DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION
SCOTT, SASK.

REPORT OF THE SUPERINTENDENT

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

FOR THE YEAR 1923

Sunflowers. Yield 11½ tons per acre after being frozen.

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SEASONAL NOTES, 1923

The season of 1923 will go on record as being remarkably favourable for the production of cereal crops. The snow disappeared during the second week in April and wheat seeding was general by April 23. The precipitation was light during seeding, but early in June wet weather set in and during the months of June and July rain fell on 28 days with a total precipitation for the two months of 9·92 inches. During a period of 58 days the average rate of growth of wheat was one-half inch per day. Beginning with August 20 there was only one shower until after September 19. Diseases such as wheat stem rust, root rot, etc., that gave promise of spreading rapidly, were checked by the dry weather, and no serious loss was sustained, the wheat marketed from the Station grading No. 1 Northern. The latest spring frost occurred on May 10, and the first autumn frost on September 11. Ten degrees of frost on September 12 damaged standing crops of sunflowers, corn and late crops of wheat and oats. The first snowfall was recorded on December 11.

METEOROLOGICAL RECORDS FOR SCOTT, 1923

Month	Temperature			Precipitation				Total Sunshine
	Highest	Lowest	Mean	Rainfall	Snowfall	Total	Heaviest in 24 Hours	
	F	F	F	Inches	Inches	Inches	Inches	Hours
January	37·0	−27·0	4·36	.....	3·5	0·35	0·25	97·6
February	38·8	−40·0	7·25	0·32	2·0	0·52	0·30	157·4
March	37·5	−22·0	12·12	0·07	5·0	0·57	0·50	133·2
April	79·8	−06·0	35·69	0·03	3·0	0·33	0·28	244·6
May	85·0	19·3	50·19	0·94	.....	0·94	0·28	308·6
June	85·0	39·0	59·8	5·67	.....	5·67	1·01	238·0
July	84·8	No. re.	.....	4·25	.....	4·25	1·38	313·1
August	84·2	22·1	58·08	1·45	.....	1·45	0·51	292·5
September	85·6	7·6	51·18	0·65	.....	0·65	0·61	216·1
October	74·3	4·0	41·77	0·32	.....	0·32	0·21	220·4
November	59·4	0·9	28·39	0·06	.....	0·06	0·06	134·2
December	48·4	34·1	15·36	.....	3·0	0·30	0·2	105·8
Total for year	.....	.....	.....	13·76	11·5	15·41	.....	2,461·5

ANIMAL HUSBANDRY

CATTLE

The work with pure-bred cattle has consisted of developing the Shorthorn herd with a view to continuing the beef type with profitable milk production. The cost of raising young pure-bred stock has received attention.

In determining the cost of raising the pure-bred cattle it was found that a calf consumed on an average 3,152 pounds of whole milk. The meal and hay were found to cost $13.36 for the first year. During the second year the feed consumed, including six months' pasture at $1.80 per month, cost $31.08. In feeding these young animals, maximum development was the main object sought, even though at a comparatively high cost.

WINTER STEER FEEDING

Twenty head of steers, 10 yearlings and 10 two-year-olds, were purchased for the feeding experiments for the winter of 1922-23. The tests were planned to have a comparison of yearlings vs. two-year-olds and to determine in some measure the value of silage in fattening steers. The steers were fed in groups of five. The meal ration consisted of oats, shorts and barley. The roughage consisted of straw and silage. The steers were put into the feed lot in November and sold the last of May.

YEARLINGS VS. TWO-YEAR OLDS

		Yearlings	Two-Year olds
Average cost per head in autumn	$	21·27	37·88
Average selling price per steer	$	71·21	90·98
Average cost of feed per steer	$	30·65	37·20
Average profit per steer	$	19·29	15·90
Grain required 100 lbs. of grain	lbs.	760	956

This is the second year that the yearlings have been compared with the two-year-olds and in each instance have proved more profitable feeders than the older steers.

SILAGE VS. NO SILAGE FOR FATTENING YEARLING STEERS

Both lots received the same grain ration and all the straw they would consume. One lot received all the sunflower silage it would consume, the other received no succulent feed.

		Silage	No Silage
Average increase in value per steer between fall and spring	$	49·94	43·10
Average cost of feed per steer valuing silage at $5.00 per ton	$	30·65	21·45
Actual value of silage per ton for feeding steers	$	3·77	.....
Grain required for 100 lbs. of gain	lbs.	760	1,050

The silage-fed steers in both years this experiment has been tried were more uniformly finished than the ones receiving straw and grain only. In the latter group some of the steers were quite fat while a number of others were not so well finished.

QUANTITY OF SILAGE FOR FATTENING STEERS

In this experiment a light ration of silage was compared with feeding all the silage the animals would consume, the object being to determine whether the silage only furnished a succulent feed that acted as a conditioner or whether it actually provided valuable nutrients that would economically replace the straw. The silage had been made from immature sunflowers and one lot received 30 pounds per animal per day and the other 20 pounds.

		Heavy ration silage	Light ration silage
Average cost of feeding steers valuing silage at $5.00 per ton	$	37·20	32·23
Average increase value between fall and spring	$	53·10	50·26
Average profit per steer valuing silage at $5.00 per ton	$	15·90	18·30
Amount of meal required for 100 lbs. gain	lbs.	956	1,008

The steers receiving the heaviest silage ration increased $2.84 more in value than those receiving the lighter ration. Those receiving the least silage consumed the most straw, required 52 pounds more grain to make 100 pounds of gain, and showed $2.40 more profit per steer.

HORSES

The cost of feed for work animals is an important item in the upkeep of every farm. During the past few years records have been kept of the number of hours of labour for the work horses and the cost of feed. The data obtained during the year of 1923 shows that the horses averaged 1,699 hours of work during the summer months and 960 during the winter, while the average cost of feed consumed amounted to $84.81.

Four pure-bred Percheron brood mares are kept. The average cost of feed for the year for these amounted to $67.04. This is higher than the cost would be on the average farm due to shortage of pasture on the Station which necessitates more dry feed. The mares were not worked while nursing their colts so that there was an average of two months labour to their credit during the year. This valued at $1 per day amounted to $48. This amount should be deducted from the cost of feed for the mares.

The cost of feeding pure-bred colts from weaning to the time when they can be worked shows rather a high figure as compared with the cost of raising colts under ordinary farm conditions, this is partly due to the shortage of pasture and also to the policy of seeking maximum development, even at a comparatively high cost. The weanlings made a gain of 2.4 pounds per day and cost $14.30 from weaning to one year old. The yearlings gained 1.02 pounds per day and cost $50.18. The two-year olds gained 0.13 pounds per day and cost $54.62 for the year's feed. There was only the one colt in the latter test and it did not make good gains due to having made most of its growth during the first two seasons.

SWINE

Fourteen brood sows and three boars made up the breeding herd. In the feeding experiments during the summer of 1923 the oats were charged at 40 and 34 cents per bushel and barley at 57 and 36 cents per bushel. Five pigs were in each lot and the experiments for the most part covered a period of about 100 days.

TANKAGE VS. BUTTERMILK VS. GRAIN ONLY

——		Tankage	Buttermilk	Grain only
Total cost of feed per head	$	7·59	7·45	6·00
Average daily gain per pig	lbs.	1·06	1·15	0·87
Cost of feed per 100 lbs. gain	$	5·04	4·52	4·81
Grain required for 100 lbs. gain	lbs.	366	335	443

Buttermilk has given the best results in this test. The quantities used per pig were—483 pounds of buttermilk at 30 cents per hundred and to the tankage lot 55 pounds per pig at $2.85 per hundred. The daily allowance per head was 6 pounds of buttermilk for the one lot and the tankage allowance for the other lot was 1/10 the grain ration.

WHOLE GRAIN VS. CHOP

		Whole grain	Chop
Cost of feed per head	$	6·00	6·40
Average daily gain per pig	lbs.	0·78	0·87
Cost of feed per 100 lbs. gain	$	5·41	5·13
Pounds of grain required per 100 lbs. gain	lbs.	498	443

Crushed grain has a greater value for growing pigs than whole grain. The higher the price of grain the more can be paid for crushing. It has been calculated from the two years' work that when grain was worth one cent per pound the total cost of crushing including hauling, etc., could not exceed nineteen cents per hundred and be profitable. Soaking of either whole or crushed grain improves the digestibility.

SELF-FEEDER VS. TROUGH FEEDING

		Self-feeder	Trough
Total cost of feed per head	$	5·89	4·07
Average daily gain per head	lbs.	1·2	0·96
Cost of feed per 100 lbs. gain	$	5·18	4·55
Pounds of grain required per 100 lbs. gain	lbs.	397	317

The pigs fed through the self-feeder were ready for market three weeks before those fed in the trough but were short bodied shop hogs, while the trough fed lot conformed more closely to the bacon type.

Brood sows on rape pasture. These sows received no grain for several months, thus curtailing their cost of maintenance.

RAPE PASTURE VS. DRY LOT

——		Pasture	Dry lot
Total cost of feed per head	$	6·19	6·19
Average daily gain per head	lbs.	1·11	1·04
Cost of feed per 100 lbs. gain	$	4·39	4·68
Grain required per 100 lbs. gain	lbs.	360	385

The rape pasture saved 25 pounds of grain per 100 pounds gain. It has been calculated that in an average season one acre would be sufficient for 30 head of hogs and that the returns for the land used as hog pasture would amount to about $18 per acre.

OAT AND BARLEY CHOP VS. OAT AND RYE CHOP.

——		Oat and Barley Chop	Oat and Rye Chop
Cost of feed per head	$	6·00	5·76
Average daily gain per head	lbs.	0·87	0·93
Cost of feed per 100 lbs. gain	$	4·81	4·34
Grain required per 100 lbs. gain	lbs.	443	410

Rye and oat chop has given slightly the better results in this test.

Where barley does not give profitable crops, rye may be a good substitute. Rye is rather pasty when fed dry. Spring rye usually gives a higher yield than barley and there are eight pounds more per bushel in rye than in barley. This experiment compares the feeds pound for pound.

CROSS-BREEDING EXPERIMENT

——		Pure-bred Yorkshire	Berk Sire York. Dam	Duroc Sire York. Dam
Cost of feed per head	$	5·88	5·88	5·88
Average daily gain per head	lbs.	0·98	0·97	1·06
Cost of feed per 100 lbs. gain	$	4·20	4·26	3·90
Grain required per 100 lbs. gain	lbs.	378	383	351

The Duroc-Yorks made the greater gains, but due to the fact that the introduction of Duroc blood results in a thicker type, which is not popular on the Canadian market, the cross is not recommended. The pure-bred Yorkshire has proved a profitable feeder and gives a higher percentage of individuals which grade "select."

TANKAGE VS. SELECTIVE FEEDING

By the use of self-feeders during the winter of 1922-23 one lot of pigs was given access to beef scrap, tankage, lime, bone meal, fine coal and salt, all in separate compartments, another lot was given access to tankage and the third lot received grain only.

——		Grain only	Tankage	Selective Feeding
Cost of feeds per pig	$	5·58	6·31	7·50
Average daily gain per head	lbs.	0·47	0·58	0·64
Cost of feed per 100 lbs. gain	$	8·51	7·72	8·34
Grain only required per 100 lbs. gain	lbs.	705	566	513

In the selective feeding lot beef scrap was consumed in larger quantities than any other feed which brought the expense too high. The profit over cost of all feeds was highest in case of the tankage lot and the check lot getting grain only gave the smallest profit. A more economical method of feeding tankage to growing swine is to feed at about one-tenth of the grain ration by weight mixed with the grain.

WINTER HOUSING OF SWINE

A comparison has been made for several season, in housing swine in a small portable cabin banked with manure and a similar lot in the larger and more expensive piggery. The portable cabin has for the most part given more satisfactory results than the piggery. The temperature of the quarters is not so important as dryness and abundance of bedding.

A shelter which is more satisfactory than the lumber cabin is the straw shed which is more cheaply built and more easily kept dry than either of the other shelters used on this Station.

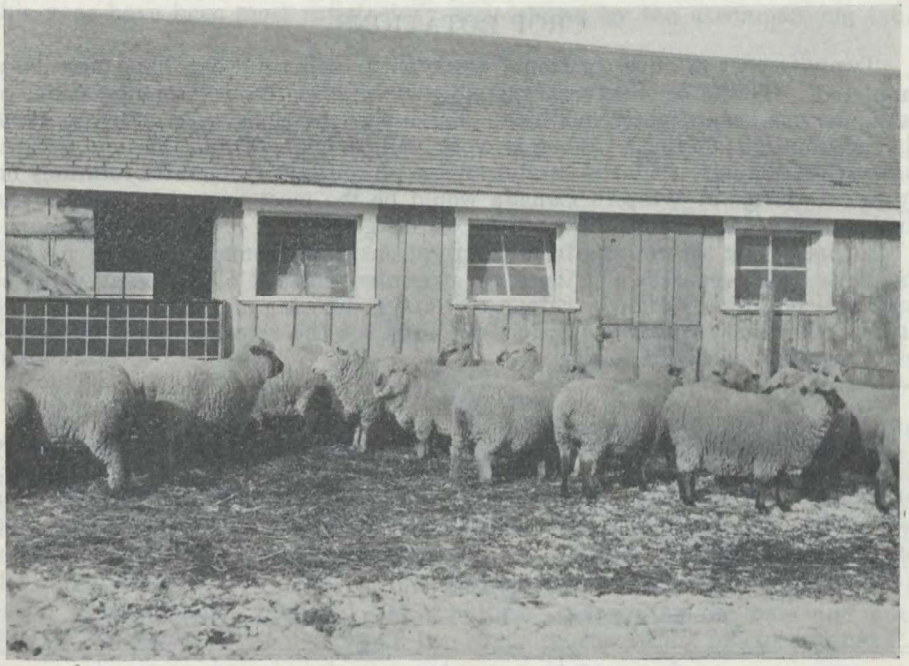
Yorkshire brood sows at Scott. In the background is seen the straw shelter, good exercising distance from the feed troughs.

SHEEP

There is an increasing interest in sheep raising in northwestern Saskatchewan. The small amount of care required for a flock of sheep together with the fact that there are two avenues of profit (wool and lambs) makes sheep an attractive side line on the average farm.

About eighty ewes and three rams make up the breeding flock at this Station. The breeds represented are the Shropshire, Cheviot and Rambouillet. The Shropshire is the most popular breed of the three. The Rambouillet excels both of the other breeds in quality of fleece. The Cheviot has rather an inferior fleece, but has a peculiar quality of being able to do well on very short pasture.

Some cross-breeding has been done using grade Shropshires ewes and pure-bred rams of the breeds previously mentioned. A record has been kept of the dressing percentage of the lambs of the different breeding. The lambs from the Shropshire and Cheviot sires averaged 46 per cent, while those from the Rambouillet sire averaged 43 per cent. The difference in case of the Rambouillet would probably be made up in the quality of fleece.



Sheep on Scott Experimental Station used in a grading experiment.

WINTER FEEDING OF LAMBS

For several years turnips and silage have been compared as succulent feeds for fattening lambs. The silage has invariably given greater gains when fed in combination with a grain ration. The silage has reduced the cost per hundred pounds gain by more than $3.

Prevention of Goitre in Lambs

Goitre has been responsible for the death of a great many lambs on the prairies. The only successful preventative employed thus far on the Station has been the use of potassium iodide in the salt given to the pregnant ewes. This has been 100 per cent efficient. The quantity fed in the past has been two per cent of the salt, but it is possible that a smaller quantity will prove effective. The method of preparation is as follows:—

Place 25 pounds of salt on a canvas or a clean floor in a warm room until thoroughly dried. Dissolve a half pound of potassium iodide in one imperial pint of water. Sprinkle the solution over the dry salt and mix thoroughly at once. Keep the salt before the ewes during the greater part of the gestation period, preferably inside the shed in a small box nailed to the wall.

Each ewe will usually eat from one-third to one-half pound of salt per month during the winter.

The price of potassium iodide varies from six to eight dollars per pound depending upon where and in what quantities it is purchased. Recently the Canadain Co-operative Wool Growers' Association has stocked potassium iodide in the Regina Warehouse.

FIELD HUSBANDRY

CROP ROTATIONS

Twelve years of investigational work with crop rotations have now been completed. Three of the rotations started in 1911 are still in operation, of these, one has been slightly modified. Three new rotations were added in 1920. The information obtained from this work will at least permit this one general observation, namely, that the establishment of suitable systematic rotations on the prairie farms of Western Canada would be the most important step in the development of agriculture that farmers of this generation could possibly take.

In presenting the returns from the rotations, brief summaries of each rotation have been prepared, and these are presented, instead of the lengthy tables that were published formerly. In ascertaining the cost of production and the returns, the same standard of values are used for the rotation work as for the cost of production of field crops.

ROTATION "C"

Rotation "C" has been under way on this Station since 1912. It is of three years' duration, and is the system followed by a number of the good farmers throughout this territory. An outline of the rotation is given in the following table under the heading "Crop." This table includes the average yields and the returns for the past season.

ROTATION "C"

Summary of Yields, Value, Profit and Loss (per acre) 1923

Crop	Average for two years	Yield 1923	Value	Cost of production	Profit + or Loss (−)
	bushels	bushels	$ cts.	$ cts.	$ cts.
Summer-fallow	.....	.....	.....	9·80	−9·80
Wheat	20·5	28	22·40	12·56	+9·84
Wheat	17·4	24	19·20	13·92	+5·28

The average returns for a four-year period show the cost per acre to be $11.74 and the value of the crop to be $16.54 with a return over all expenditures, including labour, rent, etc., of $4.80 per acre.

ROTATION "J"

A total of 120 acres of land is in use for this rotation. It is divided intc six twenty-acre fields with each one fenced. The plan followed in operating this rotation is to plough the western rye grass sod about the middle of June. The sod land is packed and disced after ploughing, later in the season is cultivated, and left in good shape for the wheat crop that follows. This method of handling sod land has always given good results on this Station. The wheat stubble is fall ploughed shallow as early as possible in the fall, and is worked down into seed bed condition as rapidly as it is ploughed. The second crop stubble is spring ploughed early in the spring, and the field is later sown with oats and western rye grass. The system followed in seeding down is to mix the

western rye grass with the seed oats as soon as the oats are sufficiently dry after treating for smut. The mixture is then sown with the grain drill. By following this method good catches of grass have been obtained every year. The first year's grass crop is usually taken for hay and the second year's crop pastured. Additional pasture is secured in the spring from the grass field that is to be summer-fallowed. The aftermath from the hay crop together with the stubble fields supply considerable fall pasture. The returns from this rotation this year have been most satisfactory as is shown by the accompanying table.

ROTATION "J"

Summary of Yields—Value, Profit and Loss (per acre) 1923

Crop	Average for 12 years	1923	Value	Cost of production	Profit (+) or Loss (−)
	bushels	bushels	$ cts.	$ cts.	$ cts.
Summer-fallow				8·53	−8·53
Wheat	25·9	39·9	32·42	14·49	+17·93
Wheat (7 years, 1912-1918)	19·9				
Oats (5 years, 1919-1923)	44·5	98	37·64	19·21	+18·43
Oats	50·4	107	40·05	19·35	+20·70
Hay and pasture	1·01 tons (8-yr. ave.)	1·27 tons	15·27	10·44	+4·83
Pasture			7·53	3·68	+3·85

The yields from Rotation "J" are a fair indication of the value of this arrangement of crops to maintain the fertility of the land and to keep weeds in control. It should be pointed out here that this rotation was started on new land. It is probable that on weedy land it would be necessary during the first cycle of the rotation to seed down after summer-fallowing. It may be found possible even on weedy fields to secure good stands of grass by following the same system as adopted on this Station, namely, spring ploughing fairly early, working down into seed bed condition, and sowing the oats and grass later in the spring—first destroying the weeds by harrowing or cultivating.

ROTATION "P"

This is an eight-year rotation that not only includes grass but includes sunflowers. Barley is used as a nurse crop instead of oats. Barnyard manure is applied to each field once in eight years. This rotation is only suited to a live stock farm where considerable feed is consumed.

ROTATION "P"

Summary of Yields—Value, Profit and Loss (per acre) 1923

Crop	Average for 12-years	1923	Value	Cost of production	Profit (+) or Loss (−)
	bushels	bushels	$ cts.	$ cts.	$ cts.
Summer fallow				12·01	−12·01
Wheat	23·7	26	20·80	13·59	+7·21
Wheat	17·1	29·3	23·44	16·39	+7·05
Summer-fallow (manure 12 tons per acre)				9·91	−9·91
Sunflowers	Ave. 4 years tons 8·14	tons 11·49	34·47	32·16	+2·31
Barley seeded down (western rye and sweet clover	bushels 29·2	bushels 63·4	22·86	17·27	+5·59
Hay	tons 1·29	tons 2·44	21·96	12·13	+9·83
Hay		1·95	17·55	12·08	+5·47

The high cost of summer-fallowing the sod land is due to the presence of sweet grass. The experience on this Station goes to show that while grass crops aid materially in the control of weeds, they also afford an opportunity for sweet grass and couch grass to become firmly established. For this reason it is important that the native grasses should be destroyed on a field before it is seeded down. The manure is ploughed under in summer-fallowing. This may not be the most economical time to apply manure, but it does afford some opportunity for the manure to partly decompose before it is required by the crops. A good crop of barley was obtained in 1923, but this is the first year that a good grain crop has been obtained following sunflowers. In seeding down, 10 pounds of western rye grass and 6 pounds of sweet clover are used. This mixture has given a good crop of sweet clover and rye grass the first season, and the stand of rye grass in the second year has been quite satisfactory.

SWEET CLOVER ROTATION

This rotation was started to determine the advisability of including sweet clover in a crop rotation. Three fields that were formerly in old rotation "R" were used, and the new rotation has now been in full operation two years. The plan followed is to have one field summer-fallow, one field of wheat, and the third field one-half used for sweet clover and the other half for oats. In seeding down the sweet clover, 15 pounds of the seed is mixed with one bushel of wheat per acre. On the other half of the field the wheat is sown at the rate of 1½ bushels per acre.

ROTATION—SWEET CLOVER.

Summary of Yields, Value, Profit and Loss (per acre) 1923

Crop	Yield		Value	Cost of production	Profit (+) or Loss (−)
	Average for 2 years	1923			
	bushels	bushels	$ cts.	$ cts.	$ cts.
Summer-fallow				9 00	−9 00
Wheat seeded down	26·2	42			
Wheat not seeded down	29·7	49·6	36 64	14 14	+22 50
	tons	tons			
Sweet clover	1·85	2·64	23 76	9 09	+14 67
	bushels	bushels			
Oats	52·7	78	29 19	15 44	+13 75

The profit per acre for the rotation amounted to $13.97. This substantial return is due to the excellent crop of wheat. It will be noted that there was a loss of 3·5 bushels per acre from using wheat as a nurse crop for the two-year period. The yields of sweet clover this year were above the average. Rain made it difficult to cure the first cutting, but the second cutting was harvested in excellent condition. It was observed that such weeds as wild buckwheat and pigweed were harvested with the hay crops before they produced seed, and with the two cuttings the land should have been fairly well cleaned of these weeds.

ROTATION—ALTERNATE CROP AND SUMMER-FALLOW

This arrangement of crops was commenced with a view to comparing it with Rotation "C" for cost of operation and return values.

WHEAT AND SUMMER-FALLOW
Summary of Yields, Value, Profit and Loss (per acre)

	Yield		Value	Cost of production	Profit (+) or Loss (−)
	Average for 2 years	1923			
	bushels	bushels	$ cts.	$ cts.	$ cts.
Summer-fallow				9 15	−9 15
Wheat	24·6	38·1	30 48	13 94	+16 54

Since the total cost of the summer-fallow year must be charged against the one crop, the returns per acre only amounted to $3.69 per acre.

ROTATION—FALL RYE

The object in view in this crop arrangement is to try out fall rye under field conditions. A rotation, summer-fallow, wheat, fall rye is used. In the second year one-half of the field is seeded in the spring to wheat with seed rye mixed at the rate of one bushel each per acre, the other half is seeded to wheat alone, and fall rye is seeded in the autumn on the wheat stubble. In the last year fall rye is harvested from the two treatments.

FALL RYE ROTATION
Summary of Yields, Value, Profit and Loss (per acre)

	Yield		Value	Cost of Production	Profit (+) or Loss (−)
	Average for 2 years	1923			
	bushel	bushels	$ cts.	$ cts.	$ cts.
Summer-fallow				7·77	−7·77
		bus. wheat			
Wheat (with fall rye)	21·5	23·4			
Wheat (alone)		41·4	25 92	12 73	+13 19
		bus. fall rye			
Fall rye (sown with wheat)	6·5	5·6	4 04	9 12	−5 08
Fall rye (on stubble)		11·6			

In the two years the rye has wintered over it came through in very poor condition, particularly where it had been sown with wheat in the spring, and in a little better shape where it was sown in the wheat stubble at cutting time.

Some of the rye produced seed-bearing stalks the first season, which when threshed with the wheat in the fall, made an objectionable mixture. The yield of wheat where it was used as a nurse crop for the rye, as mentioned above, was very materially decreased.

COST OF PRODUCTION OF FIELD CROPS

With the lowering in the market prices for farm products, it is now more important than ever that the average farmer make a careful study of all items that contribute to the cost of production of farm crops.

Records have been kept on the Scott Station of the cost of production for a period of twelve years. During the first year the cost and return values were based on an arbitrary set of figures compiled in 1911. During the past four years the costs and return values have been based on the rates prevailing each year, and the figures used for the year 1923 are submitted herewith.

COST VALUES, 1923

	$ cts.
Rent per acre	3 20
Manure per load applied on field	1 00
Seed wheat per bushel—using 1½ bus. per acre	1 50
Seed oats per bushel—using 2 bus. per acre	0 75
Seed barley per bushel—using 2 bus. per acre	0 75
Seed rye per bushel—using 1 bus. per acre	1 75
Seed sunflowers per lb.—using 14 lbs per acre	0 12
Seed sweet clover per lb.—using 15 lbs. per acre	0 13
Seed western rye grass per lb.—using 12 lbs. per acre	0 08
Twine per acre	0 40
Machinery per acre	1 00
Manual labour per hour	0 30
Single horse per hour	0 10
Threshing:—	
Wheat per bushel	0 12
Oats " "	0 08
Barley " "	0 09
Rye " "	0 10

RETURN VALUES, 1923

	$ cts.
Wheat per bushel (Prices as at October 1st, 1923, for grain of same grade)	0 80
Oats " "	0 33
Barley " "	0 36
Rye " "	0 47
Western rye hay per ton	9 00
Oat straw per ton	2 00
Barley straw per ton	2 00
Pasture for cow or horse per month	1 80
Pasture for sheep per month	0 45
Sunflowers per ton	3 00

The rental charges include the taxes as well as rent for the land. It will be noted from the prices charged that choice seed was sown. It has been considered advisable, even with some additional costs for seed requirements, to use clean, well graded seed of a good strain. The charge of $1 per acre for machinery would on a half section of land permit investing $300 each year in repairs for machinery and additional equipment. The manual labour charge at 30 cents per hour, pays for the hired help to do the work, or provides wages for the farmer if he does the work himself, but it only pays for the time actually employed, and naturally pre-supposes that the farmer or employee when not engaged on the fields is profitably employed at other work. The valuation of 10 cents per horse per hour, covers the cost of feed, labour required to care for the animals, cost of harness and interest on investment in horses, harness, and buildings. In making this estimate on the cost of horse labour, 973 hours of labour per year is credited to each horse. The charge of 12 cents per bushel for threshing wheat covers the cost where the farmer owns his own machine. Where the farmer has to hire the work done, it will be necessary to add two cents or three cents per bushel to the cost.

COST OF PRODUCTION

Crop	Costs of Production	
	per acre	per bushel
Wheat on rye grass sod summer-fallowed	$ 16 19	0·40
Wheat on stubble land	17 45	0·62
Wheat following wheat on fall ploughed land	18 82	0·78
Oats following wheat on fall ploughed land	20 91	0·21
Oats following oats on spring ploughed land	21 04	0·19
		per ton
Sunflowers on summer-fallow	34 59	3·01
Western rye grass hay	12 07	9 50
Sweet clover hay	14 19	5·37

In calculating the cost of various crops, the cost of the summer-fallow has been equally divided between all the crops grown in a rotation instead of charging the cost of the summer-fallow to the succeeding crop only.

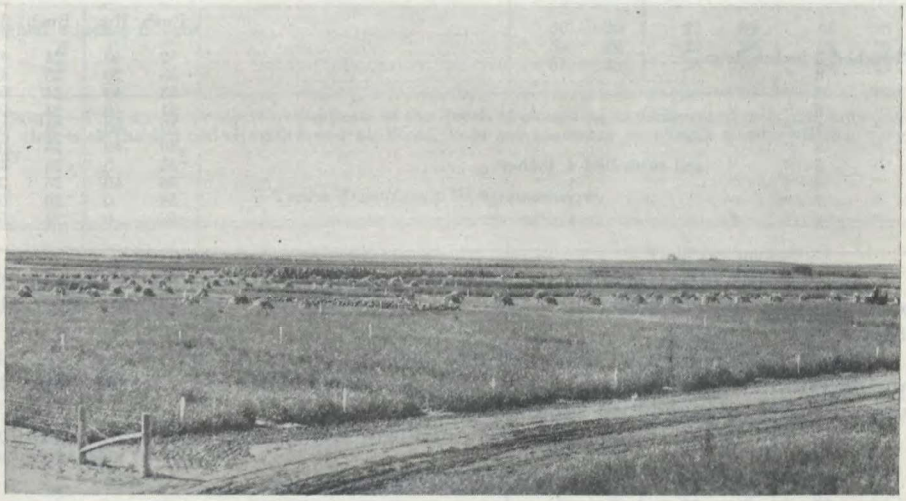
The cost per bushel for the wheat on the sod land and the two crops of oats are low due to unusually high yields. These yields can be attributed mainly to the rotation of crops that has been followed, the arrangement being summer-fallow wheat, oats, oats, hay, pasture.

The cost of production of sunflowers is about the normal cost for this Station.

The cost per ton for the sweet clover hay is considerably less than the cost of the western rye hay; this is due to the higher yields obtained from the clover. Two cuttings were obtained from the latter and only one from the former.

COST OF PREPARING STUBBLE LAND FOR CROP

In curtailing the cost of production of grain crops one of the important problems is that of how to prepare stubble land for crop with the least cost. The results presented herewith cover only one year's investigations. It should be pointed out that these costs only cover the manual and horse labour required to put the land into good seed bed condition and to sow the crop. Cost of seed and rental for the land have not been included. Each plot was 9 acres in area.



Cultural Plots at Scott, 1923.

COST OF PREPARING STUBBLE LAND FOR CROP

Treatment	Cost per acre	Cost per bushel
	$ cts.	Cts.
Fall ploughing	3 56	4·8
Fall discing (double disced twice)	1 90	2·4
Spring discing (double disced twice)	1 78	2·5
Spring ploughing	3 21	3·9

From the standpoint of control of wild buckwheat it was found that the spring ploughing and spring discing resulted in cleaner crops than the fall treatments. No other weeds were present in sufficient numbers to affect the crop returns. The highest yield per acre was obtained from the spring ploughing.

CULTURAL INVESTIGATIONS

The cultural investigation work done on this Station includes fourteen projects, some of which have furnished conclusive evidence and have been discontinued. Some others have been started quite recently.

DEPTH OF PLOUGHING

In an attempt to ascertain the most advisable depth to plough summer-fallow a number of one-fortieth acre plots have beeen ploughed at different depths and some subsoiled as is indicated in the table below. The ploughing is done in early June, and the subsoiling is done by following in the furrow with a second plough from which the mouldboard has been removed.

DEPTH OF PLOUGHING SUMMER-FALLOW

(Rotation: Summer-fallow, wheat, oats.)

Influence on First Crop	Yield per Acre	
	Wheat 1923	Wheat 9-year Average
	Bush. lbs.	Bush. lbs.
Ploughed 3 inches deep	52 40	24 40
" 4 " "	53 20	25 43
" 5 " "	53 40	24 54
" 6 " "	51 40	24 29
" 7 " "	52 40	24 54
" 8 " "	50 40	24 01
" 5 " " and subsoiled 4 inches	51 0	24 43
" 6 " " " 4 "	50 40	25 23
" 7 " " " 4 "	54 0	26 03
" 8 " " " 4 "	53 0	24 54

It is readily observed that any increase in yield resulting from deep ploughing or subsoiling of summer-fallow has not been sufficient to warrant the extra labour.

The wheat stubble is ploughed five inches deep in the fall, except the first and second plots which are ploughed three and four inches deep respectively, the same depth as ploughed for summer-fallow.

The table below gives comparative yields of second crop after summer-fallow.

DEPTH OF PLOUGHING SUMMER-FALLOW

(Rotation: Summer-fallow, wheat, oats.)

Influence on Second Crop		Yield per acre	
Summer-fallow ploughed	Wheat stubble ploughed	Oats 1923	Oats 8-year Average
		Bush. lbs.	Bush. lbs.
3 inches	3 inches	111 26	55 18
4 "	4 "	124 24	58 27
5 "	5 "	131 06	57 0
6 "	5 "	126 16	54 32
7 "	5 "	128 28	54 21
8 "	5 "	132 32	54 31
5 " and subsoiled 4 inches	5 "	133 18	57 19
6 " " 4 "	5 "	122 32	56 29
7 " " 4 "	5 "	128 08	57 28

In 1923 the plot which had been ploughed five inches as summer-fallow and subsoiled four inches gave the highest yield of oats as second crop. However, the eight year average shows the four-inch ploughing to give the highest yield. When considering the average yield for eight years of both first and second crops after summer-fallow, the figures indicate, in each case, that the ploughing of summer-fallow deeper than four or five inches is neither necessary nor profitable. In the summer-fallow treatment experiment below, the same general conclusion is drawn, namely, that there is nothing to be gained by ploughing extremely deep.

DEPTH OF PLOUGHING SUMMER-FALLOW*

(Rotation: Summer-fallow, wheat, oats.)

—	Yield per acre					
	Wheat				Oats	
	First crop on fallow, 1923		First Crop on fallow, 9-year average		Second Crop after fallow 8-year average	
	Bush.	lbs.	Bush	lbs.	Bush.	lbs.
Ploughed 4 inches in June	56	20	25	38	65	20
" 6 " "	53	20	25	18	63	13
" 8 " "	51	20	25	10	64	12

*NOTE.—This serves as a partial duplicate of the depth of ploughing experiment above, and indicates again, that with the soil and climate found at Scott, it is not necessary to plough summer-fallow very deeply.

TWICE PLOUGHING SUMMER-FALLOW

—	Yield per acre					
	Wheat				Oats	
	First Crop on fallow, 1923		First Crop on fallow, 9-year average		Second Crop after fallow, 8-year average	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Ploughed 4 inches in June	56	20	25	38	65	20
" 6 " "	53	20	25	18	63	13
" 4 " " and 4 inches in September	47	0	25	8	62	24
" 6 " " " 6 " "	46	0	24	48	60	8
" 8 " " " 8 " "	45	40	24	04	58	2
" 6 " " " 4 " "	51	0	26	18	58	30
" 4 " " " 6 " "	52	20	29	3	58	1

TWICE PLOUGHING SUMMER-FALLOW

It is generally considered that under average conditions two ploughings of summer-fallow are not necessary. Both the 1923 yield of first crop and the eight year average of second crop would indicate this, but the average yield of first crop shows the greatest increase in yield to result from ploughing four inches in June and six inches in September. However, it should be mentioned here that weeds were not prevalent. If many weeds grew on the fallow after the first ploughing, the yields probably would be reduced considerably when compared with summer-fallow which was ploughed early and kept cultivated.

PASTURE *vs.* CULTIVATED SUMMER-FALLOW

—	Yield per acre					
	Wheat				Oats	
	First Crop after treatment 1923		First Crop after treatment 9-year average		Second Crop after treatment 8-year average	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Ploughed in June—Cultivated	54	40	27	2	54	25
Ploughed in June (seeded to oats, ½ bush. per acre—pastured)	53	40	23	38	58	24

PASTURE VS. CULTIVATED SUMMER-FALLOW

The wheat on the pastured fallow ripens earlier than on the bare fallow. The bare summer-fallow is usually cultivated at least twice during the summer, and the pasture plot is usually so hard after pasturing that discing or cultivating is necessary before seeding. Hence only one cultivation is saved by use of the pasture crop, and the time is much more valuable in the spring when the pastured fallow is usually cultivated than during the summer-fallow season. The value of the pasture should also be considered. It will usually offset the difference in yield. In this experiment, sheep are used for pasturing, and the crop is pastured quite closely. Sheep will eat many of the common weeds and for this reason are the most satisfactory stock to use. Persistent weed growth would probably give trouble on a pastured summer-fallow. There were no troublesome weeds on the land under test. In view of the foregoing facts, the advisability of pasturing summer-fallow will depend entirely upon local conditions.

TIME OF PLOUGHING SUMMER-FALLOW

—	Yield per acre					
	Wheat				Oats	
	First Crop after treatment 1923		First Crop after treatment 9-year average		Second Crop after treatment 8-year average	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Ploughed 6 inches May 15th	59	40	29	43	59	31
" 6 " June 15th	54	40	27	2	54	25
" 6 " July 15th	49	0	24	41	55	8

TIME OF PLOUGHING SUMMER-FALLOW

The yields shown in the time of ploughing table would indicate that it is profitable to go to considerable expense to get the summer-fallow ploughed immediately after seeding. Approximately five bushels of wheat gain per acre on a nine year average is very significant. In 1923 the difference was over ten bushels per acre in favour of the early summer-fallow. The drier the season, during which the summer-fallowing is done, the more will be gained by early ploughing, provided that the weed growth is controlled during the remainder of the summer by cultivation.

FALL CULTIVATION BEFORE SUMMER-FALLOW

	Yield per acre					
	Wheat				Oats	
	First crop after treatment. 1923		First crop after treatment Nine-year average		Second crop after treatment Eight-year average	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Stubble cultivated in autumn	45	40	25	13	56	4
Stubble fall ploughed 4 inches deep	48	40	25	48	55	30
No fall cultivation	48	0	26	57	57	31

FALL CULTIVATION BEFORE SUMMER-FALLOW

Fall cultivation previous to summer-fallow is often a waste of time, under the conditions found at Scott, and a method of decreasing the yield of the following crop. However, certain conditions may make fall cultivation profitable.

STUBBLE TREATMENT

Rotation—Summerfallow—Wheat—Wheat

	Yield per acre			
	Wheat			
	1923		Eight-year average	
	Bush.	Lbs.	Bush.	Lbs.
Stubble burned in autumn, disced at once	42	..	22	50
Stubble burned in autumn, fall ploughed 4 inches at once	35	20	22	6
Stubble burned in spring, seed at once	36	..	26	13
Stubble ploughed down in spring	33	40	23	43

STUBBLE TREATMENT

The average yield for eight years would indicate that the spring burning of stubble is most profitable, while the 1923 yield, though less significant, has favoured the fall burning followed with the disc. In this experiment sufficient straw is used to insure a clean burn, which could not be done on a large scale without considerable time and labour. The average stubble in the dry districts is quite light, and can seldom be burned without the use of straw or a stubble burner. The weeds have always been more prevalent on the plots which were seeded without ploughing.

DISCING OF STUBBLE

	Yield per acre			
	Wheat			
	1923		Eight-year average	
	Bush.	Lbs.	Bush.	Lbs.
Disced at cutting time—Spring ploughed	37	..	20	21
Disced at cutting time—Fall ploughed	37	20	20	17
Disced in fall—Seeded in spring	33	20	21	16
Spring ploughed	33	40	23	43

The 1923 yields do not compare well with the average for eight years, but 1923 was an unusual season and since the average yield is more dependable, the natural conclusion would be, that the spring ploughing was the most advisable.

FALL VS. SPRING PLOUGHING FOR WHEAT

	Yield per acre			
	Wheat			
	1923		Eight-year average	
	Bush.	Lbs.	Bush.	Lbs.
Ploughed in fall	36	40	20	34
Ploughed in spring	31	40	23	27

For the first time since the experiment has been started the fall ploughing gave a higher yield than the spring ploughing. However, the average yield is still in favour of the spring ploughing.

FALL PLOUGHING VS. SPRING PLOUGHING FOR OATS

	Yield-per-acre			
	Oats			
	1923		Nine-year average	
	Bush.	Lbs.	Bush.	Lbs.
Ploughed in fall	122	12	49	17
Ploughed in spring	117	22	56	24

The 1923 yield is again highest in case of the fall ploughing which may be due in both cases to the unusual season of 1923. The average yield, however, is considerably higher in cases of the spring ploughing. In 1922 the spring ploughing gave the higher yield by six bushels and 24 pounds.

SEEDING TO GRASS AND CLOVER

There has been very little difficulty in the past in getting a catch of grass at this Station, whether seeded with or without a nurse crop. In this experiment several different rotations are followed on different series of plots, and grass is seeded on summer-fallow after first and after second crops with and without a nurse crop. The mixture used is 10 pounds of western rye and 6 pounds of sweet clover.

FIRST HAY CROP FROM 1922 SEEDING

	Yield per acre 1923			
	Sown alone		Sown with Nurse crop	
	Tons	Lbs.	Tons	Lbs.
Sown on summer-fallow	4	80	4	520
Sown following turnips	3	1,160	2	900
Sown following first grain crop on fallow	3	640	3	40
Sown following second grain crop on fallow	4	1,640	4	440

FIRST HAY CROP—TEN-YEAR AVERAGE

	Yield per acre			
	Sown alone		Sown with nurse crop	
	Tons	Lbs.	Tons	Lbs.
Sown on summer-fallow	2	448	1	1,332
Sown following turnips	1	1,676	1	338
Sown following first grain crop on fallow	1	1,520	1	288
Sown following second grain crop on fallow	1	1,842	1	816

SECOND HAY CROP TEN YEAR AVERAGE

	Yield per acre			
	Sown alone		Sown with Nurse crop	
	Tons	Lbs.	Tons	Lbs.
Sown on summer-fallow	1	560	1	912
Sown following turnips	1	1,404	1	804
Sown following first grain crop on fallow	1	664	1	469

The plentiful supply of moisture in 1923 accounts for a heavy yield of hay.

Breaking native pasture land, 1923.

The differences between seeding with and without a nurse crop have not been great enough to offset the value of the grain crop lost by seeding alone. It has been found that a reasonably light seeding of the nurse crop is necessary to get the highest yields of hay.

BREAKING WESTERN RYE AND ALFALFA SOD

In general practice on this Station, the western rye sod is broken after the second year, but in districts receiving more precipitation, several more crops of hay are harvested before breaking. The purpose of this experiment is to determine the most advisable method to employ in breaking this sod.

FIRST CROPS AFTER BREAKING RYE GRASS SOD

—	Yield per Acre					
	Wheat					
	First Crop after Breaking				Second Crop	
	1923		7-year average		2-year average	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Ploughed July 20–30 5 inches deep	38	40	13	05	17	20
" in October 5 inches deep	32	–	11	49	17	40
" early July 3 inches, backset in September	25	20	13	10	19	14
" in September 6 inches deep	32	–	13	13	18	10
" in spring 5 inches deep just before seeding	29	40	12	05	17	54
" 6 inches previous spring, treated as summer-fallow	31	40	15	50	18	04

—	Flax				Wheat	
	1923		7–year average		2-year average	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Ploughed 5 inches in spring worked down and seeded at once	8	52	5	12	18	30

—	Oats				Wheat	
	1923		4-year average		2-year average	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Ploughed 5 inches in spring and worked down and seeded at once	82	12	42	19	18	10

The first crop after breaking merely indicates what may be grown following each treatment, and in a measure, the value of each method employed.

APPLYING BARNYARD MANURE

To Affect Wheat

A great many farmers in the West question the value of manure to increase the yield of wheat. A common mistake is to apply too much or not spread well, and when the manure is ploughed under, air spaces are left beneath the surface, which are detrimental in a dry farming district. The amount applied per acre in this experiment is 12 tons.

APPLYING MANURE FOR WHEAT
Rotation—Summer-fallow—Wheat—Wheat

Application to affect second crop after summer-fallow	Yield per Acre			
	Wheat			
	1923		8-year average	
	Bush.	Lbs.	Bush.	Lbs.
Rotted manure in spring before ploughing	52	40	29	19
" " in fall " " "	50	–	26	38
No manure, stubble burned, fall ploughed	50	20	24	30
" " disced, " " "	45	20	24	–
Rotted manure after seeding on fall ploughed	45	–	22	34
Fresh manure in winter on " "	33	20	20	49
No manure, fall ploughed	39	–	20	54

The lowest average yield shown in the table above is where fresh manure is applied, and the highest average yield resulted from ploughing rotted manure under in the spring. A part of this increase is due to the spring ploughing, as this treatment usually gives a higher yield than fall ploughing on this Station. However, the increase in yield resulting from the application of manure before fall ploughing for an average of eight years is 5 bushels and 44 pounds as compared with no manure, and in addition to this there would be less danger of the land drifting when manure is applied occasionally. Both the burning of the stubble and the discing previous to fall ploughing have increased the yield as compared with the fall ploughing without treatment.

Both fresh and rotted manure have been applied on summer-fallow. The higher yield was obtained by applying the rotted manure. Where the fresh manure was applied, the volunteer growth of grain was objectionable, as well as the increased number of weeds resulting from the viable seeds from the litter and manure. It is considered more advisable to apply manure on stubble before ploughing for second or third crop, rather than on the summer-fallow.

Manure to Affect Barley

MANURE FOR BARLEY
Rotation—Summer-fallow—Oats—Barley

Application previous to second crop	Yield per acre			
	Barley			
	1923		8-year average	
	Bush.	Lbs.	Bush.	Lbs.
Rotted manure in spring before ploughing	68	16	33	38
" " in fall " "	68	36	32	15
No manure, stubble burned, fall ploughed	64	28	28	43
" " disced, " "	60	40	25	21
Fresh manure in winter on fall ploughed	69	28	28	38
Rotted manure after seeding fall ploughed	70	20	24	22
No manure, fall ploughed	52	44	22	23

It will be noted in the above table that in every instance where manure was applied the yield has been increased, and in comparing the ploughing of rotted manure under in the fall, with fall ploughing where no manure has been applied, there is a difference of approximately 10 bushels per acre on an eight year average, and in 1923 a difference of 15 bushels and 40 pounds.

Since 1915, the manure has been applied only once in three years, and none was applied previously.

MANURE TO AFFECT OATS
Rotation—Summer-fallow—Wheat—Oats

Applied previous to second crop	Yield per acre			
	Oats			
	1923		8-year average	
	Bush.	Lbs.	Bush.	Lbs.
Rotted manure in spring before ploughing	120	20	66	09
" " in fall " "	122	12	60	25
No manure, stubble burned, fall ploughed	124	24	60	07
" " disced, " "	112	12	56	26
Fresh manure in winter on fall ploughing	129	04	62	06
Rotted manure after seeding	121	6	57	8
No manure, fall ploughed	115	30	52	19

Manure to Affect Oats

A conspicuously low yield is the result of no manure being applied. The eight-year average shows an increased yield of 8 bushels and 6 pounds per acre resulting from applying rotted manure just before ploughing in the fall previous to the second crop as compared with straight fall ploughing not manured. One application was made each three years.

Manure has also been applied on summer-fallow on other plots but has not given such satisfactory results as the application previous to the second crop.

PLOUGHING UNDER GREEN CROPS

It is a common opinion among farmers that if a heavy crop of green weeds are ploughed under, the land is being enriched. Some have grown light crops in order that they may plough them under for this purpose. In 1915 an experiment was started on this Station to determine the value of green crops ploughed under, as compared with bare summer-fallow with an application of barnyard manure.

GREEN MANURE VS, SUMMER-FALLOW AND MANURE

Rotation—Summer-fallow—Wheat—Oats

	Yield per acre			
	Wheat			
	1923		9-year average	
	Bush.	Lbs.	Bush.	Lbs.
Cultivated summer-fallow—barnyard manure, 12 tons per acre	58	–	27	40
Cultivated summer-fallow—no manure	45	–	23	35
Peas seeded 2 bushels per acre—ploughed under when in blossom	47	–	22	47
Peas seeded 2 bushels per acre—ploughed under early in July	43	40	21	13
Sweet clover seeded with oats as a nurse crop—ploughed under when in bloom	48	–	–	–

The cultivated summer-fallow to which rotted barnyard manure has been applied has given an outstanding high yield as compared with ploughing green crops under. Sweet clover has recently been added as a green crop, but the 1923 crop is the first grown on a plot receiving this treatment, hence there is no average yield. The nine-year average would indicate the bare fallow receiving no manure to be more profitable than the growing of green crops to be ploughed under.

In the second crop the highest yield is again from the manured fallow.

SUMMER-FALLOW SUBSTITUTES

This experiment was begun in 1922 when the summer-fallow substitutes were grown on the land which had been a bare summer-fallow the year before. In 1923, wheat was sown solid on each of these plots to ascertain if possible the effect of the different crops grown in rows. The experiment will be continued as alternate crop and summer-fallow substitutes, one plot being bare summer-fallow to compare with the substitutes, and one plot will be wheat sown solid every year.

WHEAT FOLLOWING SUMMER-FALLOW SUBSTITUTES OR ROW CROPS

	Yield per acre 1923	
	Wheat	
	Bush.	Lbs.
Following bare summer-fallow	37	–
" corn single rows	47	10
" potatoes single rows	40	50
" sunflowers single rows	50	–
" oats double rows	48	50
" oats triple rows	50	30
" barley double rows	47	50
" barley triple rows	42	30
" wheat double rows	41	10
" wheat triple rows	41	–

The bare summer-fallow was a single plot test, all others were in duplicate. After this experiment is continued for a number of years the yields should indicate the value of each crop as a summer-fallow substitute. Very little can be gathered from one year's results.

The continuous wheat plot was only included in 1923, hence is not shown in these yields following 1922 substitutes, but will be found below as a comparison to the yields grown in rows this year. The crops grown in single rows were 42 inches apart and each row group was 42 inches from centre to centre of groups.

ROW CROPS ALTERNATING WITH WHEAT

	Yield per acre 1923	
	Bush.	Lbs.
Wheat sown solid	34	40
" in double rows	23	10
" in triple rows	30	10
Oats sown in double rows	61	16
" triple rows	75	–
Barley sown in double rows	35	30
" triple rows	40	10
Potatoes—single rows	357	20
	Tons	Lbs.
Corn—single rows	11	1,560
Sunflowers—single rows	20	1,200

The wheat sown solid and sunflowers are single plot tests, all others are average of two plots. The above figures are presented merely to give an idea of the yields to be expected from the different crops grown in rows in a good season such as 1923.

CROP MANAGEMENT FOR FALL RYE

Fall rye has proven an uncertain crop in this district. For this reason it has been thought advisable to test out several ways or handling it to bring it through the winter.

Dates of Seeding.—An experiment of dates of seeding was commenced in 1920, when the Dakold variety, one of the hardiest under test, was sown on three different dates. This experiment has been continued for a period of three years, although the dates on which the fall rye was sown were different each year. The accompanying table gives the yields obtained during this period.

DATES OF SEEDING FALL RYE

When sown	Yield per acre Sown 1920		Yield per acre Sown 1921		Yield per acre Sown 1922	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Middle July	.....		24	16	5	20
Last of July	15	30	24	16	7	8
Middle August	20	–	.....		15	–
Last of August	21	44	21	44	21	24
Middle September	.....		20	20	26	24

It will be observed that in 1920 and in 1922 the last date of seeding gave the best returns, while in 1921 the earlier seedings produced the best crop. Judging from the three years' work it would appear that late August is a fairly safe time to sow fall rye.

Sowing Fall Rye with a Spring Grain Crop.—The method of sowing fall rye with a spring grain crop, if proved satisfactory, will have aided materially in solving the late fall and early spring pasture problem. The experimental work with sowing included three methods:—

(1) Sowing the fall rye in the spring with wheat, oats, barley, and spring rye, to test out these various crops as nurse crops.

(2) Sowing with oats, and harvesting the oats with the binder, and pasturing the rye in the fall.

(3) Sowing with wheat in the spring and not pasturing the rye vs sowing in the wheat stubble at cutting time.

The results from the several experiments may be summed up by stating that where the fall rye was sown with oats in the spring, and the rye pastured in the fall, the crop has winter killed. Where the rye was sown with the wheat in the spring the crop did not come through the winter, as well as when it was sown in the wheat stubble in the fall. Considerable seed matured the first year, thus decreasing the market value of the wheat. It was also found that the yield of wheat was less where the two crops were grown in combination than where the wheat was grown alone.

Up to the present there has been no combination of fall rye and spring grain that has proved satisfactory at this Station.

Straw Mulch for Fall Rye.—The plan followed on the Station is to cover one-half of each plot with straw. This is spread some time in November or December. In the first year this was tested, no records of resulting yields were obtained, but it was estimated that 65 per cent of the crop came through the winter safely where there was no straw mulch; 85 per cent where there was a light mulch, such as could be spread with the manure spreader if chaff were used; and where there was a heavy mulch, a 100 per cent stand was obtained. In the two succeeding years, yields were obtained from a number of plots each year. In every instance the mulched areas gave considerably higher yields than the unmulched. The average yield from the several plots are given in the accompanying table.

WINTER PROTECTION—FALL RYE—STRAW MULCH

	Yield per Acre					
	No mulch		Straw mulch		Ave. increase	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
1922	11	38	23	46	12	8
1923	12	52	20	8	7	12
Average increase	.....		.....		9	38

The yields shown in the above table are from the variety Dakold. With the more tender varieties, such as Rosen and Vassa, winter protection is more necessary and not always successful. In view of the increased yield, it may be found advisable to test some mechanical means of spreading the straw.

The matter of removal of the straw should also have some attention. The plan followed on the Station has been to rake the straw off the plots and burn it, but if a light enough covering can be put on, the removal of the straw will not be necessary.

CROPS FOR ENSILAGE

Acre plots of oats and peas, sunflowers, and corn were sown on land that had been summer-fallowed the previous year. All crops were sown on May 29, and in as far as possible soil and other conditions were uniform. It was found necessary to ensile the oats and peas on August 18, as the oats were then in the early dough stage and the peas were podding. The sunflowers and corn were left until September 7, when they were cut and ensiled just five days before a heavy frost.

ENSILAGE CROPS

Kind of Crops	Number of days from seeding to harvest	Stage of maturity when cut	Yield per acre					
			Average green weight, two years		Green weight, 1923		Air dried weight, 1923	
			Tons	Lbs.	Tons	Lbs.	Tons	Lbs.
Sunflowers	101	10 p.c. in flower	8	1,874	9	40	2	170
Corn	101	Early silk	7	250	7	1,870	1	1,843
Oats and peas	81	Oats early dough; peas podding	5	676	7	1,660	2	294

The summer season was particularly favourable to the development of cereal crops, consequently, oats and peas made an unusually good showing. It will be noted that from the standpoint of air dried forage they gave better returns than either the sunflowers or corn. The loss in weight in drying amounted to 77.3 per cent for the sunflowers, 75.7 for the corn, and only 72.5 for the oats and peas.

SUNFLOWERS—DISTANCE APART FOR ROWS

The grain drill was used to sow the seed for the test of distance apart to have the rows of sunflowers. The land had been summer-fallowed in 1922 and the seed was sown on May 29, and the crop was harvested on September 7.

SUNFLOWERS—DISTANCE APART FOR ROWS

Distance between rows	Area of plots	Yield per acre, Green weight	
	Acre	Tons	Lbs.
42 inches	0·17	12	88
36 "	0·15	12	1,733
30 "	0·13	11	1,730
24 "	0·109	11	1,139

While there is very little difference in yield from the several spacings, this year's results show the wider spacing to be the best, particularly as less seed was required. In 1922 similar results were obtained, but in two preceding years the closer spacing gave the highest yields. Further experimental work will be necessary before conclusions can be drawn.

INDIAN CORN—DISTANCE APART FOR ROWS

The four spacings tested were the same as for sunflowers, 42, 36, 30 and 24 inches. This is the first year the distances between rows for corn have been tested, and since 24 and 36 inch spacings gave the best returns, the results can scarcely be considered conclusive even for the one season.

ANNUAL HAY CROPS

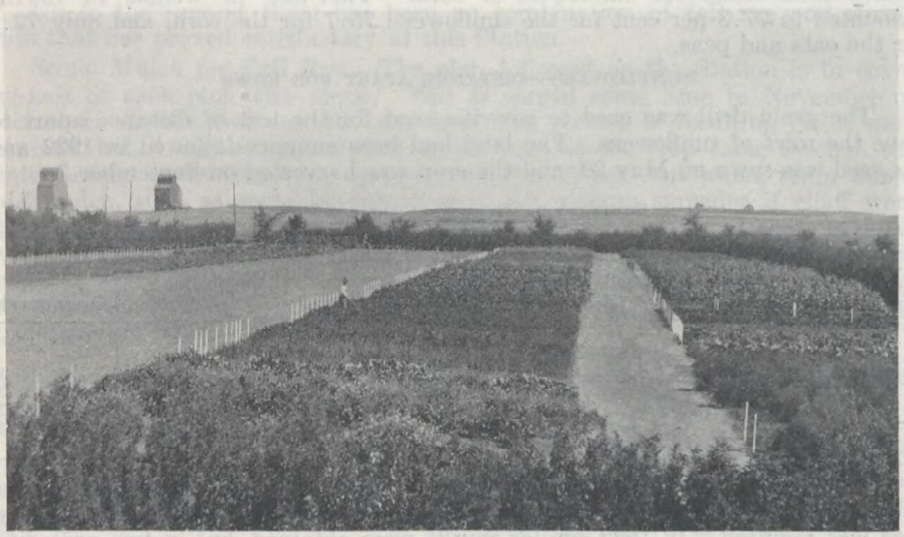
The decreasing yields from later seedings of oats for hay may be due to the dry weather prevailing during the late summer. This may also account, in some measure, for the smaller amounts of moisture in the crops. In this experiment the crop was cut with a grain binder.

DATES OF SEEDING BANNER OATS FOR HAY

Date sown	Date cut	Stage cut	Yield per acre	
			Green weight	Air dried weight
			Tons Lbs.	Tons Lbs.
May 19	Aug 6	Heads turning	7 800	2 1,896
May 29	Aug. 30	" "	7 1,400	3 1,720
June 8	Sept. 6	" "	6 600	3 1,087
June 18	Sept. 14	" "	6 280	4 826
July 7	Frozen before reaching turning stage.			

HORTICULTURE

The winter of 1922-23 was quite mild, trees and shrubs came through the winter in good condition, but losses of herbaceous perennials were heavier than for several seasons. The ample supply of moisture received during June and July resulted in a wonderful growth of the trees and shrubs. Ten degrees of frost on September 12, destroyed Compass cherries and a few late plums, but cross-bred apples were not noticeably injured.



Vegetable Garden, Scott. Three ranges are used in the garden each year. The fourth range is summer-fallow. Note protecting hedge of caragana.

VEGETABLES

ASPARAGUS

The first asparagus was cut on May 22, three days earlier than in the preceding year. There was a plentiful supply of moisture, consequently the asparagus continued to bear edible shoots until July 4.

ARTICHOKES

Tubers of the Jerusalem artichoke were planted in the garden on April 25 and harvested on October 17. They gave a yield of 8,671 pounds per acre. When cooked the artichokes proved quite edible with just a trace of the "sunflower" flavour.

STRING BEANS

Variety Tests.—Seventeen varieties and strains of beans were sown in the garden on June 8. Half of each plot was harvested for green beans as soon as they were fit for use, the remaining half was left to ripen for seed. The frost on September 12 destroyed the latter before the seed had matured, but good crops of green beans were obtained. Two lots of Pencil Pod Black Wax were the heaviest producers. Extra Early Valentine, Stringless Green Pod and Grennells Rustless Wax gave good returns. Challenge Black Wax was the first variety to be fit to use but proved rather tough and poor yielding.

Seeding Spacing.—In determining the rate of seeding for beans, two varieties were sown. The seed was spaced at 2, 4, and 6 inches apart in the rows. The returns from this test indicate that for seasons such as 1923 when there was a plentiful supply of moisture the closer planting is advisable.

TABLE BEETS

Test of Varieties.—Sixteen plots of beets were sown in the variety tests on May 22, and the beets were harvested on October 16. A strain of Crosby Egyptian (Steele Briggs Seed Co.) gave the best yields and Early Blood Turnip (McKenzie) was second. Extra Early (McKenzie) and Detroit Dark Red (C.E.F.) yielded slightly less but were more uniform. The variety Long Smooth Blood was too deeply rooted which made harvesting without injuring the beets almost impossible.

Dates of Seeding.—Commencing with April 25 seed of the Detroit Dark Red variety of beets was sown at 10-day intervals covering a period of 50 days. The earliest seeding gave the heaviest yield and with one exception the yields decreased as the time of seeding was delayed. In occasional seasons early sown beets have been injured by severe spring frosts so that where early seeding is practised in the north a second seeding a little later may be advisable. The beets when about half grown are at their best for table use, so that twice seeding will lengthen the period for choice table beets.

CARROTS

Test of Varieties.—Twelve lots of carrots were sown in the garden on May 10; the main crop from each plot was harvested on October 5. The highest yielding varieties were Garden Gem, Oxheart and Chantenay. During August and early September a table test was made and in this test the Chantenay proved equal to any variety and superior to most. The Oxheart varieties were all of rather strong flavour.

Dates of Seeding.—The Chantenay variety of carrots was sown at 6 different dates with a 10-day interval between each seeding. This is the first season that very early seeding has been practised. This year's results indicate that

early planting is advisable since it gives a long season that the carrots can be used before taking them up and storing for winter. The first seed was sown on April 24 and the carrots were fit to use on July 25.

CABBAGE

Test of Varieties.—Eighteen lots of cabbage were sown in the hotbed on April 12. A number of plants of each variety were transplanted to the garden on June 6. The best yielding varieties were Summer Ballhead, Glory of Enkhuizen, Kildonan and Brandon Market. Early Jersey Wakefield and Copenhagen were the first to be ready to use. Of the red varieties, Mammoth Red Rock gave the best yield.

Dates of Seeding.—The two varieties Copenhagen Market and Ex. Am. Danish Ballhead were sown in the garden on six different dates commencing with April 24 and continuing to June 15. This year's results go to show that early seeding in the garden is feasible but that late sown cabbages are unprofitable.

CAULIFLOWER

Three varieties of cauliflower were grown in the test plots. The Snowball variety gave the best yield and had the best flavour. Early Whitehead gave the second highest yield but had rather a strong flavour. The Dwarf Exfurt was inferior to the Early Whitehead in yield, but superior in flavour.

CELERY

Eight varieties of celery and two of celeriac, or turnip rooted celery, were tested. The seeds were sown in the hotbeds on April 4, and the plants were transplanted to the garden on June 6.

All varieties thrived well during the wet weather in June and July, but suffered from the dry weather that prevailed during the latter part of the season. All varieties were rather fibrous. Winter King (Stokes) gave the highest yield, Giant Pascal was more tender than most of the other varieties. Several methods of blanching were tested, but hilling up with soil proved the most effective.

A new method of growing the celery was tried out—the plan followed was to plant in a bed six feet square and put the plants six inches apart each way. A board wall 16 inches high was put around outside of the bed.

CELERIAC

The Large Root celeriac gave the best crop. This vegetable appears to be more suited to this district than the salsify, and is quite its equal as a flavouring for soups.

TABLE CORN—TEST OF VARIETIES

The usual lengthy list of early varieties of table corn was tested this year. New additions to the list included Mandan Flour from North Dakota, Sixty Days from British Columbia, Aristocrat and Northern Success, two varieties sold by prairie seedsmen. The Pickaninny, is still the leading variety from the standpoints of earliness and quality combined. Howes Alberta Flint and No. 74 were two of the first varieties to be ready for use. On several of the later maturing sorts the grain had only reached the milk stage when the crop was destroyed by frost on September 12.

CITRON

Citrons have been grown on the Station each year, but during this time few good crops have been harvested. This year the plants were started in hotbeds and transplanted to the gardens after danger of frost was over. This

did not prove satisfactory. The sudden change from the hotbeds to the outdoor conditions appeared too severe for such tender plants. Seeds sown in the garden on June 7 produced some fruit. Fifty-eight pounds were obtained from the Red Seed variety from a row 30 feet long.

CUCUMBERS— TEST OF VARIETIES

Seven varieties of cucumbers were sown on June 7, the seed was sown in rows instead of in hills and the plants were thinned to twelve inches apart in the row. This method decreases the injury from winds as the vines mat together. This is the first season that a bountiful crop of cucumbers has been obtained on this Station, and this is attributed to the pollination by the bees that were received the past spring from the Central Experimenal Farm. The best yielding varieties were Early Russian, Fordhook White Spine and Improved Long Green.

LETTUCE

Two seedings of lettuce were made, one on May 11 and the second on June 8. The crop from both seedings thrived well and provided an abundant supply of lettuce throughout the greater part of the season. The following four varieties were the best varieties tested, both from the standpoint of weight of individual heads and quality. Improved Hanson, Trianon Cos, Iceberg and New York.

ONIONS

The onion tests were sown on April 24 and the main crop was harvested on October 3. Two lots of Yellow Globe Danvers were the highest yielding with Large Red Wethersfield third. In three seasons out of the last four the Yellow Globe Danvers has given the highest yield. White Barletta proved to be the best yielding pickling onion.

PARSNIPS

In the test of varieties of parsnips the Elcombe Giant (Steele Briggs) outyielded all other varieties. Hollow Crown gave the second highest returns. Seeding parsnips at 10-day intervals during the spring months was tried out. In this test the earliest seeding produced the best returns, while the latest seeding (June 15) produced an unprofitable crop.

PARSLEY

The Moss Curled variety of parsley was grown and bore a luxuriant crop. A single plant taken inside and kept in the kitchen continued to produce green sprigs for garnishing purposes for a couple of months after the season was over.

PEPPERS

Three varieties of peppers were tested. The seed was sown in the hotbed on April 11 and the plants were set out in the garden on June 7. Harris Earliest produced 19 pounds of fruit on a row 33 feet long. This variety has usually given the best yields.

PEAS

Thirty-five varieties and strains of garden peas were grown. Half of each plot was harvested as green peas in the pod, the remainder were harvested when ripe and threshed for seed. By following this plan a continuous supply of seed is maintained. Rather than publish a lengthy list of varieties, it has been thought advisable to divide the list into three divisions, early, medium and later maturing, and only the best yielding of each division are included in the following table. The peas were sown on May 9 on fall ploughed garden soil.

PEAS—TEST OF VARIETIES AND STRAINS

Variety	Seedsman	Ready for use	Weight of green peas in pod		Remarks
			Lbs.	Oz.	
Early.					
Little Marvel	Scott	July 17	8	9	Good flavour, medium tender.
Eight weeks	Scott	" 12	7	12	Medium flavour, tender
Extra Early	McKenzie	" 7	7	–	Tender but not sweet
Early Morn	Scott	" 14	6	12	Medium sweet, tender.
Thomas Laxton	Scott	" 13	5	9	Sweet and tender.
Medium Season.					
Homesteader	Scott	July 21	10	–	
English Wonder	Scott	" 21	8	1	
American Wonder	P. Wright	" 21	8	–	Medium sweet, tender.
Gregory Surprise	Scott	" 18	6	2	Medium flavour, medium tender.
Laxton Superb	McKenzie	" 16	5	8	Medium sweet, tender, mealy.
Later Maturing					
Harrison Glory	Invermere	Aug. 2	16	2	Medium flavour, medium tender.
Danby Stratagem	Scott	July 31	11	–	Flavour excellent, very tender.
Pioneer	Scott	" 30	10	2	Medium flavour, medium tender.
Premium Gem	S. Briggs	" 28	10	–	Flavour fair, medium tender.
Nott Excelsior	S. Briggs	" 27	10	–	Flavour fair, medium tender.

Double Row System.—In this experiment two rows of peas were grown close together, the intervening space between one pair of rows and the next pair was kept cultivated. The test consisted of having pairs of rows 2, 4 and 6 inches apart. It was found that the wider spacings gave the best yields. The pair of rows that were 6 inches apart gave almost double the yield of a single row and only required one-fifth more land.

PUMPKINS

Three varieties of pumpkins were tested for yield. Owing to the comparatively short growing season in this district the Large Cheese variety failed to produce fruit. The Small Sugar yielded 169 pounds and the Connecticut Field 175 pounds. A strain of home grown seed of the Connecticut Field produced 446 pounds. Sufficient plants for two plots of pumpkins were transplanted from hotbeds after danger of frost was over, neither plot produced as much fruit as was grown from the plants started in the garden.

SQUASH AND MARROW

Seven varieties of Squash and Marrow were sown in the garden on June 8. Three hills of each variety were planted six feet apart. The Vegetable Marrow gave 215 pounds; Early Orange Marrow 208 pounds. The Hubbard Squash continues to be one of the most popular varieties of Squash. The Vegetable Marrow sown inside on May 8 and planted in the garden on May 26, did not produce as good a crop as the same variety sown in the garden.

SPINACH

Two varieties of Spinach and Swiss Chard were tested for the production of " Greens ". The seed was sown on May 22. The Victoria Spinach was ready for use on the 9th of July, Swiss Chard on the 14th and New Zealand on August 1. The Swiss Chard makes excellent greens. Sowing the three varieties, however, maintains a supply for a longer period than where only one variety is sown.

SALSIFY

The variety Mammoth Sandwich Island was grown. It was sown on May 21 and harvested on October 13. The total production from a single row 33½ feet long only amounted to 15 pounds.

KOHL RABI

Two varieties of this vegetable were sown in the hotbeds on April 11 and transplanted in the gardens on June 6. The early White Vienna gave a heavier crop than the purple Vienna. This vegetable thrives well here, but does not continue fit for use a sufficient length of time as it becomes very fibrous after a short period.

TURNIPS

Three varieties of turnips were grown, but owing to the dry season during the latter part of the summer all turnips were rather strong flavoured.

TOMATOES

Eighteen varieties of tomatoes were sown in the hotbeds on April 10 and planted in the gardens on June 14. Owing to the wet weather prevailing during the flowering period the tomatoes gave a much lighter crop than usual. Early Ruby (Steele Briggs) gave the heaviest crop, Pink (Ottawa 3039) gave the second best returns, and Bonny Best (Keith) was third. The Early Mascot and Red Cherry, produced very small fruit that proved to be of little value.

A new method of pruning tomatoes was tried. This consisted in cutting the tops off the plants above the first truss of fruit and this was compared with the cutting above the second truss, and above the third truss. It was found that cutting back to one truss hastened the period for ripening fruit but decreased the total returns. Cutting back to three trusses made little difference to the date of ripening, and affected the yield but little, as compared with where the plants were allowed to grow naturally. This is the first year this experiment has been carried out and further work will be necessary before any definite conclusion can be drawn.

SOWING VEGETABLES IN FALL

It has been observed that in a number of years seed of some vegetables remained in the ground throughout the winter and produced a crop the following year. With a view to determining the possibility of sowing some of the hardier kinds in the fall, a test was started in the autumn of 1922. The following table gives the dates when these vegetables were ready for use when sown in the fall as compared with when sown in the spring, and where yields were obtained from the different kinds of seed they too, are included in this table.

FALL SOWING VEGETABLES

Fall Sowing 1922. Variety.	Sown in Fall. Ready for use	Sown in Spring. Ready for use	Fall sowing. Total weight		Spring sowing. Total weight	
			Lbs.	Oz.	Lbs.	Oz.
Onion—Yellow Globe Danver	End of season	End of season	9	–	14	–
Lettuce—Hanson	July 4	July 10	2	8	1	6
Radish	June 9	June 12				
Carrot—Chantenay	July 20	July 23	21	7	37	13
Parsnip—Hollow Crown	End of season	End of season	64	–	33	–
Spinach—Victoria	June 6	June 12	2	–	2	–

It will be noted for the most part heavier yields were obtained from the spring seeding than from the fall planting but the vegetables from the fall sowing were ready for use a little earlier than those sown in the spring.

RHUBARB

Four varieties of rhubarb are grown in the rhubarb bed. Hobdays Giant as usual was the first to be ready for use. The stalks of this variety are rather coarse grained and green coloured. The Victoria continues to be one of the most popular varieties.

Starting rhubarb from seed every two or three years is one of the cheapest and most certain methods of maintaining a plentiful supply of rhubarb.

The surplus plants can be thinned out at the end of the first season and set out in a new bed, or the plants can be left in the rows and supplied with well rotted manure, and will then give a good supply of rhubarb for at least two or three seasons. In order to combat the bacterial disease of rhubarb, that is so prevalent on the prairies, frequent renewal of plants is necessary.

Rhubarb plants stored in the basement in the fall gave several cuttings of highly coloured stalks that made excellent sauce for winter.

POTATOES

Test of Varieties.—Thirty-two varieties of potatoes were grown in the uniform test plots. Approximately half of these varieties were introduced in 1922, so that only the two years' results are available. The two years' average returns places the four highest yielding varieties in the following order, Burnaby Mammoth, Extra Early Eureka, Majestic and Prince Albany. Of the medium early varieties, Everitt continues to give good yields. Irish Cobbler has out-yielded Gold Nugget, but, the latter is a much smoother potato and of quite as high quality.

Cost of Production.—The investigations to determine the average cost of production of potatoes over a period of years was continued this season. It was ascertained that the costs for 1923 including rent, seed, labour, etc., amounted to $65.28 per acre. The returns valuing the crop at 40 cents per bushel amounted to $111.46, leaving a profit per acre of $45.88.

Potatoes—Kind of Sets.—A comparison was made between whole potatoes and sets having three eyes in each piece. Two varieties were used, the Everitt, a medium early long potato, and, the Wee MacGregor a later maturing and more oval shaped variety. The rows were 30 inches apart and the sets twelve inches apart in the row.

POTATOES—KIND OF SETS.

	Yield per acre			
	Wee MacGregor		Everitt	
	Bush.	Lbs.	Bush.	Lbs.
Whole potatoes	292	-	319	40
Tubers cut to three eyes to a set	300	-	230	40

The results obtained are similar to the results in 1922. The cut sets from Wee MacGregor gave the best yield, and the whole tubers in the Everitt variety.

Sprouting Previous to Planting.—The two varieties, Irish Cobbler and Everitt, were used for this experiment. The tubers for sprouting were placed in shallow trays, with the seed end up, several weeks before planting. The trays were stored in a basement near a window. The potatoes planted without sprouts were taken from the bins at planting time.

SPROUTING POTATOES PREVIOUS TO PLANTING

Variety	Yield per acre			
	Sprouted		Not sprouted	
	Bush.	Lbs.	Bush.	Lbs.
Irish Cobbler	416	32	381	20
Everitt	309	20	309	20

The difference in favour of sprouting is not so marked owing to a favourable season and to the tubers all maturing fairly well before frost.

Potatoes in Hills and Rows.—This is the second season for testing growing potatoes in hills. The potatoes were planted on May 15 and were harvested on September 25. The Gold Nugget variety was used. The hills were 36 inches apart, with the sets planted one foot apart in the rows. The results for 1922 are included herewith.

POTATOES—HILLS VS. ROWS

	Total yield per acre				Average Yield for 2 years	
	1922		1923			
	Bush.	Lbs.	Bush	Lbs.	Bush.	Lbs.
Rows	138	14	260	–	199	–
Hills—3 sets in each	130	20	221	–	175	–
" 2 " "	110	40	180	–	145	–
" 1 set in each	74	20	120	–	97	–

The two years' results from this test should be fairly conclusive since the season of 1922 was very dry, while the midsummer months of 1923 were quite wet. The only advantage gained by planting in hills is a decrease in the amount of manual labour necessary to keep the fields clean. It will be noted that there was a serious loss of yield as the quantity of seed was decreased.

Influence of Windbreaks on Potatoes.—The experiment to determine the influence of windbreaks on yields of potatoes has been continued. Five varieties were grown in the fields and the same varieties were grown inside shelter belts. Those inside the protecting hedges were planted on May 12 and harvested on September 26. Those outside were planted May 15 and harvested on September 25.

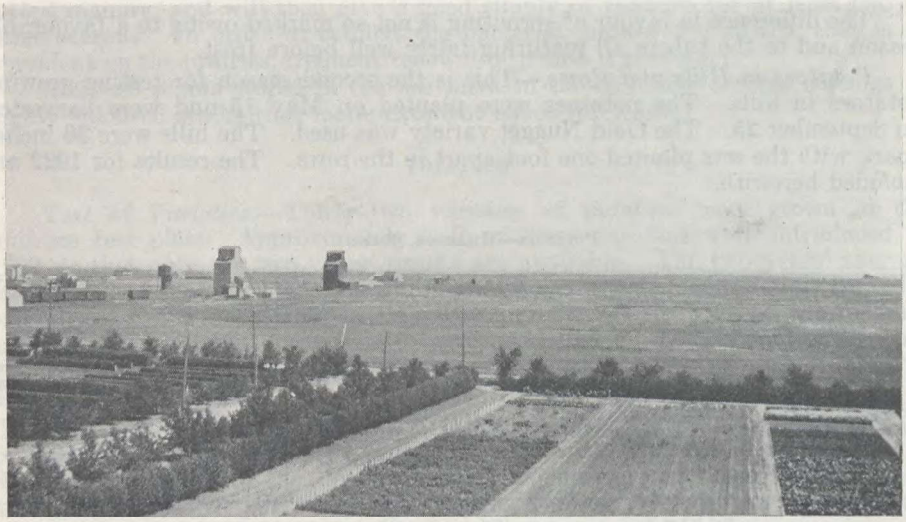
POTATOES—INFLUENCE OF WINDBREAKS

	Outside Windbreaks		Inside Windbreaks		Increased Yield 1923		Increased average yield two years	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Everitt	230	40	394	54	164	14	152	–
Irish Cobbler	238	20	365	42	127	22	137	–
Gold Nugget	260	–	364	6	104	6	117	–
Wee MacGregor	300	40	387	12	86	23	113	–
Early Ohio	183	20	277	12	93	12	78	–

TREE FRUITS

APPLES

Quite a number of inquiries have been received from owners of shelter belts as to the best varieties of apples to test. For this reason it has been thought advisable to publish a list of the varieties of cross-bred and crab apples that have produced fruit during the past season. The following table includes the parentage of a number of cross-bred sorts, the date of ripening, and the diameter of the fruit produced.



Corner of the vegetable garden at Scott and specimen hedges.

APPLES—TEST OF CROSS-BRED VARIETIES

Name	Parentage	Number of trees Fruited	Size of Fruit	Date Picked
			Inches	
Alberta	Pyrus baccata x Haas	7	1¼	Sept. 8
Dean	" x Wealthy	1	1½	" 10
Elsa	" x Yellow Transparent	9	¾	" 9
Elkhorn	Jewel x Gideon	1	2	" 5
Golden	Pyrus prunifolia x Golden Russet	1	1¼	" 5
Gretna	Pioneer x Northern Spy	1	2	" 4
Hyslop Crab		1	1¼	" 11
Jewel	Pyrus baccata x Yellow Transparent	1	1¼	" 7
Jewel & Tetofsky	(second cross)	2	2	Aug. 31
Jewel & Rideau	"	1	1¾	Sept. 9
Magnus	Pyrus prunifolia x Simbrisk No. 9	1	1	" 10
Osman	Pyrus baccata x Osimoe	4	1⅛	" 5
Piotosh	Pioneer x McIntosh	1	1¼	" 10
Pioneer	Pyrus baccata x Tetofsky	4	1⅛	" 11
Prince	" "	3	1½	" 9
Pioneer & Northern Spy	(Second Cross)	1	1⅛	" 10
Robin	Pyrus baccata x Simbrisk No. 9	1	1⅛	" 5
Transcendent Crab		3	1½	" 5
Tony	Pyrus baccata x McMahon White	1	½	" 5

The trees of the Osman variety are outstandingly the hardiest under test. The four trees of this variety grown on the Station, are all vigorous, shapely

trees that differ in appearance from the more tender varieties which have frequently been frozen back. The fruit is rather small, somewhat inclined to be dry, but fairly well coloured. The fruit on the cross-bred variety Jewel x Tetofsky is of goood size, nicely coloured, and quite superior to any of the first cross sorts. The trees have been frozen back a little each year, but bear remarkable crops for their size and condition.

PLUMS AND CHERRIES

The native plums came through the winter in excellent condition. The yields and quality of the fruit varied on the different trees. Quite a number produced from 20 to 40 pounds of fruit, and this was sold for five cents a pound. A severe frost on September 12 froze a number of the later maturing plums, and completely destroyed the fruit on the Compass cherries. The latter appear to be too late in maturing for this district. Five Mammoth plum trees produced a light crop. The fruit was considerably larger than any from the native plums. Three Rocky Mountain cherries bore fruit. These are a variety of the Sand cherry and the bushes are low growing and fruit principally on the branches near the ground. The fruit is much larger, but in flavour is similar to the Choke cherry.

SMALL FRUITS

CURRANTS

The red and white currants bore fairly good crops, but the black currants were not so productive this season, this may have been due to a frost that occurred on May 18. The older plantation, established shortly after the Station was started, is to be used for the production of cuttings, the object being to multiply some of the best varieties, particularly the black currents that are not as yet grown commercially. Since the plantation is to be used for this purpose, the average yields for a five year period of all varieties are given in the following table:

BLACK CURRANTS—TEST OF VARIETIES

Variety	Average yield per acre for five-years, 1919-23
	Lbs.
Kerry	5,935
Topsy	5,928
Magnus	5,732
Eagle	5,339
Eclipse	5,219
Naples	4,408
Beauty	4,406
Saunders	4,126
Climax	3,945
Collins Prolific	3,945
Boskoop	3,221
Clipper	2,866
Victoria	1,734
Lee Prolific	1,611
Buddenborg	1,156
Success	1,110

RED CURRANTS—TEST OF VARIETIES

Variety	Average yield per acre five years 1919–23
	Lbs.
Red Grape	4,020
Raby Castle	3,599
Stewart	3,560
Red Cross	3,542
Red Dutch	3,274
North Star	2,971
Franco German	2,323
Cumberland	2,159
Victoria Red	1,627
Cherry	1,283
Rankin	847

WHITE CURRANTS—TEST OF VARIETIES

Variety	Average yield per acre for five years, 1919–23
	Lbs.
White Cherry	2,214
White Grape	2,132
Large White	767

It will be noted that of the black varieties, the Topsy, Kerry, Mangus, Eagle and Eclipse are the five outstanding varieties. These are all varieties that were started on the Central Experimental Farm and are not as yet grown commercially.

The red grape has produced the heaviest crops, and the Red Cross the largest fruit. Raby Castle and Stewart are two of the best yielding of the varieties usually sold by western nursery firms.

Of the three white kinds, White Cherry is closely followed by the White Grape variety.

RASPBERRIES

Only a light crop of raspberries was harvested. The Herbert for the first time outyielded the Sunbeam variety. The raspberry canes were protected during the winter of 1922-23 by bending down and covering with soil, this may account for the heavier yields on the Herbert variety. The fruit on the Herbert is of excellent quality and the berries are of good size, so that it may be found profitable to give winter protection, and use this variety to a greater extent than is being done at present.

STRAWBERRIES

The matted row system of growing strawberries is followed on the Station. In setting out a new plantation the rows are left 5 feet apart and the plants are set 18 inches apart in the row. By the end of the second season the rows are well filled in. The Dakota has given considerably heavier yields than the everbearing varieties and the other summer bearing kinds Alaska and Senator Dunlap.

ORNAMENTAL GARDENING

Of all the material used in ornamental gardening the flowering shrubs will be found to give the best returns for money and time invested. They bloom at a season when the annual flowering plants are only commencing to grow, and when hardy kinds and varieties are grown they furnish beauty and fragrance in the spring months when flowers are most appreciated. The accompanying list contains the names of the kinds of shrubs that have proven hardy in exposed positions on the Scott Station:

Clematis shading the porch of the Superintendent's house.

Shrubs Grown Principally for their Flowers

Kind	Date of first bloom
Spiraea arguta (Snow Garland)	Late May
Lonicera tatarica (Bush Honeysuckle)	Early June
Caragana arborescens (Siberian Pea Tree)	Early June
Syringa vulgaris (Lilacs, hardier varieties)	Early June
Ribes aureum (Flowering Currant)	Second week June
Potentilla fruticosa (Shrubby Cinquefoil)	Middle June
Rosa rugosa (Japanese Rose)	Middle July

FLOWERS

Perennials.—Perennial flowers closely follow the flowering shrubs in importance as suitable material for ornamental plantings on the prairies. The following are some of the hardiest of the perennial flowers arranged in the order of their time of flowering. Iceland poppy, Tulips, Iris, Sweet Rocket, Achillaea (The Pearl) Columbine, Pyrethrum (Roseum), Pinks, Lychnis (chalcedonica), Perennial Larkspur, Gypsophila (paniculata) and Paeonies.

Annuals.—Under northern conditions annuals that are frost hardy to some extent are important in lengthening the season for flowers. Notes taken on the Station following the frost on September 12 when 10 degrees were registered showed that the following were hardy or only slightly injured, Bartonia aurea Candytuft, Carnation (Marguerite), Dimorphotheca, Gaillardia, Larkspur, Leptosiphon, Malope, Pentstemon, Petunia, Phlox Drummondii, Sweet Sultan, Stocks (Ten Weeks), Verbena.

Ten-week stocks in variety tests at Scott Station.

CEREALS

The season of 1923 was peculiarly favourable to the production of cereal crops. The weather was dry during April and May, so that rapid progress with seeding was possible. The late summer months were dry permitting the crop to be harvested in good condition. The rains came during the two main growing months, June and July, when a total of 9.92 inches of rainfall was recorded.

Several diseases appeared on the wheat during the latter part of August, but owing to the dry weather prevailing then, did comparatively little injury, as is shown by the yields and the fact that wheat marketed from the Station graded No. 1 Northern.

The land, upon which the cereal plots were located, is a chocolate coloured clay loam, with a clay subsoil. The plots used for the tests were one-fortieth acre in area, and, with one or two exceptions, tests of varieties were made in duplicate.

WHEAT

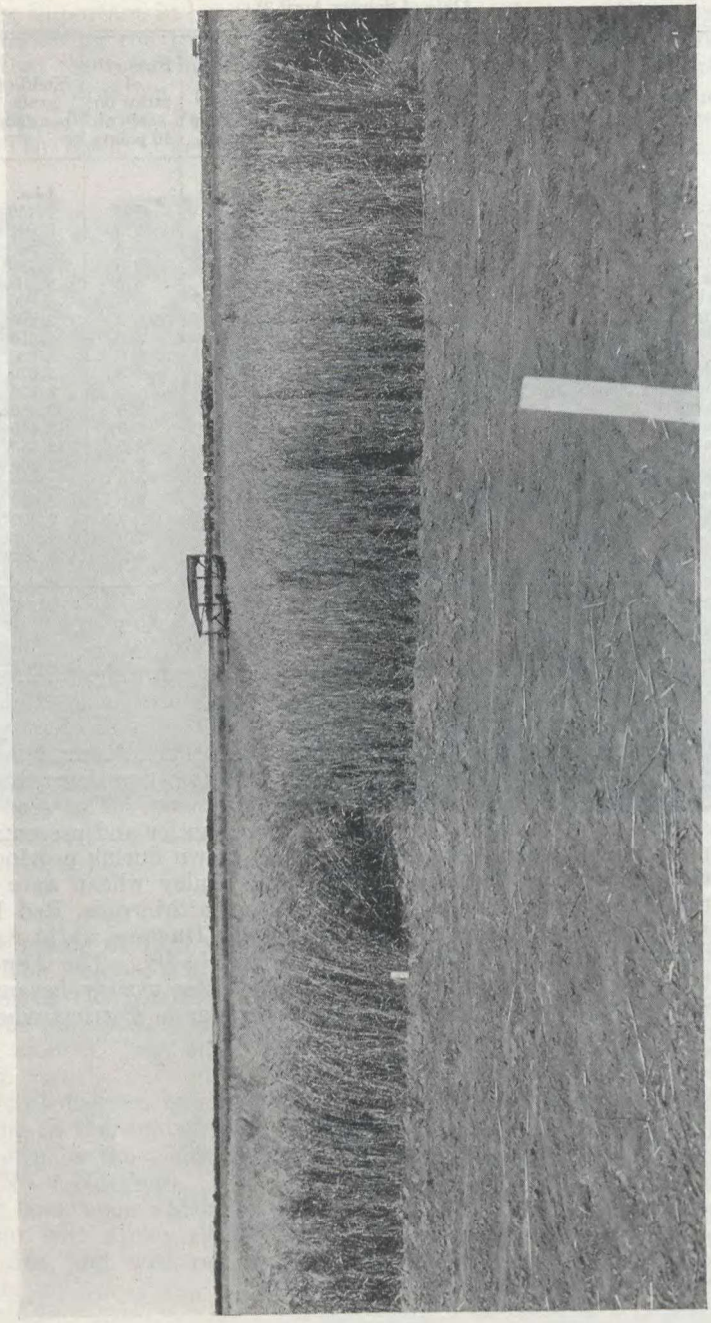
A total of 21 varieties and strains of wheat were tested. Five of these were strains of the Red Bobs variety, which were tested for different seed growers. The results obtained are given in the succeeding table.

TEST OF VARIETIES OR STRAINS
Date of Sowing April 23

Name of Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on scale of 10 points	Yield of grain per acre	Yield of grain per acre
			inches		Lbs.	Bus. Lbs.
Supreme, Sask. 603	Aug. 28	127	42·5	8·5	3,150	52 30
Supreme, Wheeler	" 28	127	41·5	8·5	3,040	50 40
Red Bobs, Wright	" 28	127	41·5	8·5	2,920	48 40
Kitchener, Wheeler	Sept. 4	134	41·5	9·0	2,740	45 40
Kubanka, Sask. 6	" 4	134	50·0	5·0	2,700	45 –
Red Bobs, Wyler	Aug. 28	127	42·0	8·5	2,690	44 50
Kinley, Dybvig	Sept. 4	134	48·0	9·0	2,690	44 50
Early Triumph, Wheeler	Aug. 28	127	41·0	8·0	2,650	44 10
Early Red Fife, Ottawa 16	Sept. 4	134	47·0	8·0	2,620	43 40
Acme, Sask. 450	" 4	134	45·0	4·5	2,570	42 50
Marquis 10B, Wheeler	Aug. 29	128	43·0	8·0	2,470	41 10
Red Fife, Ottawa 17	Sept. 4	134	46·5	8·0	2,450	40 50
Kubanka, Ottawa 37	" 4	134	51·0	6·0	2,440	40 40
Marquis, Ottawa 15	Aug. 29	128	42·5	8·0	2,350	39 10
Garnet, " 652	" 18	118	39·0	9·5	2,260	37 40
Pioneer, " 195	" 24	123	39·5	6·0	2,170	36 10
Duchess, " 933	" 18	117	35·0	9·0	2,020	33 40
Ruby. " 623	" 21	120	41·5	8·2	2,000	33 20
Kota	" 26	125	41·0	3·0	1,850	30 50
*Orchard, Orchard	Sept. 4	134	47·0	8·0	2,680	44 40

*NOTE.—Only one small plot of this variety was grown owing to insufficient seed being supplied by the originator.

The Red Bobs strains made an unusually good showing. Three of the strains outyielded all other varieties, while a fourth strain came sixth on the list. While the Red Bobs has always given good returns, this is the first year that it has ever produced the highest yields. Of the five strains tested, the sample obtained from R. O. Wyler of Luseland appeared the most uniform, the sample of Supreme from Dr. Wheeler was a very close second. The seed for the Kitchener variety was obtained this year from Dr. Wheeler and presents a more uniform appearance than the strain that has been grown during previous years. All the strains of Red Bobs, the Kitchener, and Kinley wheat were infected with stem rust to a considerable extent. The Durum, Marquis, Red Fife and Garnet wheat, only showed traces of the rust, but the Duchess wheat was badly infected. Quite a number of the varieties lodged badly. The Durum and Kota wheat proved very weak in the straw. The latter variety because of its low yield and weak straw is not likely to prove popular in districts where other varieties can be successfully grown.



Showing weak straw in the Kubanka wheat and the stronger strawed bread wheats.

Red Fife and Marquis have now been grown for ten years and a number of other varieties for five years. The average yields for three different periods are included in the following table.

SPRING WHEAT—AVERAGE YIELDS

Variety	Three-year Average		Five-year Average		Ten-year Average	
	bush.	lbs.	bush.	lbs.	bush.	lbs.
Kitchener	31	13	28	33	....	....
Red Bobs	31	44	27	8	....	....
Early Red Fife, Ottawa 16	30	58	....	....	....	....
Red Fife, Ottawa 17	29	38	26	59	28	2
Marquis, " 15	27	52	24	54	26	55
Pioneer " 195	26	18	23	15	....	....
Garnet, " 652	25	....	21	45	....	....
Ruby, " 623	21	52	19	24	....	....

It will be noted that Red Fife has now a higher average yield than the Marquis. Under field conditions, the Marquis has the advantage over the Red Fife in not shattering so readily in the field. This is a valuable asset under conditions existing in northwestern Saskatchewan where fields are large and the grain so often ripens more rapidly than it can be cut with the binders. The Kitchener variety is at the top of the list for the five year period, while Red Bobs has the highest three year average.

OATS

The test of varieties of oats was made on land that had been summer-fallowed in 1922. Sixteen varieties were grown and the rate of seeding per acre was two bushels, excepting for the hulless variety, Liberty, of which one bushel per acre was sown. Owing to the heavy rainfall during June and July and to the abundance of plant food in the soil there was considerable lodging. The extent to which this took place is indicated in the following table under the heading "strength of straw."

OATS—TEST OF VARIETIES

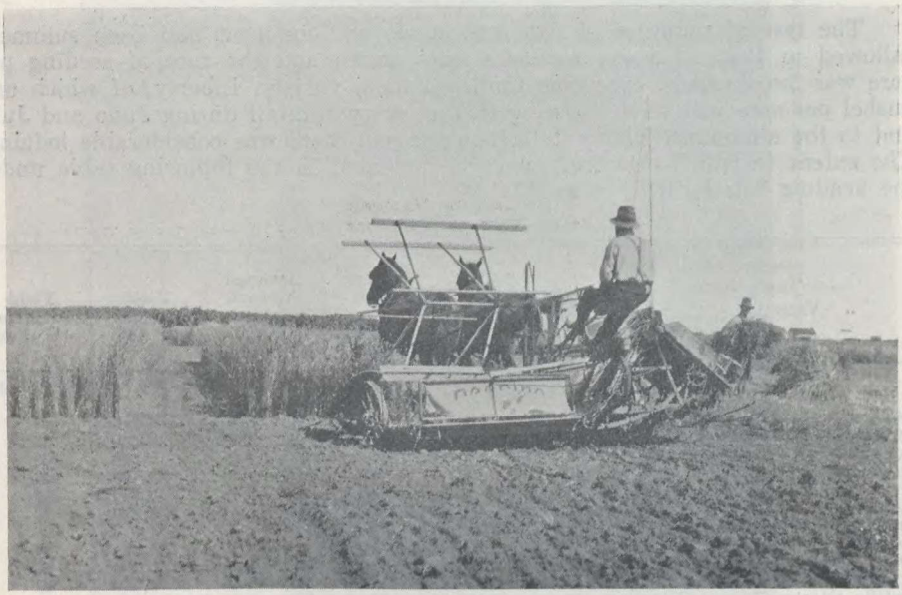
Variety	Date of ripening	Number of days required to mature	Average length of straw, including head	Average strength of straw, scale of 10 points	Yield of grain per acre	Yield of grain per acre	
		days	inches		lbs.	bush.	lbs.
Banner	Aug. 31	120	51·0	6·9	3,700	108	28
Gerlach	" 31	120	49·5	5·0	3,640	107	2
Gold Rain	" 31	120	49·5	6·4	3,630	106	26
Leader	" 31	120	47·0	7·5	3,490	102	22
O.A.C. No. 3	" 21	110	41·0	6·6	3,440	101	6
Victory	" 31	120	47·0	6·5	3,390	99	24
Daubeney, Ottawa 47	" 22	111	39·5	6·6	3,350	98	18
Longfellow, Ottawa 478	" 31	120	51·0	6·0	3,300	97	2
Great Russian	" 31	120	49·0	6·0	3,200	94	4
Columbian, Ottawa 78	" 31	120	47·5	8·0	3,180	93	8
Prolific, Ottawa 77	" 31	120	49·0	6·3	3,110	91	16
Norway King	" 31	120	47·0	6·0	3,070	90	10
Tartar King	" 31	120	46·5	8·0	2,830	83	8
Cole, Sask. 795	" 19	108	37·0	6·4	2,770	81	16
Alaska	" 20	109	42·0	6·4	2,590	76	6
Liberty, Ottawa 480	" 31	120	48·5	8·6	2,020	59	14

Banner oats have again given the highest yield. The variety Gerlach, which was fourth in 1922 is second, while Gold Rain, which gave the highest yield in 1922 is third. Victory is down to sixth place. O.A.C. No. 3 has given the best yield of the early maturing sorts, while Cole, the earliest ripening variety, which along with O.A.C. No. 3 was grown under test for the first time this year is down to the fourteenth place. Norway King, a side or "mane" oat, the seed of which was received from a farmer in the Tramping Lake district, yielded over 18 bushels per acre less than Banner.

Four varieties have been grown on summer-fallowed land for a period of nine years. Owing to quite a number of varieties having been introduced into the tests in 1922, the only other average obtainable is the two-year average which is included in the following table.

OATS—AVERAGE YIELDS

Variety	Two-year average		Nine-year average	
	bush.	lbs.	bush	lbs.
Banner, Ottawa 49	79	29	71	28
Gold Rain	77	22	69	25
Gerlach	76	20	....	....
Victory	75	21	69	22
Leader	72	21	....	....
Great Russian	69	27	....	....
Daubeney, Ottawa, 47	68	35	56	12
Columbian, " 78	67	27	....	....
Longfellow, " 478	67	23	....	....
Prolific, " 77	64	6	....	....
Tartar King	63	23	....	....
Alaska	53	7	....	....
Liberty, Ottawa 480	47	27	....	....



Harvesting cereal plots at Scott.

The Banner has the highest average yields both for the two-year and the nine-year periods, outyielding its nearest competitor, Gold Rain, by two bushels per acre. Banner has given good yields both in the dry seasons and in the moister years. Leader in the two-year average is down to fifth place with an average return of 7 bushels per acre less than the leading variety. Tartar King, the only side oat in this list, has given 16 bushels per acre less than the Banner. The hulless oat, Liberty, with a yield of 47 bushels and 27 pounds, is considerably below most of the other varieties, even though 30 per cent is allowed for the hulls on the other oats. Feeding experiments are under way on this Station to determine whether the hulless oats are profitable to feed to young pigs, calves, poultry, etc.

BARLEY

Eleven varieties of barley were sown on land that had been summer-fallowed the previous year. The seed was used at the rate of two bushels per acre. Quite a number of the varieties lodged badly, this influenced the returns from some of the tests. Since quite a number of the varieties were only introduced three years ago, the average for a three-year-period is included in the table following:—

BARLEY—TEST OF VARIETIES

Variety	Number of days required to mature	Average length of straw, including head	Average strength of straw, scale of 10 points	Yield of grain per acre 1923	Yield of grain per acre 1923		Average yield per acre three-years	
	days	inches		lbs.	bush.	lbs.	bush.	lbs.
Duckbill, Ottawa 57	114	45·0	9·3	2,670	55	30	34	10
Albert	94	40·0	8·3	2,600	54	8	28	17
O.A.C. No. 21	104	41·5	3·2	2,480	51	32	35	37
Barks Excelsior	114	33·0	7·0	2,470	51	22	....	....
Gold	104	34·0	6·2	2,420	50	20	35	37
Barks C.P.R.	114	35·6	6·5	2,390	49	38	37	43
Himalayan (hulless) Ottawa 59	96	33·2	4·0	2,310	48	6	35	10
Keystone, Sask. 228	104	44·0	2·5	2,290	47	34	....	....
Gordon A	104	46·0	5·7	2,110	43	46	28	6
Chinese, Ottawa 60	104	43·5	3·7	2,020	42	4	32	12
Stella, " 58	104	44·5	4·2	1,930	40	10	30	28

Duckbill, a two-rowed sort that has been grown on this Station for quite a number of years, gave the highest yield. This was due mainly to its having stood up while other varieties, except the Albert, lodged to a considerable extent. The O.A.C. No. 21 and Keystone proved particularly weak in the straw. The latter is a selection from the O.A.C. No. 21. The Barks barley has the highest three-year average, but it is rather short in the straw for this district. Himalayan, the hulless variety, produced fair returns this year, and has a fairly high three-year average, but it too is short in the straw and lodges badly. The Albert variety is the earliest maturing under test, and was second highest this season, but in the dry years has not given good returns.

PEAS

Four varieties of peas were tested. All were sown on summer-fallow. Uniform stands were obtained on all plots.

PEAS—TEST OF VARIETIES

Variety	Number of days required to mature	Average length of vine	Average length of pod	Yield of grain per acre 1923	Yield of grain per acre 1923		Average yield per acre three-years	
	days	inches	inches	lbs.	bush.	lbs.	bush.	lbs.
Early White	146	59	2·0	1,440	24	....	22	14
Arthur, Ottawa 18	146	60	2·25	1,380	23	....	21	49
Solo	146	59	2·25	1,610	26	50	21	26
Chancellor, Ottawa 26	146	54	1·75	1,100	18	20	20	16

The variety Solo gave the highest yield this year, but has the second lowest three-year average. The Early White, a selection made by the University at Saskatoon, is a small-seeded early white pea that has proven fairly productive on this Station. The Arthur has the second highest three-year average. It has a longer pod and a larger seed than the Early White. It splits easily in threshing, but there is a ready market for split peas.

FLAX

Three varieties of flax were grown on summer-fallow. Two of these varieties have been under test for a period of seven years and the average returns from this period are included in the following table.

FLAX—TEST OF VARIETIES

Variety	Length of straw	Yield per acre 1923	Yield per acre 1923		Average yield per acre	
	Inches	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Premost	19	500	8	52	8	26
Crown	18	465	8	17	–	–
Novelty, Ottawa 53	18½	455	8	7	8	37

The soil in this district is not considered satisfactory for the flax crop, and it is but little grown in the vicinity of the Station. In some districts with a heavier soil, flax has proven profitable. Where wire worms are prevalent it is frequently grown on the heavier land for the first few years after bringing the land under cultivation. It will be noted from the table that the yields of all varieties were low and that there is very little difference in yield from the three varieties under test this year.

SPRING RYE

Two varieties of spring rye and one of Einkorn wheat were grown in the comparative test plots. The wheat was sent to the Station under the name of Siberian spring rye and as such had been exhibited at a local seed fair. The following table gives the results obtained for the year 1923 and the average yields for a five-year period for the two varieties of rye.

SPRING RYE—TEST OF VARIETIES

Variety	Number of days required to mature	Average length of straw including head	Average strength of straw scale of 10-points	Yield of grain per acre 1923	Yield of grain per acre 1923		Average yield per acre five-years	
	Days	Inches		Lbs.	Bush.	Lbs.	Bush.	Lbs.
Prolific	118	48·0	5·0	2,980	53	12	34	44
Ottawa Select 12	117	47·5	6·5	2,880	51	24	29	44
Einkorn wheat	119	45·5	3·75	1,970	35	10	–	–

The Prolific spring rye has invariably outyielded the Ottawa Select No. 12, and in the five-year period has an average lead of 3 bushels per acre. The Einkorn wheat is also known as One-Grained Wheat, receiving the name from producing but one kernel in each spikelet. It will be noted that it produced 1,010 pounds of grain less than the Prolific rye.

WINTER RYE

Only two varieties of winter rye were tested. These were sown on summer-fallowed land on August 23, 1922. Half of each plot was mulched with straw to decrease winter injury.

Fall rye has seldom produced good yields on this Station. The Dakold is the hardiest variety tested. The Rosen has proven insufficiently hardy and will be dropped from the tests this year.

WINTER RYE—TEST OF VARIETIES

Variety	Winter protected straw mulch. yield per acre	No mulch Yield per acre	Average yield per acre 1923	
	Lbs.	Lbs.	Bush	Lbs.
Dakold	1,060	800	16	34
Rosen	120	winter killed	1	4

FALL WHEAT

Sufficient seed for two plots of the Kharkov variety of winter wheat was obtained from the Dominion Experimental Station, Lethbridge. The seed was sown on summer-fallowed land on August 28 and although part of each plot was mulched with straw, the crop winter-killed completely.

SEED GRAIN

The season has been favourable for the production of good seed. The following table gives the quantities of seed grain produced and the yield per acre.

SEED GRAIN PRODUCTION

—	Area	Total yield	Yield per acre
	Acres	Bush.	Bush.
Marquis 10B	1·03	40	38·9
Banner, Ottawa 49	6·0	560	93·0
Liberty, Ottawa 480	5·55	379	68·2
Spring Rye (Prolific)	5·19	293	56·4

FORAGE PLANTS

The season of 1923 was only moderately favourable for the production of forage crops. The months of April and May were dry, consequently hay yields were only fair. The late summer months were too dry to obtain the best results from corn, sunflowers and field roots. Annual hay crops were exceptionally heavy due to the abundance of rain in June and July.

In the comparative tests of varieties, in most instances, quadruple plots of each variety were used. With a number of forage crops, the green weights were taken at harvest time and representative samples of each variety were dried indoors. Where this was done both the green weights and the dried weights are shown in succeeding tables.

ENSILAGE CROPS

INDIAN CORN

Thirteen varieties and strains of field corn were planted on summer-fallow. The seed was sown with the grain drill which was set at 3 bushels of wheat

per acre and the rows were 30 inches apart. The object of the thick seeding was to make sure of a uniform stand for the variety tests. The moisture during June and July was favourable to the thick seeding, but for field work thinner seeding would appear advisable. When the drill was set at 2¼ bushels of wheat per acre with the rows 3 feet apart a good stand of corn was obtained in the fields on the Station. The plots were sown on May 19 and cut September 8.

CORN FOR ENSILAGE—TEST OF VARIETIES

Variety	Seedsman	Average height of plants	Average stage of maturity	Average yield per acre	
				Green weight	Air dried
		Inches		Tons Lbs.	Tons Lbs.
Comptons Early	J. O. Duke	56	Tassel	14 710	3 143
Longfellow	J. O. Duke	55	"	12 1,872	2 1,659
Wisconsin No. 7	John Parks	60	"	11 1,958	2 1,043
Leaming	John Parks	61	Early tassel	11 1,892	2 1,029
Northwestern Dent	Brandon Exp. Farm	68	Early silk	11 836	2 989
Northwestern Dent	McKenzie	67	" "	11 638	2 946
White Cap Yellow Dent	Steele Briggs	60	" tassel	11 902	2 820
Golden Glow	J. O. Duke	56	" "	10 1,900	2 709
Quebec 28	Macdonald College, Que.	68	Late tassel	10 328	2 441
Northwestern Dent	Indian Head Exp. Farm	68	Early tassel	10 328	2 279
Wisconsin No. 7	J. O. Duke	62	Tassel	9 1,734	2 161
North Dakota	Steele Briggs	72	Late tassel	10 130	1 1,774
Leaming	J. O. Duke	54	Early tassel	8 1,358	1 1,653

It will be noted that Comptons Early has given the heaviest yield. This variety has the heaviest average yield of fodder corn at this Station for a period of years. The strains of Northwestern Dent were the only ones to reach the early silk stage.

Strains of Northwestern Dent

Two strains of Northwestern Dent corn were grown under field conditions. The field had produced a light crop of sweet clover in 1922 and had been summer-fallowed after the first cutting was removed. The seed from Brandon was from a strain that had been grown on that Farm for several years. The plants emerged earlier and developed more rapidly than did the strain from Indian Head. The former yielded 10 tons 36 pounds per acre and the latter 9 tons 556 pounds.

SUNFLOWERS

In the two past years the yields from the varieties of sunflowers have not been comparable due to rabbits destroying some of the plants. This season a low fence was made and poultry netting was used to exclude the rabbits. This proved to be satisfactory and uniform tests have been obtained. Triplicate tests were made with each variety and the yields quoted in the succeeding table are the averages from the triplicate tests. The seed was sown by hand on May 11, and the crop was harvested on September 8.

SUNFLOWERS—TEST OF VARIETIES

Variety	Seedsman	Average height of crop	Average stage of maturity	Average yield per acre	
				Green weight	Air dried
		Inches		Tons Lbs.	Tons. Lbs.
Manchurian	McKenzie	76	95% bloom	16 562	4 140
Giant Russian	Dakota Improved Seed Co.	102	30% "	15 1,275	3 1,818
Mammoth Russian	McDonald	102	30% "	15 1,271	3 1,817
Ottawa No. 76	C. E. F.	60	Late flowering	9 1,605	2 240
Mixed Mennonite	Rosthern	72	" "	6 1,926	2 195

ANNUAL HAY CROPS

Five kinds of annual crops were tested for hay production. Three of these were sown in the uniform duplicate test plots on May 28. The land had produced a crop of sweet clover in 1922 and was ploughed in the spring previous to seeding and given the usual spring treatment. A sample of Teff grass was received too late to include in the regular test but was compared with oats. The oats and Teff grass were sown on summer-fallowed land on June 15.

ANNUAL HAY CROPS

Crop	Rate of seeding per acre	Date cut	Yield per acre	
			Green weight	Air dried weight
	Lbs.		Tons Lbs.	Tons Lbs.
Oats and Peas	47 oats 47 peas	Aug. 16....	13 1,720	3 1,800
Oats	68	" 16....	13 280	3 760
Hungarian Millet	20	" 16....	8 720	1 1,120
Hubam Sweet Clover	20	" 30....	3 1,100	- 1,760
OATS AND TEFF GRASS				
Oats	68	Sept. 24....	8 800	4 1,160
Teff Grass	10	" 24....	2 1,800	1 1,400

The yields obtained are considerably above the average. Oats and peas have again headed the list. It will be noted that although annual sweet clover made a fair return, it gave considerably less yield than any of the other crops. Teff grass might have given better results had it been sown earlier.

VARIETIES OF OATS FOR HAY

On the prairies the oat crop is the most commonly used of the cereals for hay production. The practice has been to cut the oats with the binder thus decreasing the cost of curing and stacking. The question as to the best time to cut oats has given rise to quite a number of controversies. Oats are cut for feeding in the sheaf from the time when they are quite green until they are quite ripe. During the past two seasons experiments have been conducted to determine not only the best time to cut the oats for hay, but the best yielding varieties. Chemical analyses are under way to determine the returns from the chemical standpoint.

VARIETIES OF OATS FOR HAY

Variety	Yield per acre—Turning		Yield per acre when ripe	
	Green weight	Air dried weight	Green weight	Air dried weight
	Tons Lbs.	Tons Lbs.	Tons Lbs.	Tons Lbs.
Banner	11 272	5 1,658	5 1,392	3 1,547
Cold Rain	11 400	5 500	8 -	2 925
Daubeney	9 1,328	3 1,248	5 880	3 1,820
Liberty	9 1,200	4 1,000	5 880	3 464
Victory	8 1,536	5 138	6 1,312	5 400
Alaska	8 768	3 1,205	7 1,232	2 640
Leader	7 1,744	5 86	5 240	4 320

VARIETIES OF PEAS FOR HAY

Four varieties of field peas were sown on summer-fallowed land on June 15. All varieties were cut for hay on August 18, or 64 days after sowing. Duplicate tests were made and the yields quoted in the following table are the average yields from the two tests. In seeding the drill was set at two bushels of peas per acre for peas and two bushels of oats per acre for the oats.

PEAS FOR ANNUAL HAY CROPS

Crop	Stage of maturity when cut	Average yield per acre	
		Green weight	Air dried weight
		Tons Lbs.	Tons Lbs.
Arthur	75% flowering	7 440	1 143
Early White	Early pod	6 1,480	– 1,898
Prussian Blue	50% flowering	6 1,040	– 1,936
Chancellor	Full flower	6 640	– 1,678
Oats (Banner)	Flowering	8 80	– –

No air dried weights were taken for the oats, but the results from other tests made would indicate that the returns would be double the returns from the best yielding variety of peas.

PERENNIAL AND BIENNIAL HAY CROPS

PERENNIAL AND BIENNIAL HAY CROPS—KINDS

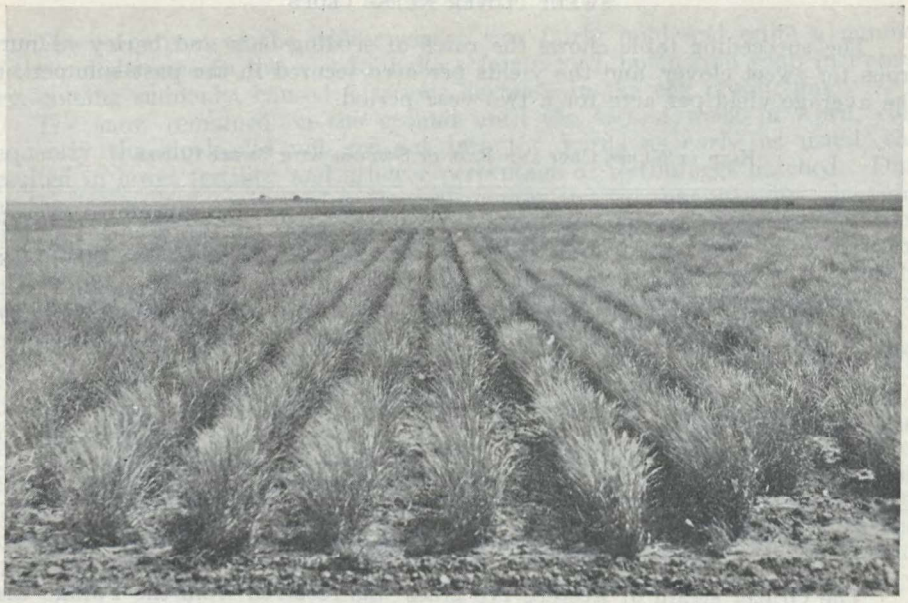
Crop	When sown	Yield of cured hay per acre 1923
		Tons Lbs.
Western Rye Grass	1922	3 560
Brome Grass	1922	2 1,200
Alfalfa	1922	1 880
Sweet Clover	1922	2 260
Western Rye Grass and Brome Grass	1922	3 1,200

It will be noted that a combination of western rye grass and brome grass has given a heavier yield than western rye grass alone. During the dry seasons it was found that either the western rye grass or brome grass alone outyielded the combination of the two grasses.

MIXTURE OF WESTERN RYE GRASS AND SWEET CLOVER

These two forage crops have given good satisfaction on the Station when sown in combination. The sweet clover is more easily cured when mixed with western rye grass than when sown alone. It only makes a moderate part of the first cutting, but if the crop is cut early in the season there is a good aftermath, principally of sweet clover, that can either be cut for hay or pastured. When cut for hay in the first cropping year, the sweet clover does not appear in the second year unless the seed failed to germinate freely the first summer.

Considerable attention is being given to ascertaining the best proportion in which to use western rye grass and sweet clover. It is important to have a good stand of sweet clover the first year in order to secure as heavy a crop as possible, but it is also necessary to have sufficient western rye grass so that there will be a good stand after sweet clover has died out.



Grazer—The first named variety of western rye grass. Seed yield from this field in 1922, 480 pounds; in 1923, 660 pounds.

The following tables give the yields obtained during the past summer from the several rates of seeding western rye and sweet clover, and the yields obtaind in the years 1922 and 1923 from the 1921 seeding:

WESTERN RYE GRASS AND SWEET CLOVER SOWN 1922

	Yield per acre Cured Hay, 1923	
	Tons	Lbs.
Western rye, 8 lbs., Sweet Clover 4 lbs.	3	1,200
" 8 " " 6 "	3	1,520
" 8 " " 8 "	3	1,400
" 8 " " 10 "	3	1,280
" 8 " " 12 "	3	1,120
" 4 " " 8 "	3	1,880
" 6 " " 8 "	3	1,660
" 10 " " 8 "	3	1,400

WESTERN RYE GRASS AND SWEET CLOVER SOWN 1921

	Yield per acre					
	Western Rye and Sweet clover 1922		Western Rye 1923		Average Yield, 2 years	
	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.
Western rye, 8 lbs., Sweet clover, 4 lbs	1	1,440	1	1,840	1	1,640
" 8 " " 6 "	1	1,560	1	1,880	1	1,720
" 8 " " 8 "	2	600	2	160	2	380
" 8 " " 10 "	2	880	1	1,960	2	20
" 8 " " 12 "	3	160	1	1,880	2	40
" 4 " " 8 "	2	240	2	160	2	200
" 6 " " 8 "	2	320	2	200	2	260
" 10 " " 8 "	1	1,840	4	280	2	160

SWEET CLOVER NURSE CROPS

The succeeding table shows the rates of seeding oats and barley as nurse crops for sweet clover, and the yields per acre secured in the past summer and the average yield per acre for a two year period.

KIND OF NURSE CROP AND RATE OF SEEDING WITH SWEET CLOVER

Nurse Crop used	Yield per acre Cured Hay, 1923		Average Yield per acre Cured Hay, 2 years	
	Tons	Lbs.	Tons	Lbs.
Oats, ½ bushel per acre	2	2,600	2	50
" ¾ " "	2	1,200	2	450
" 1½ " "	2	600	2	290
" 2 " "	1	1,400	1	1,480
Barley, ½ bushel per acre	1	480	1	720
" ¾ " "	2	1,680	2	1,630
" 1 " "	1	400	1	920
" 1½ " "	1	200	1	780

GRAZER—WESTERN RYE GRASS

The Grazer strain of western rye grass was received from the Forage Crop Division at the Central Experimental Farm, Ottawa in 1919, and until the past year was known as Strain No. 5. During the present year it was given the name of "Grazer" for the reason that it produces, when conditions are favourable, a fair amount of aftermath. It gives a fairly fine quality of hay, and good returns when allowed to produce seed.

Five pounds of seed was supplied the Scott Station in 1921 by the Forage Crop Division. The seed was sown in rows 36 inches apart and spread over an area of 3.08 acres of land. During the past two years a total of 3,461 pounds of seed has been threshed from the area where the original five-pound sample was sown. In these two years the seed has been multiplied almost seven hundredfold, the 3.08 acres yielded 1,457 pounds of seed in 1922 and 2,004 pounds in 1923, or a total of 3,461 pounds of seed in the two seasons.

FIELD ROOTS

Twenty-two varieties of swede turnips, 12 of fall turnips, 21 of mangels and 6 of sugar beets were sown in quadruple test plots on May 21. The plots were harvested October 10. During the months of June, July, and part of August the roots made good growth but the dry weather in the autumn stunted the growth so that barely an average crop was harvested. Several varieties of carrots were sown but damage from gophers eating off the tops made a comparison impossible.

The two leading varieties of turnips were White Globe and Purple Top Mammoth, this latter variety is called Improved Greystone by some seedsmen. These are both fall varieties. Two strains of Bangholm were the highest yielding swedes. The highest yielding varieties of mangels were from seed of Danish origin. The highest yielding Canadian variety was Yellow Intermediate, the seed for which had been grown at the Central Experimental Farm. The sugar beet seed received from the Dominion Sugar Company of Chatham, Ontario, and the seed obtained from Vilmorins in Paris, France, produced equal yields, while a Danish strain was third.

POULTRY

The early part of the winter season was fairly mild and quite a number of the pullets were on the way to make a fair record, but a cold snap in February, coming suddenly, caused a serious decrease in the egg production.

The snow remained on the ground until the second week in April, consequently the stock did not get out into the yards as early as usual, this resulted in lower fertility and a lower percentage of fertile eggs hatched. During the spring and again during the fall months the weather was dry, the rains came principally during June and July. There was no extremely hot weather, consequently the chicks thrived well on range and at the close of the season there was an exceptionally fine lot of Barred Rock pullets for use on the Station during the coming year, also a considerable number of well developed cockerels to be sold to farmers to improve the flocks throughout this territory.

TEMPERATURES IN POULTRY HOUSES

Records were kept of the temperatures in two of the poultry houses on the Station during the three mid-winter months. The permanent poultry house contained 100 birds and has a straw loft. Both buildings have the regulation cotton fronts with some glass. Both have walls with a double ply of lumber and paper between. The colony house, however, had a shed roof and no straw loft.

WINTER TEMPERATURES IN POULTRY HOUSES

Month	Highest monthly reading	Lowest monthly reading	Mean Temperature for month
PERMANENT POULTRY HOUSE	°F.	°F.	°F.
December	46	−04	19·2
January	44	−16	20·4
February	54	−14	20·3
PORTABLE POULTRY HOUSE			
December	48	−06	18·2
January	44	−04	17·0
February	52	−14	19·7
OUTDOORS (IN SHADE)			
December	39	−32	6·4
January	37	−27	4·3
February	38	−40	7·2

It was observed that the larger building was the least influenced by a sudden change in temperature. The mean temperature was higher in the permanent house and considerably higher than the temperature out of doors.

EGG PRODUCTION

During the poultry year the hens laid 9,296 eggs and the pullets 16,078, or a total of 25,374. The average number of eggs per bird per month from the pullets was 10.5 and from the hens 9.9. The production from the pullets was low, due to the unfavourable weather conditions prevailing during the month of February.

INFLUENCE OF DATE OF HATCHING ON EGG PRODUCTION

It is generally believed that early hatching plays an important part in determining the egg production during the pullet year. Records were kept of the date of hatching of a number of pullets for each of several periods—the returns from the pullets of different ages are given below:

INFLUENCE OF AGE OF PULLETS ON EGG PRODUCTION

Time of Hatching	Number of Eggs laid during the Pullet year
Early April	159
Late April	173
May	135
Early June	129

The early April pullets went into a partial moult which may account for the lower egg production as compared with the late April pullets. During the past year this moult was avoided by keeping the earliest pullets separate and not pushing them too rapidly during the latter part of the season.

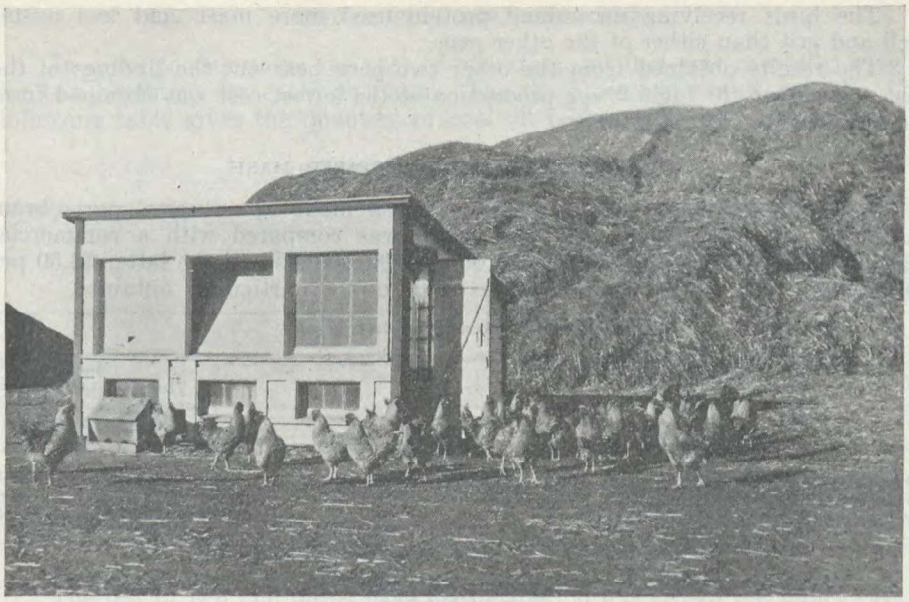
FEEDS FOR POULTRY

To secure the maximum egg production during the winter months it is important to feed well balanced rations. The feeding must be done regularly and in a systematic way. On the farms during the summer poultry can pick up a considerable part of their living, but during the winter months the birds must be well fed if winter eggs are to be obtained. Grit, oyster shell, and charcoal can be fed in a small self-feeder, and a slightly larger one can be used for the mash. This leaves only the scratch grain, green feed, water and milk to be supplied daily. On the Experimental Station the plan followed, in feeding in the winter, is to give about one ounce of scratch grain per bird in the litter as soon as it is light in the morning; sprouted oats are fed about 10 a.m.; and sufficient wet mash is given at 1 p.m. so that all is cleaned up in about twenty minutes. Just before the birds go to roost at night they are given a full feed of the scratch grain, well scattered around over the litter. The following table shows the composition of the scratch grain and the mash used.

WINTER FEEDS FOR LAYING BIRDS

Scratch Grain		Meal Mash	
Whole wheat	2 parts by weight	Oat chop	100 lbs.
Whole oats	1 part "	Bran	100 "
Whole barley	1 part "	Shorts	100 "
		Corn meal	100 "
		Beef scrap	100 "

The beef scrap can be omitted if milk is supplied. An experiment has been started this year to determine how necessary it is to feed corn. The following are the average quantities of feeds that were consumed per bird in one of the pens on the Station during the month of January.



Barred Rock cockerels at Scott secured most of their feed from around the straw pile—grain that would otherwise have been wasted.

MONTHLY FEED REQUIREMENTS PER BIRD

Scratch grain	5¾ lbs.
Meal mixture	3 "
Grit	2 ounces
Oyster shell	2 "
Charcoal	¼ "

The quantity of food consumed will vary with the number of eggs produced as well as with the breed that is kept, and the amount of range allowed. In this instance the birds were kept inside the house during the entire month. Seventeen out of the 23 pullets were producing. The profit over feed cost for the 23 birds was $8.23.

BEEF SCRAP AND MILK FOR EGG PRODUCTION

This experiment follows up one conducted in 1921-22, when it was found that winter eggs were more economically produced when milk was fed, instead of beef scrap. The experiment this year was planned to include one group of birds that received neither milk nor beef scrap. Three lots were used, each containing 26 Barred Rock pullets fairly uniform as to age, breeding, etc. The experiment was conducted during the winter months and covered a period of 90 days.

MILK VS. BEEF SCRAP FOR EGG PRODUCTION

	Check lot no beef scrap or milk	Beef scrap	Milk
	$ cts.	$ cts.	$ cts.
Total value of feed consumed	7 65	8 62	8 77
Total cost of feed per bird	0 29	0 33	0 34
Average number of eggs produced	eggs 10	eggs 17	eggs 19
Cost per dozen to produce eggs	0 33	0 23	0 21

The birds receiving no animal protein used more mash and less oyster shell and grit than either of the other pens.

The results obtained from the other two pens bear out the findings of the past year when the highest egg production at the lowest cost was obtained from the pen receiving the skim milk.

COMMERCIAL VS. HOME PREPARED MASH

In this experiment a home prepared mash made up of equal parts bran, cornmeal, oat chop, shorts and beef scrap was compared with a commercial mash. The cost of the former was $1.66 per 100 pounds and the latter $4.50 per 100 pounds. The following table gives some of the particulars obtained.

COMMERCIAL VS. HOME PREPARED MASH

—	Home prepared mash	Commercial mash
Total value of feed used	$18 84	$32 40
Total cost of feed per bird	0 37	0 62
Average number of eggs produced per bird	eggs 24	eggs 16

INCUBATION

Four makes of incubators and the natural method of incubation were used in hatching this year. The incubators were operated in a cement basement under the poultry administration building. The hens were set out of doors on the ground. Small portable coops, each sufficiently large for one hen, were used for shelter. Attached to each coop there is a small enclosure about 4 feet long made of lath. The setting hens are confined in these coops from a couple of days previous to putting the eggs under them up to the time the chicks are of sufficient age to follow the hens around the yards. This makes a very satisfactory method of confining the setting hens. A further description of these coops can be obtained from the Scott Station.

INCUBATORS AND NATURAL METHOD OF INCUBATION

Name of Incubators	Number of eggs set	Per cent eggs fertile	Per cent of fertile eggs hatched
		p.c.	p.c.
Buckeye (2 machines used)	1,326	81·22	45·86
Prairie State	752	86·57	37·94
Tamlin	305	85·57	49·61
Queen	258	82·17	45·28
Hens	436	84·17	56·01

The percentage of fertility and the per cent of fertile eggs hatched are with one exception considerably lower than in 1922. The percentage of fertile eggs hatched by the hens was highest in 1923. It may be pointed out here that while the incubators were set early in the season, the hens were not set until the last week in April. The Queen incubator that gave the best results in the previous year is down to third place. This may be due to the fact that the regulator for the lamp did not work properly. The Tamlin, which is a hot water machine, has given satisfactory results both years. This machine is made in England and is rather expensive.

COST OF FUEL FOR INCUBATORS

In order to determine the cost of operation, all fuel was carefully weighed for two hatchings for each incubator. The machines ran simultaneously. The following table gives the quantity of coal oil required for each 100 eggs:

FUEL REQUIREMENTS FOR INCUBATORS

Name of machine	Capacity	Coal oil required for each 100 eggs
	Eggs	Lbs.
Prairie State	240	9·2
Buckeye	250	12·2
Queen	135	16·9
Tamlin (hot water)	100	17·7

This work has only been conducted the one season, but it is planned to carry it on another year.

HENS VS. PULLETS' EGGS FOR INCUBATION

The test of hen and pullet eggs for incubation has shown the pullet eggs to have a higher hatching percentage. This is contrary to results obtained in previous years. It was found, however, that the losses of chicks hatched from the pullet eggs were much greater than those hatched from hen eggs. This is in accordance with the findings of previous years.

HENS VS. PULLETS EGGS FOR INCUBATION

—	Total eggs set	Per cent eggs fertile	Per cent of fertile eggs hatched
	Eggs	p.c.	p.c.
Hens	436	84·17	48·50
Pullets	301	78·07	56·01

DATE OF HATCHING

One of the difficulties encountered in trying to secure early pullets is the lack of fertility in the eggs during the early spring months. The first eggs were set in March, and the chicks hatched out early in April. The following table gives some of the particulars obtained from this experiment.

TIME OF HATCHING

Time set	Total eggs set	Per cent eggs fertile	Per cent fertile eggs hatched
	Eggs	p.c.	p.c.
March	1,003	69·49	46·91
April	1,144	75·61	35·37
May	1,064	85·62	57·4

It will be noted that the fertility increased rapidly as the season advanced. The lower percentages of fertile eggs hatched in April may be due to the lack of ventilation in the incubator room. During the early season fewer incubators were operating and during the latter part of the season it was possible to obtain good ventilation.

COST OF RAISING CHICKS HATCHED IN INCUBATORS

This is the second year that the cost of raising chicks has been ascertained. No estimate has been made on the cost of the eggs used for hatching, or on the labour requirements, as these two items vary widely.

Cost of oil for incubators	$ 16 80
Cost of oil for brooding	38 82
Cost of all feed from hatching to November 1	106 00
Total cost aside from eggs and labour	162 13

The stock on hand, raised in incubators, on November 1, 1923, were as follows: 189 choice pullets; 61 choice cockerels; 43 inferior birds.

Sales of broilers previous to November 1 amounted to $60.85. The total cost aside from cost of eggs and labour for the 293 birds on hand was $101.28 or 0·35 cents per bird. In the experiment conducted a year ago the cost amounted to 0·33 cents per bird.

BEES

Two colonies of bees were received from the Bee Division of the Central Experimental Farm, Ottawa, on May 18. Both colonies arrived in good condition. One was put on a scale and daily weighings made. The colony remained at 50 pound until about June 1, when the Caragana commenced to flower. In a ten day period from June 5 to the 15, there was an average increase in weight of 3 pounds per day. Wet weather set in and for the remainder of the month there was very little honey gathered. There was also a shortage of flowers during this period. The sweet clover commenced to bloom early in July and furnished the greater part of the honey for the remainder of the season. The total honey secured amounted to 60 pounds of extracted.

Three swarms were obtained and at the close of the season there are on hand five colonies in good condition. One colony was stored in the cellar for the winter, the other four colonies were put in a packing case to be wintered out of doors.

A syrup made from granulated sugar was fed the bees. An average of about 20 pounds per colony was used to furnish sufficient stores for winter.

LIST OF PROJECTS UNDER WAY AT THE EXPERIMENTAL STATION, SCOTT, SASK.

ANIMAL HUSBANDRY

PROJECT NO.	TITLE
	BEEF CATTLE
A. 179.	Cost of beef production for steers of different ages.
A. 195.	Sunflower silage for steer feeding.
A. 196.	Feeding horned vs. dehorned steers.
A. 197.	Corral vs. straw shed for wintering steers.
A. 254.	Breeding for dual purpose beef cattle.
A. 255.	Cost of milk production from dual-purpose cattle.
A. 256.	Cost of rearing dual-purpose calves.
	SWINE
A. 110.	Value of rape as a pasture crop for hogs.
A. 120.	Self-feeder vs. trough feeding.
A. 147.	Feeding hogs inside vs. outside.
A. 163.	Cost of bacon production.
A. 235.	Value of buttermilk for hog feeding.
A. 236.	Whole grain vs. ground grain for hog feeding.
A. 237.	Barley vs. rye for hog feeding.
A. 238.	The economy of cross-bred hogs for market.
	HORSES
A. 291.	Whole vs. ground grain for horses.
A. 293.	Cost of horse labour.
A. 294.	Cost of rearing horses.
A. 296.	Cost of wintering idle horses.
A. 297.	Grading up horses with pure-bred sires.
	SHEEP
A. 305.	Treating goitre in sheep.
A. 306.	Screenings for lamb feeding.
A. 307.	Winter feeding of lambs.
A. 308.	Sunflower silage vs. roots as a succulence.
A. 309.	To determine the age at which to breed lambs.
A. 310.	Grading up the flock with pure-bred rams.
A. 311.	Cost of maintaining breeding ewes.
A. 312.	Comparison of pure-breds vs. cross-breds.

FIELD HUSBANDRY

	ROTATION EXPERIMENTS
F. 105.	Two-year rotation—Summer-fallow; wheat.
F. 106.	Three-year rotation—Summer-fallow; wheat; wheat.
F. 108.	Three-year rotation—Summer-fallow; wheat; ½ oats and ½ sweet clover.
F. 109.	Three-year rotation—Summer-fallow; wheat; fall rye.
F. 123.	Six-year rotation—Summer-fallow; wheat; oats; oats; hay; pasture.
F. 132.	Eight-year rotation—Summer-fallow; wheat; wheat; summer-fallow; sunflowers; barley; hay; pasture.
	CULTURAL EXPERIMENTS
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F. 145.	Summer-fallow substitutes.
F. 146.	Stubble treatment.

PROJECT NO. TITLE

F. 147. Breaking sod from cultivated grasses and clovers.
F. 148. Depth of ploughing.
F. 149. Soil packers.
F. 155. Dates of seeding spring grain crops.
F. 156. Dates of seeding corn and sunflowers.
F. 157. Date of seeding fall rye.
F. 161. Rates of seeding spring grain crops.
F. 167. Method of seeding corn.
F. 168. Method of seeding sunflowers.
F. 169. Methods of seeding grass and clover mixtures.
F. 173. Seeding grain with various types of drills.
F. 177. Harrowing growing grain crops.
F. 182. Time of cutting sunflowers.
F. 184. Winter protection for fall sown crops.
F. 185. Shrinkage of corn and sunflowers after cutting.

MANURE AND COMMERCIAL FERTILIZER EXPERIMENTS

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F. 190. Manure for oats.
F. 192. Manure for corn, sunflowers or potatoes.
F. 194. Green manure crops.

FARM MANAGEMENT EXPERIMENTS

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F. 196. Cost of operating tractor.
F. 197. Cost of producing farm machinery.
F. 199. Yield and profit from various silage crops.

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