from twenty to forty clusters of flowers.

Conifera.—The growing of conferous trees is usually looked upon as an uncertain venture. The experiments at the Station indicate that if the roots of trees are properly looked after in transplanting no losses are sustained, providing the work is done at the proper season. Because of the fact that evergreens only require about 10 per cent of the moisture required by deciduous trees they should prove fairly

satisfactory for dry farming conditions. In addition to the trees planted in the arboretum a large number of evergreens have been planted on the lawns. No protection has been given, and no water has been supplied other than that which came in the form of precipitation.

The following table gives the names and heights of several of the varieties of evergreens grown at Scott:

Variety Name	Height	
	Feet	Inches
Lodge Pole pine—Pinus Contorta Murrayana	7	7
Scotch pine—Pinus Sylvestris	6	6
White spruce—Picea Alba	5	9
Jack pine—Pinus Banksiana	5	8
Blue spruce—Picea pungens	4	9
Balsam fir—Abies balsamea	4	4

Hedges.—Twenty-one specimen hedges were planted a number of years ago. Of these the Caragana Arborescens has proven to be one of the most compact and hardy. The Caragana has been extensively used for hedge purposes on the Station for protecting the fruit trees, and the vegetable garden. The White Spruce hedge has proven the most ornamental, and while it does not grow very rapidly it maks a wind break superior to that afforded by any other kinds. No difficulty has been experienced from loss of individual trees in this hedge.

Flowers

Each year extensive tests are made with the annual and perennial flowers. The latter require less work providing the flower beds are kept free from weeds and grass. The following table gives the height of the plants and the flowering season for a number of the annuals:—

FLOWERS—ANNUALS

Kind	Variety	Height of Plants	Flowering Season
Flowers Started in the Hotbed		Inches	
Acroclinium	Everlasting Rose	14	June 20—Aug. 20
Aster	Ostrich Plume	17-29	Aug. 12—Oct. 3
Antirrhinum	Deep Crimson, Rosy Queen.	16-21	July 9—Sept. 28
Chrysanthemum	Mixed Double and Single	24	June 19—Oct. 3
Cosmea	Early Flowering Mixed	36	" 19— " 3
Dimorphotheca	Aurantiaca Hybrids	16	" 28— " 3
Godetia	Mixed	18	July 22—Sept. 19
Gypsophila	Elegans	..	June 20—July 29
			Sept. 14—Oct. 3
Helichrysum	Large-fld. Mixed	44	July 6— " 9
Lavatera	Loveliness	25	" 20—Sept. 18
Lobellia	Ramosa	14	" 12— " 19
Malope	Rose	32	" 17— " 28
Marigold	French	38	" 6— " 27
Nemesia	Mixed	16	June 17—Oct. 3
Nicotiana	Hybrid Mixed	..	" 18—Sept. 28
Petunia	Single Fringed	18	" 25—Oct. 3
Phlox Drummondi	Deep Crimson	15	July 9—Sept. 19
Salpiglosis	Mixed	42	" 17— " 29
Schizanthus	Rose and Amber	22	" 2— " 19
Stocks (ten weeks)	Crimson, purple white	21	" 7—Oct. 9
Tagetes	Golden Gem	11	June 17—Sept. 27
Verbena	Mixed	20	" 17— " 27

PERENNIAL FLOWERS

The following is a list of the perennial flowers that have proven hardy, and have bloomed freely:—

HARDY PERENNIAL FLOWERS

Kind	Variety	Height	Season of Bloom
		Inches	
Achillea	The Pearl	18	July 6—Oct. ..
Aquilegia (Columbine)	Seedlings	30	June 28—Sept. 10
Delphinium (Larkspur)	"	70	July 14— " 28
Gypsophila (Paniculata)	Chalk Plant	40	" 22— " 19
Lychnis Chaledonia	Jerusalem Cross	24	June 21—Aug. 18
Pæonias	Mme de Verneville	33	July 6—July 22
	Festiva Maxima	38	" 9— " 18
	Livingston	29	" 16— " 29
Papaver nudicaulis	Iceland Poppy	24	May 27—Sept. 27
Papaver Orientale	Oriental Poppy	30	July 2—July 20
Polemonium	Jacobs Ladder	35	June 12— " 20

POULTRY

The winter of 1919-20 will long be remembered as the most lengthy and most severe ever experienced in this district. Snow fell early in October and winter weather continued until mid-April. As a result the pullets were late in commencing to lay and the egg production during the winter was unusually low. Notwithstanding the adverse winter, several pullets had a record of over 200 eggs in the one year. With the exception of the eggs from one pen of White Wyandottes, good fertility was secured. The late, cold spring made brooding hazardous in the cotton-front poultry houses. Precautions, such as replacing part of the cotton with glass, putting on storm doors and banking up the houses at the ground line, helped to maintain a more uniform temperature inside. During the summer months the young chicks made exceptionally rapid growth and the greater part of the surplus stock were disposed of in the late summer at profit-bearing prices. The average price received for eggs sold for eating amounted to fifty cents per dozen. This left a good margin even with the high prices paid for feed.

STOCK

Breeding and laying stock on hand on October 31 the end of the poultry year consisted of the following:—

Barred Plymouth Rock hens	55
Barrel Plymouth pullets	117
White Wyandotte hens	14
White Wyandotte pullets	25
Buff Orpington pullets	36
Cockerels	35
Total	262

EXPERIMENTS

The following is a list of the experimental work with poultry underway on the Station. The profits from the flock have been determined. A comparison was made between two types of incubators—hot air and hot water. Three breeds were compared for egg production, all birds were trap-nested and the egg records compared. Early and late hatched pullets were compared, and hens were compared with pullets for fertility of the eggs and number of eggs laid. Pedigree records were started during the year and crate fattening experiments have been continued.

INCUBATORS AND BROODERS

Four incubators with a total capacity of 900 eggs were used. In addition later in the season when the weather became warmer chicks were hatched out under hens. For brooding, two of the portable colony houses, each 10 by 12 feet, were used. Coal-burning stoves supplied the heat and sheet-iron hovers were suspended over the stoves. This system of brooding is fairly satisfactory providing the greater part of the cotton on the front of the houses is replaced by glass. The building must be tightly constructed and early in the season storm doors are necessary and the houses have to be banked up to keep the floors warm. Here on the prairie where strong winds frequently prevail during the spring months some difficulty is experienced in regulating the draught in the stoves. The incubators are used in the cement basement and usually good hatches are secured.

The folowing table gives the hatching records from the several incubators:—

—	Eggs Set	Per cent Eggs Fertile	Per cent Fertile Eggs Hatched	Per cent chicks Hatched alive July 1	Total eggs for 1 chick, July 1
Buckeye	735	90	50·9	25	8
Prairie State	688	85	42	61	4
Tamlin (100—egg)	364	82	52	55	4
Tamlin (100—egg)	561	93	46	47	5

It has been found that taking an average for two years the hot air incubators have required 2.5 eggs for each chick hatched and the hot water incubators 2.2 eggs.

COMPARISON OF BREEDS

In the comparison of three breeds of poultry, pullets were used and records kept of the production during the year. The White Wyandottes were a little later in maturing than the other two breeds, which may account for their being below the Barred Rocks in egg production. The strain of Buff Orpingtons was secured from a nearby farmer. During the past few years this strain has proven quite popular in this district.

The following is the average egg production for the pullets:—

Barred Rock pullets	13.9	eggs per bird per	month
White Wyandotte pullets	11.8	"	"
Buff Orpington pullets	7.8	"	"

It has been decided that unless the Buff Orpington pullets in 1921 make a better showing than they have in the past few years they will be disposed of and this breed dropped from the poultry work at this Station.

TRAP-NESTING

While trap-nesting is expensive it appears to be about the only certain method of determining the heavy laying females in the flock. High egg production can only be secured by breeding the highest egg-producing strains. The highest egg production from the Barred Rocks during the year was 204 eggs, the lowest was 98; this is a wide spread.

EARLY AND LATE HATCHED PULLETS

The records for the year show that pullets hatched out in March and April laid on an average 172 eggs, while the May hatched pullets only laid an average of 154 eggs in the first year. It is much more expensive to secure March and April hatched birds than those hatched in May. The three-year average shows that for every March and

April pullet there were required 11.5 eggs, and the average for the same period showed that 6.1 eggs were required for every May hatched pullet.

The following table gives the hatching results by the month for the spring of 1920:—

—	Eggs Set	Per cent Eggs Fertile	Per cent Fertile Eggs Hatched	Per cent Chicks Hatched Alive July 1	Total Eggs for one Chick, July 1
March	744	79	41	28	10·6
April	862	90	41	56	4·7
May	742	93·9	60	43	4

HENS VS. PULLETS

Hens were compared with pullets for egg production and fertility of the eggs. A considerable number of the hens were disposed of during September, consequently the egg-production records can only be compared for ten months. During this period the hens laid an average of 8.9 eggs per month while the pullets record for this period averaged 10.3. These figures are for all breeds. The following table gives the records from the comparative hatches of hens' and pullets' eggs:—

—	Eggs Set	Per cent Eggs Fertile	Per cent Fertile Eggs Hatched	Per cent Chicks Hatched Alive July 1	Total Eggs for one Chick, July 1
Hens	911	99	56·3	42	4·1
Pullets	586	93	39	45	6

PEDIGREE RECORDS

The work of establishing pedigree stock was only commenced in the spring of 1920. Pedigree cockerels were secured from the Brandon Experimental Farm and mated with some of the best laying hens and pullets. The eggs from each hen or pullet were kept separate in the incubator and the young chicks were marked before they were put in the brooder house. This work will be conducted for at least one more year before pedigree stock will be sold.

CRATE FATTENING

Crate fattening experiments have been conducted at the Station for three years. Several rations of grain have been used. The one most commonly fed is a ration of one-half oats and one-half barley meal. In one season the work was carried on during the warm weather and in that year good returns were secured from the fattening experiments. During the last two years the weather has been much colder and as a result the fattening tests have been conducted at a loss. Birds on fair range make better gains than those in the fattening crates. Further experimental work along this line will be necessary before any definite conclusions can be drawn.

Below is submitted a balance sheet for the poultry for the year closing October 31, 1920:—

—	Nov. 1, 1919 Value	Oct. 31, 1920 Value	Returns Including Sales	Total Cost of Feed	Return Values in Excess of Feed Cost
Poultry	$384 50	$553 60	$990 04	$551 22	$607 92

EXHIBITION AND EXTENSION WORK

SCOTT STATION 1920-21

Each season for several years an exhibit has been sent out from the Scott Station to the summer fairs. Since the season for fairs is comparatively short, three years are required to cover the territory this Station is expected to serve. The exhibit of grains, grasses, models of buildings, models of farm equipment, etc., was staged this year at the following summer fairs: Saskatoon, Lloydminster, North Battleford, Turtleford, Wilkie, Unity, Biggar and Naseby. The assistant superintendent accompanied by other members of the staff attended these fairs in order to set up the exhibit and answer questions connected with the display and with the work on the Station generally. Fine weather was experienced at nearly all the fairs and for the most part the attendance was good and considerable interest was taken in the agricultural display and in the exhibit from the Station.

At Saskatoon material from Scott was used to supplement the travelling exhibit sent out to all the larger exhibitions from the Central Experimental Farm. While only a percentage of those attending the large fairs are particularly interested in agricultural matters, correspondence received after each summer fair indicates that this is a good means of making known the work on the Station. The Lloydminster Fair followed the Saskatoon Exhibition and was held July 19 to 21. The exhibition grounds are on the borders of Saskatchewan and Alberta and a large territory is served by this fair. Good exhibition buildings were helpful in permitting a good display of the exhibit. At Battleford wet weather decreased the attendance much below what it otherwise would have been. Turtleford was the next fair on the circuit. This was their first fair and the attendance was good but owing to many special attractions of a sporting nature there was not the same interest taken in the agricultural section as at the other places. Fine weather and good crowds were experienced at Wilkie. The exhibition buildings at this point are well located on the grounds, consequently most of the people at the fair visited the exhibit several times during the day. At Unity the exhibit was staged in the skating rink. This building is rather dark but the management arranged for electric lights. This improved the appearance of the exhibit and made it more attractive. This was a real two days' fair. The attendance was large and much interest was taken in all of the work underway at the Station. Biggar held their first summer fair, with very creditable results. The exhibit from the Station proved one of the special attractions at this fair. Naseby, the last point on the circuit, is a strictly country fair. While the attendance was smaller than at other fairs the interest taken in the exhibits generally and in the exhibit from the Station was particularly encouraging.