DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL FARM

INDIAN HEAD, SASKATCHEWAN

REPORT OF THE SUPERINTENDENT

N. D. MacKENZIE, B.S.A.

FOR THE YEAR 1923

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REPORT OF THE SUPERINTENDENT, N. D. MacKENZIE, B.S.A.

FOR THE YEAR 1923

SEASONAL NOTES

Spring conditions were about average—the heavy coating of snow disappeared soon after the middle of April and work on the land commenced on April 21, when the first wheat was seeded. A heavy fall of snow on April 24 held up further work for four more days and then, with fairly good weather, seeding was rapidly completed. The month of May was mostly fairly dry and warm and germination and growth was rapid. Showers at the end of the month and early in June brought the crops on well and growth was very rapid, especially with the hay crops. Haying started on June 16 but heavy rains that continued practically throughout the latter part of June and the month of July made it difficult to save the heavy crop. Grain made exceptional growth but was somewhat injured by hail on July 31. The heavy rains and damp atmosphere made conditions ideal for the development of rust and other plant diseases and the yield of grain was seriously damaged. Grain cutting commenced on August 13 and, with a few delays due to rains, was pushed rapidly to conclusion. Threshing started on August 24 with rye and with wheat on August 30, and good weather enabled this to be completed in good time. Fall work was nicely completed as the final freeze-up did not come until November 24.

METEOROLOGICAL RECORDS

Month	Temperature F.					Rainfall		Snowfall		Sunshine
	Maximum		Minimum		Mean	Days	Inches	Days	Inches	Hours
	Date	°	Date	°	°					
1923										
January	17	43	5	−33	1·68	.....	.....	7	8·50	25·9
February	28	41	3	−36	0	.....	.....	3	8·0	91·2
March	19	41	18	−26	10·65	.....	.....	4	19·25	116·7
April	28	80	6	− 8	33·53	1	0·20	4	10·60	187·5
May	26	92	8	15	51·06	5	1·90	.....	.....	268·0
June	16	90	9	40	61·63	11	6·99	.....	.....	227·2
July	20	88	30	41	50·0	13	7·25	.....	.....	256·0
August	12	85	21	39	56·11	8	1·62	.....	.....	261·6
September	1	86	12	20	53·63	4	0·98	.....	.....	178·3
October	15	72	30	8	41·0	3	0·25	1	1·0	155·0
November	8	62	26	− 3	30·57	2	0·58	1	3·0	58·6
December	7	39	30	−32	14·67	.....	.....	3	7·0	99·4
	.....	....	.....	.....	.....	47	19·77	23	57·35	1,925·4

87861—1½

ANIMAL HUSBANDRY

HORSES

Of the thirty-one horses on the Farm at the end of the year, twenty-two are pure-bred Clydesdale mares, fillies, and filly foals. The brood mares work on the Farm as well as produce foals. The stud of mares is an especially good one and special attention has been paid to maintaining draftiness and size in the stock. Some excellent young animals have been raised as is evidenced by the fact that four young fillies from the Farm were selected as part of the Saskatchewan exhibit at the Royal Winter Fair, Toronto, Ont., and the International Show at Chicago, Illinois, U.S.A. At these fairs they came into competition with the best studs on the Continent and were all successful in winning prizes. A first, a third and two ninth prizes were won at Toronto and a third, a fourth, a fifth and a sixth prize at Chicago.

NAVEL ILL

Navel ill has always been troublesome in raising foals at this Farm and an experiment was started in 1920 in an endeavour to control the disease. This experiment consists in the treatment of in-foal mares with mixed bacterial vaccine at the eighth month of gestation and giving them a repeated, heavier dose one month later. The foals were all treated as soon as possible after birth with lighter dose of the same vaccine. It should be noted that the treatment of the mares does not, in any way, do away with the necessity for every precaution in cleanliness and disinfection at foaling time. Four mares were treated with the vaccine and all raised foals. One of the foals from a treated mare showed distinct symptoms of the disease at three months of age. It was again treated with the vaccine at intervals and is growing well, although still showing the effects of the disease in swollen, weakened joints and an unthrifty general appearance. This mare's 1922 foal was affected in the same way. The other mares in this group are young mares whose foals have not been affected in previous years.

One mare was not treated and was used as a check. She lost a foal in 1917 with a typical case of navel ill, and was used as a check for that reason. Her foal in 1923 was treated soon after birth and until about two days old the foal appeared bright and active. It then became dull and, on examination by the veterinarian, was pronounced to be suffering from navel ill, pus being present in the navel cord. In spite of every care, the foal died at the end of the third day.

During the four years this experiment has been carried on, a total of seventeen mares have been treated and these raised sixteen foals, two of which developed mild cases of the disease which were successfully treated. The other foal was dead at birth. Seven mares were not treated but the foals were treated at birth. Only three foals were raised by this group. Three of the other foals developed typical cases of the disease and died, the fourth foal of this group being dead at birth.

While these results are by no means conclusive, yet they indicate that the vaccination of in-foal mares with mixed bacterial vaccine is a wise precaution to take on farms where navel ill has been prevalent. It would be advisable for a veterinarian to be called to give the treatments and it should be emphasized that the vaccination in no way does away with the necessity for absolute cleanliness and disinfection at foaling time.

CATTLE

The breeding herd consists entirely of pure-bred Shorthorns and is a decidedly high-class one. The basic idea in the development of the herd has been to produce a good beef animal but it has been kept in mind that to be profitable to the average farmer the cow must produce a paying quantity of milk in addition to a calf. Every care, therefore, has been taken to select herd sires which were likely to get both qualities in their offspring and good success has been attained in the effort. Some of the cows are hand-milked each year and their calves pail-fed. The average production of the cows completing their year's production in 1923 was 6,092 pounds of milk, with an average test of 4 per cent. The feed required for this production was meal, 1,830 pounds; ensilage, 9,452 pounds; hay, 1,495 pounds; straw, 3,144 pounds; pasture, 6.06 months, making a total cost of feed for the year of $49.14, or a cost per 100 pounds of milk produced of 81 cents. The prices used in calculating the cost of feed were meal, $20 per ton; ensilage, $3 per ton; hay, $10 per ton; straw, $2 per ton and pasture $1 per month.

The highest production obtained from one cow during the year was 11,-105.5 pounds of milk from a young cow, "Rose Tree 5th," with an average test of 3.95 per cent.

The young bulls from the herd find ready sale to farmers at moderate prices and are disposed of, usually, before they are six months old. The herd is increasing in size and in the course of a year or so heifers and cows will be available for sale as well.

In addition to the breeding operations, the pure-breds are used for experimental work to as great an extent as possible.

CORN VS. SUNFLOWER SILAGE FOR PREGNANT COWS

The experiment started in 1922 in the comparison of corn and sunflower silage as a basic roughage for pregnant cows and was continued during the winter of 1922-23. Another group was added to test the efficacy of potassium iodide as a corrective of the deficiencies noted the previous year in the sunflower silage ration. The basic ration for all groups was silage, oat straw and sufficient grain, consisting of equal parts of bran and ground oats, to maintain the cows in good condition. The cows were in approximately the fifth month of gestation when started on test and the rations were continued until after calving in each case. The results are as follows:—

Group	Feed	Number of Calves dropped	Calves goitred	Calves died or dead at birth from goitre	Remarks
1	Mixed silage and alfalfa hay	2	0	0	Both normal.
2	Sunflower silage and potassium iodide.	2	2	0	One slightly goitred, other badly.
3	Corn silage	2	0	0	Both normal.
4	Sunflower silage	2	2	1	Very bad.

While the results obtained this year could not be considered conclusive in themselves, yet, taken with the previous year's results, they indicate that sunflower silage, oat straw and meal is not a suitable ration for the maintenance of pregnant cows, and that the addition of alfalfa hay to such a ration makes it a good one. The potassium iodide apparently did not correct the deficiencies of

the ration, although, in many cases, it has prevented the development of goitre in other classes of live stock. While in this test the corn silage ration was sufficient for the production of normal healthy calves, yet it should be remembered that this was not entirely true in the previous year's results.

The two years' results combined are as follows:—

CORN VS SUNFLOWER SILAGE FOR PREGNANT COWS

Group	Feed	Calves dropped	Calves goitred	Calves died or dead at birth from goitre	Remarks
1	Mixed silage and alfalfa hay	5	0	0	All normal.
2	Corn Silage	8	3	1	Other two slightly goitred
3	Sunflower silage	8	8	4	Other four calves slightly goitred.
4	Sunflower silage and potassium iodide	2	2	0	Goitre slight.

SUNFLOWER VS. CORN SILAGE FOR GROWING HEIFERS

The experiment in the comparison of sunflower and corn silage as a basic roughage for growing heifers, which was commenced in 1922, was continued this year. Unfortunately, only four heifers of suitable and similar age were available for this work. The ration received by both lots was identical with the exception of the kind of silage, and consisted of ten pounds of silage, five pounds of straw, six pounds of alfalfa hay and four pounds of grain (one part bran and three parts ground oats) per head daily. The experiment was continued for a total of one hundred and six days, the length of time sunflower silage was available.

The following brief table will give the results of the experiment in gains made:—

SUNFLOWER AND CORN SILAGE FOR HEIFERS

Lot	Feed	Initial weighing	Second weighing	Third weighing	Fourth weighing	Fifth weighing	Total gain
		lb.	lb.	lb.	lb.	lb.	lb.
1	Corn silage	1,740	1,810	1,910	1,950	1,995	255
2	Sunflower silage	1,720	1,760	1,845	1,920	1,970	250

It will be noted that the total gains made by both lots were almost identical and no difference could be noted in the thriftiness or condition of the two lots. While this year's results could not be considered conclusive in themselves, yet, taken with the previous year's results, when more heifers were used and the gains made identical, although the corn silage lot were more thrifty and sleek in appearance, they would indicate that the two silages are very similar in feeding value for growing heifers with only a very slight indication that corn silage was a little more desirable. No difference could be noted in palatability, as both silages were readily eaten. Both silages were excellent in quality, the corn being in the late dough stage when cut and the sunflowers about one-half in bloom and they were wilted for two days before being put in the silo, so there was no excess moisture present.

STEER FEEDING EXPERIMENT

During the fall of 1922 forty-five head of steers were purchased for experimental feeding. The object of the experiment was to compare the profits to be

obtained in feeding steers of different ages. All steers were fed outside with an open shed for shelter which faced the south and had a tight board corral for exercise. The shed was bedded twice a week and the frozen manure removed. The cattle were watered twice daily at a trough where the water was warmed slightly with a tank heater, and salt was available at all times. The steers were divided into three lots, fifteen two-year-olds, fifteen yearlings and fifteen calves. The ration fed to all lots was similar, consisting of good silage, cut oat straw and grain (two parts of ground barley to one of ground oats). The silage and straw were mixed together twenty-four hours before feeding and at feeding time the grain was mixed with it as well, making a very palatable ration and ensuring each animal its proper share of the grain. At the beginning of the feeding period only a light grain ration was fed and this was gradually increased until the close of the experiment, when the two-year-olds were receiving fifteen pounds of grain per head daily, the yearlings twelve pounds and the calves nine pounds. The two-year-olds received thirty pounds of silage and fifteen pounds of straw daily, the yearlings twenty pounds of silage and ten of straw and the calves ten of silage and five of straw.

When the steers were ready for market fourteen of the two-year-olds and seven of the yearlings were sent overseas with the combined experimental shipment from the various Experimental Farms and the remainder were sold locally at prices fully equal to their market value. As it was not possible to keep individual records of the steers sent to Great Britain, these were valued by capable buyers at the farm before shipment and these values were used in calculating the results obtained.

The detailed results are shown in the following table:—

STEER FEEDING

	Two-year olds	Yearlings	Calves
Number of steers in lot	15	15	15
Number of days fed	138	138	138
	lb.	lb.	lb.
Total weight (initial)	14,830	12,040	6,390
Average weight (initial)	988	802	426
Total weight (final)	19,290	15,680	9,580
Average weight (final)	1,286	1,045	639
Average gain per steer	298	243	213
Average daily gain per steer	2·16	1·76	1·54
Grain consumed	19,425	17,235	13,500
Silage consumed	52,105	45,710	22,855
Straw consumed	25,130	21,010	10,505
Cost of grain at 1 cent per pound	$ 194.25	172.35	135.00
Cost of silage at $5 per ton	$ 130.26	114.27	57.14
Cost of straw at $2 per ton	$ 25.13	21.01	10.50
Total cost of feed	$ 349.64	307.63	202.64
	lb.	lb.	lb.
Total gains in period	4,460	3,640	3,190
Cost of feed for 100 lbs. gain	$ 7.84	$ 8.45	$ 6.35
Initial cost per 100 lbs. (freight, commission charges paid)	$ 4.90	4.45	5.00
Total cost of steers at beginning of feeding period	$ 726.67	535.78	329.50
Total cost of steers at end of feeding period	$ 1,076.31	843.41	532.14
Necessary selling price to break even, per 100 lbs	$ 5.57	5.38	5.55
Steers sold from groups at Indian Head	1	8	15
Selling price	$ 5.75	5.75	5.05
	lb.	lb.	lb.
Weight of animals sold	1,108	7,780	9,580
Steers shipped to Great Britain	14	7	0
Weight of steers shipped	18,182	7,900	0
Estimated price per pound	cts. 7	6·80	.....
Value	$ 1,272.74	537.20	.....
Value of animals sold	$ 63.71	447.35	433.79
Total value of steers	$ 1,336.45	984.55	433.79
Profit or loss over cost and feed	$ 260.14	141.14	−48.35
Profit or loss per steer	$ 17.33	9.41	−3.22

It will be noted that the calves made the cheapest gains, followed by the two-year-olds and yearlings, respectively. Unfortunately, however, the gains made were almost entirely in growth and very little in fleshing, so that they were not as well finished as the other groups when they had to be sold. This applies to the younger steers in the yearling lot as well and explains the poor price received for the calves and eight yearlings. The steer in the two-year-olds not shipped with the remainder was rough and not suitable for export. The results of this test would indicate that good quality two-year-olds are the most profitable class of steers to feed in outside corrals and that calves will not usually be profitably fed under these conditions.

A further lot of sixty steers was purchased in the fall and is now on feed to be marketed during the spring of 1924. Thirty head are being finished for market and are divided into two groups to test the value of a ration containing hay and ensilage as compared with ensilage alone. The remaining thirty are being fed a maintenance ration to determine the cost of wintering yearling steers. The value of hay in the ration is being tested with these steers as well.

DEHORNING

Fifteen of the yearlings were hornless when purchased and the other fifteen were dehorned on November 26, both lots being weighed before the dehorning took place. The dehorning was done with the regular dehorning nippers and the bleeding was not excessive in any case. The steers were weighed again one month later when being placed on experimental feeding, the weights of the two groups being as follows:—

DEHORNING

Number of steers	Treatment	Initial weight November 26	Weight December 26	Gain
		Lbs.	Lbs.	Lbs.
15	Hornless	10,580	10,960	380
15	Dehorned	10,425	10,690	265

The difference in gains made by the two lots is not largely in favour of the hornless steers and records will be kept throughout the winter of the weights of these steers, so that we will be able to determine the influence dehorning has on steers being fed throughout the winter.

SHEEP

The sheep flock consists of thirty pure-bred Shropshire ewes, forty-seven grade ewes, twelve shearlings and two pure-bred rams. The aim with the pure-bred flock is to develop it as well as possible and have a high-class lot of pure-breds so that breeding stock will be available throughout the district. The culls from the pure-bred flock and the grades are used for experimental work.

EARLY VS. MEDIUM AND LATE LAMBS

Some ewes are bred to lamb as early as possible and others to lamb later in order to have early, medium and late lambs to determine the comparative returns from each class. In the fall of 1922 it was not possible to breed the ewes as early as had been done the previous year. As a result, only four lambs were dropped in February and the remainder in March and April. As these lambs reached market weights they were sold to local butchers, realizing Winnipeg prices at home, and, consequently, bringing good returns. The lambs

did not all develop equally quickly, but more of the February and early March lambs were sold in July, the later March lambs in August, while most of the April lambs were not ready for market until nearly Christmas. The heavy rains in June and July appeared to be very hard on the younger lambs, while the older ones were not adversely affected.

All the lambs had access to a creep behind which they were given a little grain, while the ewes were kept out. This was of great assistance in keeping the lambs growing well right from the beginning. The lambs marketed in July and August were, of course, sold off pasture, while the later lambs required a period of fairly heavy feeding to fit them for the market, which detracted from their net profit. The results of the test, in tabular form, are as follows:—

EARLY, MEDIUM AND LATE LAMBS

Date sold	Date lambed	Number of lambs	Average weight	Price	Amount obtained
			Lbs.	c.	$
July	February and early March	10	78·1	12	9·37
August	Later March	13	78·8	10½	8·27
Christmas	April and early May	40	86·88	10½	9·34

It will be seen that this year again the returns from the early lambs were considerably greater than from those lambed later in the season. Expensive equipment is not necessary as no artificial heat was used with the early lambs and the barn and sheds used to house the sheep are no better than can be readily provided on the average farm.

SILAGE VS. TURNIPS FOR FATTENING LAMBS

Forty of the later lambs were used in an experiment to determine the comparative value of silage and turnips as a roughage for fattening lambs. The two lots were as nearly equal as possible and the meal ration was the same for both lots, being equal parts of oats, barley and bran with a little linseed meal. The weight of silage and roots fed was the same. The results, in tabular form, are as follows:—

SILAGE VS. TURNIPS FOR FATTENING LAMBS

	Roots	Value	Silage	Value
		$		$
Number of lambs on experiment	20	.....	20	.....
Number of days on experiment	28	.....	28	
	Lbs.		Lbs.	
Total initial weight	1,510	.....	1,560	.....
Total final weight	1,730	.....	1,745	.....
Total gain	220	.....	185	.....
Amount of oats consumed at 1 cent per lb	640	6 40	640	6 40
Amount of bran consumed at $23 per ton	360	4 14	360	4 14
Amount of barley consumed at 1 cent per lb	360	3 60	360	3 60
Amount of oatmeal consumed at 2 cents per lb	110	2 20	110	2 20
Amount of hay consumed at $10 per ton	840	4 20	840	4 20
Amount of roots consumed at $5 per ton	1,060	2 65	.....	.....
Amount of silage consumed at $5 per ton	.....	.....	920	2 30
Total cost	.....	23 19	.....	22 84
Cost to produce 1 pound gain		c. 10·5		c. 12·3
Value of lambs when put on feed at 9 cents per lb		$135 90		$140 40
Value of lambs when sold at 10½ cents per lb		185 97		187 58
Increase in value		50 07		47 18
Profit over cost of feed		26 88		24 34
Profit over cost of feed per lamb		1 34		1 21

The results indicate that while turnips, pound for pound, are to be preferred to good quality corn silage for lamb feeding, yet the difference is not great and where turnips were not available silage would form an excellent succulent roughage for fattening lambs.

SWINE

The Yorkshire and Berkshire breeds of swine are kept on the Farm, about six brood sows of each breed being kept on hand. Breeding operations are conducted with the aim of producing the type of bacon pig required for the export trade. Care has been taken to retain as brood sows only those which prove prolific and careful mothers. Sales of young stock are made each year to farmers in this part of the province and the remainder used for experimental work in feeding.

PASTURE AND DRY LOT FEEDING

In order to ascertain the comparative value of various pastures and to make comparisons with dry lot feeding in various forms, a comprehensive experiment was started during the summer. Sixty thrifty young pigs were divided into six equal lots of ten pigs each, seven of the ten in each lot being Berkshires and the other three Yorkshires. The experiment was continued during the time that the clover pastures were useful and it was notable that while the ten pigs were sufficient to eat down one-quarter of an acre of each of these, the rape pastures would have carried more pigs. This was possibly due to the large amount of moisture which fell during the early part of the experiment. Lot 1 was pastured on the biennial white sweet clover, sown as an annual; lot 2 on rape; lot 3 on Hubam annual sweet clover; lot 4 was hand-fed in a dry lot; lot 5 was self-fed in a dry lot, and lot 6 was hand-fed in a dry lot but received buttermilk as a supplement to the meal ration, while all the preceding lots received tankage. The results of the experiment are given in tabular form as follows:—

PASTURES AND DRY LOT FEEDING

	Sweet clover and tankage	Rape and tankage	Hubam and tankage	Self-feeder and tankage	Handfed and tankage	Buttermilk
Number of hogs on experiment	10	10	10	10	10	10
Number of days on experiment	56	56	56	56	56	56
Amount of shorts consumed	lbs. 458	458	458	758	532	417
Amount of oats consumed	423	423	423	708	524	354
Amount of barley consumed	334	334	334	650	470	342
Amount of tankage consumed	150	150	150	300	216	.....
Amount of butter milk consumed	.....	.....	.....	.....	.....	105
Amount of pea meal consumed	325	325	325	592	416	291
Cost of shorts at 1½ cent per lb	$ 5 72	5 72	5 72	9 47	7 02	5 21
Cost of oats at 1 cent per lb	4 23	4 23	4 23	7 08	5 24	3 54
Cost of barley at 1 cent per lb	3 34	3 34	3 34	6 50	4 70	3 42
Cost of tankage	4 50	4 50	4 50	9 00	6 48	.....
Cost of buttermilk at ½ cent per lb	.....	.....	.....	.....	.....	0 52
Cost of pea meal at 3½ cents per lb	11 37	11 37	11 37	20 72	14 56	10 18
Total cost of feed	29 17	29 17	29 17	52 77	38 00	22 88
Total gain in lbs	lbs. 590	597	531	777	633	467
Cost per lb. gain	cts. 4·90	4·88	5·49	6·8	6·0	4·89
Value of pasture per acre	$ 25 00	26 74	10 62	.....	.....	.....

In calculating the value of the pasture in the above table, the difference in cheapness of gains between the pasture lots and the similarly-fed dry lots is used as the basis.

In comparing the various lots from a bacon-hog standpoint it was notable that all the Berkshires would have graded as thick smooth, none of them being of bacon type. With the three Yorkshires of each lot the case was different and a marked difference was noticeable in the grading of the various lots. Lot 1, all three graded select; lot 2, two select and one thick smooth; lot 3, one select and two thick smooth; lot 4, three thick smooth; lot 5, two select and one feeder; lot 6, one select and one thick smooth and one feeder.

The buttermilk used in this experiment was the condensed material and was diluted before feeding. It was not as satisfactory as the fresh form. Where this is the only form in which buttermilk can be secured, tankage is to be preferred on account of the greater ease of handling. It is notable that while the self-fed lot made the greatest gains, these were also the most expensive and this method of feeding did not favour the development of bacon hogs.

The common white sweet clover made a more palatable pasture than the annual, which, toward the end of the period, was becoming woody. The Hubam might have given better results had the hogs been turned on it a little earlier and further trial should be given this clover.

FIELD HUSBANDRY

ROTATIONS

The need of a system of crop rotation which will correct some of the defects of the present system of straight grain growing on the prairies is pretty generally recognized. The rotation of crops which might suit one farm, however, would not necessarily be the proper one for other farms in the same district or for farms in other districts. With this in view, four distinct systems of crop rotation are under test at this Farm. The crop sequence of the four is as follows:—

	Rotation C	Rotation J	Rotation P	Rotation R
1st year	Wheat	Wheat	Wheat	Wheat.
2nd year	Wheat	Oats	Oats	Oats.
3rd year	Summer-fallow	Corn	Corn	Fallow.
4th year		Wheat (seeded down)	Barley (seeded down)	Wheat.
5th year		Hay or pasture	Hay	Oats (seeded down)
6th year		Hay and breaking	Hay or pasture	Hay.
7th year			Hay or pasture	Hay or pasture.
8th year			Hay and breaking	Hay and breaking.
9th year				Corn.

Rotation "C" and "R" have been carried on for eleven years, while rotations "J" and "P" have only been in their present form for two years.

It will be noted that rotation "C" is the common wheat-growing rotation which has been used widely over the prairie, while all the others make more or less provision for live stock.

Rotation "C" is gradually proving more and more unsatisfactory as years go by. The yield of grain is gradually decreasing and the percentage of weeds increasing in spite of careful and clean summer-fallowing. This is becoming more and more noticeable each year but it is important to carry such a rotation in order to have a sort of yard stick by which to measure the others. It is noticeable, also, that the soil on this rotation has a decided tendency to drift in windy springs, while the other rotations are free from this trouble.

Rotation "J." This rotation is only getting nicely into working order and we cannot draw too many conclusions regarding it on that account. Its crop arrangement still provides for the production of one-third of the ground in

a cash crop (wheat) and this is grown on land that is practically equal to the bare fallow. It also allows for the maintenance, the year round, of a moderate amount of live stock or the winter feeding of a larger number. It provides for a more uniform yearly distribution of labour than does rotation "C" and also for a more even distribution of revenue, which are both desirable features. One undesirable feature is the amount of manual labour required in the handling of the hay and corn crops. With half the land under these crops the necessity for labour-saving machinery not commonly used is greater and entails an additional outlay. Some crop, however, is provided by all the land each year and the rotation is profitable and might be adopted, either in whole or in modified form, over a fairly wide area on the prairie.

Rotation "R" has been carried on for the same number of years as rotation "C" and has some very noticeable advantages over it. The land is comparatively free from weeds, the crop, in unfavourable years, is much better than on rotation "C" and the land has no tendency to drift. All but one-ninth of the land produces crop each year and it provides for the carrying of a fair amount of live stock. This rotation has been uniformly profitable, even during the years of price deflation. Rotation "R," while rather long and seemingly a live stock rotation primarily, yet has almost half the area of ground in grain and produces uniformly good crops.

Rotation "P," while it has not been carried on in its present form long, has many features to recommend it. During the past two years it has been considerably the most profitable rotation of the four. Its crop sequence is apparently a good one and uniformly good crops are obtained from it. It, however, entails the marketing of over half the crops grown through live stock and while this can be profitably done, it means a more radical departure from present day practice than the other two rotations, "J" and "R." It can be recommended, however, as suitable for adoption where live stock forms a major part of the farm operations and, as a permanently profitable rotation, is possibly the best of the rotations under test.

The following brief tables summarize the results obtained from the various rotations:—

ROTATION "C"—THREE YEARS' DURATION

Crop	Yield per acre		Value of crop per acre	Cost of production per acre	Profit or loss per acre
	Average for five years	1923			
	Bush.	Bush.	$	$	$
Summer-fallow					
Wheat	23·1	23·0	17·25	25·76	−8.51
Wheat	13·8	9·7	7.28	12.71	−5.43

ROTATION "J"—SIX YEARS' DURATION

Crop	Yield per acre		Value of Crop per acre	Cost of production per acre	Profit or loss per acre
	Average for five years	1923			
	Bush.	Tons	$ cts.	$ cts.	$ cts.
Hay	On account of re-arrangement of this rotation no 5-year averages are available.	2·21	17 68	17 72	− 0 04
Hay and break		2·86	22 88	13 98	8 90
Wheat (on stubble)		16·8 bush.	12 60	16 39	− 3 79
Oats		52·6	19 36	19 98	− 0 62
Corn		tons 7·5	20 03	38 58	−18 55
Wheat (seeded down)		bush.32·72	24 54	18 11	6 43

ROTATION "P"—EIGHT YEARS' DURATION

Crop	Yield per acre		Value of crop per acre	Cost of production per acre	Profit or loss per acre
	Average for five years	1923			
		bush.	$ cts.	$ cts.	$ cts.
Barley (seeded down)	On account of the re-arrengement of this rotation no 5-year averages are available.	28·7	14 24	16 91	− 2 67
		tons			
Hay		2·98	23 84	13 97	9 87
Hay		2·44	19 52	13 05	6 47
Hay		3·06	24 48	15 22	9 26
Hay and break		2·49	19 92	16 57	3 35
		bush.			
Wheat		27·3	20 48	21 25	− 0 77
Oats		51·6	18 98	19 57	− 0 59
		tons			
Corn		6·47	17 31	31 01	−13 70

ROTATION "R"—NINE YEARS' ROTATION

Crop	Yield per acre		Value of Crop per acre	Cost of production per acre	Profit or loss per acre
	Average for five years	1923			
	bush.	bush.	$ cts.	$ cts.	$ cts.
Summer-fallow					
Wheat	32·9	26·4	19 80	31 19	−11 39
Oats (seeded down)	45·3	38·1	11 43	18 72	− 7 29
	tons	tons			
Hay	1·80	2·76	22 08	14 54	7 54
Hay	2·24	3·17	25 36	15 14	10 22
Hay and break	1·70	2·53	20 24	13 20	7 04
Corn	9·98	10·18	27 18	29 28	−2 10
	bush.	bush.			
Wheat	26·8	26·5	19 88	15 55	4 33
Oats	55·3	38·6	11 58	18 26	− 6 68

COST OF PRODUCTION

The cost data kept in connection with the rotations enable us to give accurate figures in connection with the cost of production of the various crops grown on these rotations. They are given in detail in the following tables, and it will be noted that the cost of producing wheat on corn land was such that the wheat was profitable at the average price received in this district during the year, whereas wheat produced on summer-fallow was not profitable as the cost of the fallow the previous year had to be added to the cost of producing the crop. The corn land has been profitable in itself.

COST OF PRODUCING WHEAT ON SUMMER-FALLOW, 1923

Area of field—5·85 acres.	
Rent of land, 5·85 acres—2 years at $3.40	$ 39 78
Use of machinery—2 years at $1 per acre	11 70
After harvest cultivation, 1921—man and 3 horses, 32 hours at 55 cents	17 60
Cultivation, 1922—man and 3 horses, 34½ hours at 55 cents	18 98
Cultivation, spring 1923—man and 3 horses, 10½ hours at 55 cents	5 78
Seed—8 bushels at $1.75	14 00
Seeding, April, 1923—man and 3 horses, 3½ hours at 55 cents	1 93
Cutting, August, 1923—man and 3 horses, 6½ hours at 55 cents	3 58
Stooking, August, 1923—4 men, 3 hours at 25c	3 00
Threshing—134 bushels and 24 lbs. at 12 cents	16 13
Twine—15 lbs. at 13½ cents	1 99
	$ 134 47
Total yield, 5·85 acres—134 bushels and 24 lbs.	
Yield per acre—22 bushels and 58 lbs.	
Cost per acre	$ 22 99
Cost per bushel	1 00

COST OF PRODUCING WHEAT ON STUBBLE, 1923

Area of field—5·85 acres.		
Rent of land, 5·85 acres—1 year at $3.40	$	19 89
Plowing, September, 1922—man and 3 horses, 19¾ hours at 55c		10 76
Use of machinery at $1 per acre		5 85
Cultivating, April, 1923—man and 3 horses, 6 hours at 55 cents		3 30
Harrowing, April, 1923—man and 3 horses, 3¼ hours at 55 cents		1 78
Plowing, April, 1923—man and 3 horses, 1 hour at 55 cents		0 55
Seed—7 bushels at $1.75		12 25
Harrowing, May, 1923—man and 3 horses, 2 hours at 55 cents		1 10
Cutting, August, 1923—man and 3 horses, 7½ hours at 55 cents		4 13
Twine—14 lbs. at 13¼ cents		1 85
Threshing—56 bushels and 40 lbs. at 12 cents		6 80
Stooking—4 men, 2½ hours at 25 cents		2 50
	$	70 76
Total yield, 5·85 acres—56 bushels and 40 lbs.		
Yield per acre—9 bushels and 41 lbs.		
Cost of production per acre	$	12 09
Cost of production per bushel		1 24

COST OF PRODUCING WHEAT AFTER CORN, 1923

Rent of land, 5·5 acres—at $3.40	$	18 70
Manure—5·5 acres (12 tons per acre over 9 years) at $1 per ton		7 33
Use of machinery—1 year at $1 per acre		5 50
Cultivating, May 5—man and 3 horses, 5½ hours at 55 cents		3 03
Harrowing, May 5—man and 3 horses, 1¾ hours at 55 cents		0 96
Seed—8 bushels and 20 lbs. at $1.75		14 58
Seeding, May 5—man and 3 horses, 3½ hours at 55 cents		1 93
Cutting, August 22—man and 3 horses, 4½ hours at 55 cents		2 48
Stooking, August 22—5 men, 2½ hours at 25 cents		3 13
Twine—6 lbs. at 13¼ cents		2 12
Threshing—143 bushels and 15 lbs. at 12 cents		17 19
	$	76 95
Total yield, 5·5 acres—143 bushels and 15 lbs.		
Yield per acre—26 bushels and 20 lbs.		
Cost of production per acre	$	13 99
Cost of production per bushel		0 53

It will be noted that in the case of barley the cost of production was higher than the value of the crop and this was, in part, due to a partial damage to the crop by hail. This damage was approximately 30 per cent and was the cause of the low yield.

COST OF PRODUCING BARLEY AFTER CORN, 1923

Rent of land—5·5 acres, at $3.40	$	18 70
Use of machinery—5·5 acres, at $1 per acre		5 50
Manure—5·5 acres (12 tons per acre, over 8 years at $1 per ton)		8 25
Discing, May, 1923—man and 3 horses, 9½ hours at 55c		5 23
Seeding, May, 1923—man and 3 horses, 4½ hours at 55 cents		2 48
Harrowing, May, 1923—man and 3 horses, 2½ hours at 55 cents		1 38
Seed—10 bushels and 40 lbs. at $1.25		13 50
Cutting, August, 1923—man and 3 horses, 7 hours at 55 cents		3 85
Stooking, August, 1923—4 men, 4 hours at 25 cents		4 00
Threshing—157 bushels and 34 lbs. at 10 cents		15 77
	$	78 66
Total yield, 5·5 acres—157 bushels and 34 lbs.		
Yield per acre—28 bushels and 32lbs.		
Cost per acre	$	14 30
Cost per bushel	$	0 50

COST OF PRODUCING OATS ON FALL-PLOWED STUBBLE, 1923

Rent of land—5·5 acres, at $3.40	$	18 70
Use of machinery at $1 per acre		5 50
Manure—5·5 acres (12 tons per acre, over 8 years) at $1 per ton		8 25
Plowing, October, 1922—man and 3 horses, 21 hours at 55 cents		11 55
Cultivating, May, 1923—man and 3 horses, 6 hours at 55 cents		3 30
Harrowing, May, 1923—man and 3 horses, 2 hours at 55 cents		1 10
Seeding, May, 1923—man and 3 horses, 4½ hours at 55 cents		2 48
Packing, May, 1923—man and 3 horses, 2 hours at 55 cents		1 10
Seed—14 bushels and 4 lbs. at $1		14 12
Cutting, August, 1923—man and 3 horses, 4¾ hours at 55 cents		2 61
Stooking—6 men, 2½ hours at 25 cents		3 75
Twine,—18 lbs. at 13¼ cents		2 39
Threshing—283 bushels and 33 lbs. at 9 cents		25 56
	$	100 41
Total yield, 5·5 acres—283 bushels and 33 lbs.		
Yield per acre—51 bushels and 20 lbs.		
Cost per acre	$	18 25
Cost per bushel	$	0 35

The cost of production in the case of hay was high, due to the excessive amount of rainfall during the haying season in 1923, which made curing difficult and, therefore, expensive. The yield per acre, however, was fairly good. The rainfall was also the cause of an unusual amount of hoeing in the corn crop as the rainy weather caused weeds to develop to a greater extent than usual.

COST OF PRODUCING ALFALFA AND WESTERN RYE HAY, 1923

Rent of land—6 acres, at $3.40	$	20 40
Use of machinery—1 year at $1 per acre		6 00
Manure—6 acres (12 tons per acre, over 8 years) at $1 per ton		9 00
Seed, 1921 (over 4 years)—75 lbs. western rye at 14 cents		2 63
42 lbs. alfalfa at 75 cents		7 88
Mowing, 1923—man and 2 horses, 11 hours at 45 cents		4 95
Raking, 1923—man and 2 horses, 8¼ hours at 45 cents		3 71
Coiling and pitching, 1923—3 men, 22 hours at 25 cents		16 50
Hauling, 1923—2 men and 4 horses, 10¾ hours at 90 cents		9 56
Two men in mow, 10½ hours at 25 cents		5 13
	$	85 76
Total yield—6 acres (2 cuttings)—4 tons and 1,210 lbs.		
Yield per acre—2 tons and 870 lbs.		
Cost per acre	$	14 29
Cost per ton	$	5 87

COST OF PRODUCING CORN SILAGE—1923

Rent of land—5·5 acres—at $3.40	$	18 70
Use of machinery—1 year at $1 per acre		5 50
Manure—5·5 acres (12 tons per acre, over 9 years) at $1 per ton		7 33
Ploughing, September 1922—man and 3 horses, 32¾ hours at 55 cents		18 01
Disking, October 1922—man and 3 horses, 15¼ hours at 55 cents		8 39
Cultivating, May 1923—man and 3 horses, 19½ hours at 55 cents		5 23
Harrowing, May 1923—man and 3 horses, 2 hours at 55 cents		1 10
Seeding, May 1923—man and 3 horses, 3½ hours at 55 cents		1 93
Seed—2 bushels and 43 lbs. at $1.90		5 26
Packing, May 1923—man and 4 horses, 2 hours at 65 cents		1 30
Cultivating, May 1923—man and 2 horses, 18½ hours at 45 cents		8 33
Hoeing, 1923—5 men, 25 hours at 25 cents		31 25
Cutting, September 1923—man and 3 horses, 9 hours at 55 cents		4 95
Twine—24 lbs. at 13¼ cents		3 18
Hauling, September 1923—man and 2 horses, 57½ hours at 45 cents		25 88
Pitching, 1923—6 men, 11½ hours at 25 cents		17 25
Silo filling—equipment rental, 11½ hours at $2.50		28 75
Tramping silage—3 men, 11½ hours at 25 cents		8 63
	$	200 97
Total yield—5·5 acres—56 tons and 10 lbs.		
Yield per acre10 tons and 365 lbs.		
Cost per acre	$	36 54
Cost of silage per ton		3 65

CULTURAL EXPERIMENTS

While some of the cultural experiments have not been under way for a sufficiently long time for definite findings to be obtained, some of them have given results which in time should provide important information on the problems with which they are concerned.

PRELIMINARY FINDINGS

In the case of fall rye, there seems to be a fairly wide range from the middle of August till the middle of September, when the yield is better than with plots sown either before or after those dates. While the fall rye sown on summer-fallow gave the largest yield, yet it was not as profitable as the yield obtained when the rye was seeded as a stubble crop following wheat, as there was less expense in growing the crop. Seeding fall rye with either wheat or oats in the spring did not prove a satisfactory method of growing the crop of fall rye. The fallow which was not ploughed, but was kept clean by cultivation, gave as good yields as the ploughed fallow. In the case of the crop of oats following the fallow wheat, the wheat stubble is ploughed in the fall, on all plots. An increase in yield could be noted in the plots where the fallow had been fall ploughed and cultivated during the fallow year and where the ground was just cultivated in the fallow year over the average yield on the plots where the fallow was ploughed early in June.

In stubble treatment the spring burning of the stubble followed by cultivation and seeding gave the best yield, both with wheat and oats.

Giant Russian sunflowers were sown in plots from May 1 to June 18. They were sown in rows 36 inches apart and all plots given similar cultivation. During the early summer the early sown plots appeared distinctly the best, but as the season progressed the later seedings gained and finally surpassed them, the seedings on May 29 and June 5 giving considerably the heaviest yields when cut.

No outstanding results can be noted in various cultural methods for sunflowers, except that the average yield was better on plots not thinned and where the rows were 36 inches apart than it was on closer seeding or wider seeding or where the plants were thinned out.

The yields of grain where commercial fertilizers were used did not show increase over the bare fallow.

In every case where alfalfa, sweet clover, western rye grass and brome grass were seeded at the rate of five, ten and fifteen pounds per acre the lighter seedings gave equally good, or better, results than the heavier seedings.

A large number of summer-fallow substitutes have been tried on plots as compared with the bare fallow and the ones which show the most promise, when the combined yield of the fallow substitute, the following crop of wheat and the crop of oats after wheat are considered, are millet and the various grains (wheat, oats and barley), sown in two-row groups with 36-inch space between the groups of rows, and corn, sown in rows 36 inches apart.

It should be emphasized again that the results obtained so far are really only single-year results and, therefore, cannot be used for drawing definite conclusions.

HORTICULTURE

The late spring delayed all horticultural work and little seeding could be done in the gardens until early in May. All seeds germinated slowly, and frost up to May 15 made it necessary to reseed in a number of cases. The rains during the growing season were more than ample and this, combined with

warm weather, produced a rapid growth of all vegetables, but in quality much below the average. A severe hail storm on July 30 did a lot of damage to the fruits and flowers, which showed for the balance of the season. Insect pests, while hardly as bad as in former seasons, gave considerable trouble but were kept in control by spraying at the proper time. Trees and shrubs made an extraordinary growth which went into the winter in poor condition to withstand heavy frosts and, undoubtedly, considerable winter killing will have taken place.

VEGETABLES

POTATOES—TEST OF VARIETIES

Thirty-two varieties of potatoes were under test in 1923. They were planted on a rich clay loam on which alfalfa had been grown for several years. The land was broken in the fall and again plowed in the spring and the potatoes planted on May 16 and taken up on October 1. The yields were satisfactory, although the percentage of unmarketable potatoes was high, caused, undoubtedly, by the wet season promoting a second growth. Potato bugs were much in evidence but were easily controlled by one spraying of arsenate of lead in the proportion of two pounds to forty gallons of water. The results of these variety tests are given in the following table:—

POTATO VARIETY TESTS

Variety	Form	Colour	Total yield per acre		Yield per acre marketable		Yield per acre unmarketable	
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Houlton Rose	Oval	Pink	460	02	401	02	59	..
Late Puritan	Long	White	423	44	382	07	41	37
King Seedling	Long	White	401	02	379	..	22	02
Early Ohio (I. H. seed)	Long	Pink	401	02	379	..	22	02
Irish Cobbler (I. H. seed)	Round	White	393	28	381	08	12	20
Dreer Standard	Oval	White	378	20	340	30	37	50
New London	Long	White	378	20	347	05	31	15
Seedling from R. Day	Oval	White	363	12	336	43	26	29
Green Mountain	Long	White	363	12	329	09	34	03
King George	Long	White	363	12	321	35	41	37
Wee MacGregor	Oval	White	363	12	329	09	24	03
Everett	Long	Red	332	56	291	19	41	37
Early Bovee	Long	Pink	332	56	295	06	37	50
Table Talk	Long	White	325	22	287	32	37	50
Vick Extra Early	Long	Pink	317	48	306	27	11	21
Seedling from Mrs. F. L. Morey	Long	White	317	48	279	58	37	50
Money Maker	Oval	White	310	14	234	34	75	40
Early Ohio (selected)	Long	Pink	302	40	272	24	30	16
Eureka Early	Oval	White	302	40	264	50	37	50
Seedling from Mrs. Mercer	Long	White	295	06	276	11	18	55
Irish Cobbler (Rosthern)	Round	White	295	06	272	24	22	42
Carman No. 1	Oval	White	272	24	242	08	30	16
Early Hebron	Long	Red	257	16	234	34	22	42
Morgan Seedling	Round	Pink	257	16	232	41	24	35
Manitoba Wonder	Long	Red	227	..	192	57	34	03
Rawlings Kidney	Long	White	211	52	181	36	30	16
Bermuda Early	Round	Red	204	18	196	44	7	34
Early Six Weeks	Round	Pink	196	44	177	49	18	55
Dalmeny Beauty	Oval	White	181	36	158	54	21	42
Early Norther (Seager Wheeler)	Oval	Pink	181	36	168	08	13	28
Gold Nugget	Oval	White	121	04	102	12	18	55
New Queen	Oval	Pink and white.	113	30	83	14	30	16

POTATOES—SPROUTING SEED

For several seasons this experiment has been carried on to determine the advantage of sprouting seed in order to obtain an early crop. Average-sized seed is spread out in the cellar, preferably where sunlight can reach it through the windows, from five to six weeks before planting. The seed is carefully handled to avoid breaking the sprouts, which are usually from three to four inches in length. From the results already obtained, we would recommend this plan where small garden plots are required. The varieties used were Irish Cobbler and Early Ohio, the seed being planted on the same date, May 16. The following table shows the results obtained:—

SPROUTING SEED POTATOES

Variety	Date ready	Yield per acre			
		marketable		unmarketable	
		Bush.	Lbs.	Bush.	Lbs.
Irish Cobbler (sprouted)	July 14	348	04	103	41
Irish Cobbler (unsprouted)	July 21	219	26	52	58
Early Ohio (sprouted)	July 12	264	50	105	56
Early Ohio (unsprouted)	July 21	245	55	72	20

DIFFERENT DATES OF PLANTING POTATOES

This experiment was started in order to determine the best date on which to plant potatoes. The plantings were made at intervals of two weeks, commencing on May 16 and the last planting on July 12. The varieties used were Irish Cobbler and Early Ohio, planted on the same soil as the variety tests. The following table gives the results obtained:—

DATE OF PLANTING POTATOES

Variety	Date of planting	Yield of marketable potatoes per acre		Yield of unmarketable potatoes per acre	
		Bush.	Lbs.	Bush.	Lbs.
Irish Cobbler	May 16	365	20	14	35
Early Ohio	May 16	362	40	20	40
Irish Cobbler	May 30	342	30	26	10
Early Ohio	May 30	309	16	37	40
Irish Cobbler	June 14	220	36	49	10
Early Ohio	June 14	213	20	37	30
Irish Cobbler	June 28	129	16	37	50
Early Ohio	June 28	71	53	18	55
Irish Cobbler	July 12	22	42	7	34
Early Ohio	July 12	15	08	11	21

COST OF GROWING POTATOES

For a number of seasons an experiment has been carried on to ascertain the cost of producing potatoes under local conditions. The cost includes rent of land, preparation of the soil, spraying, seed and storing over winter. The variety grown was Early Ohio. A walking plough was used to open up and cover the drills, while a modern potato digger was used to lift the crop. The yield of marketable potatoes was 223 bushels and 20 pounds and the cost of production amounted to $70.25, bringing the cost per bushel to 31½ cents. The average cost per bushel over a period of six years has been 30.36 cents.

ASPARAGUS.—The first cutting of asparagus was made on May 27 and the beds produced a light crop up till June 12. Bar Mammoth, Conover Colossal and Palmetto are recommended as suitable varieties.

ARTICHOKES.—Jerusalem artichokes were planted in April, 1920, and were still producing from the same bed this season. The plants grow to a height of from four to five feet. The quantity of the roots was medium but the majority were small and unshapely.

BEANS.—Nineteen varieties were under test this season. A few of the early sorts produced a small crop but all were so badly affected by rust that the crop was practically a failure for pod beans and ripened seed. The seed was sown in the garden on May 30 and the first picking was made on July 18. The outstanding varieties were Bountiful Green Bush O-2825, Yelllow Eye O-2822, Masterpiece O-2746 and Extra Early Red Valentine O-2769, all selections from the Central Experimental Farm.

DISTANCE APART OF PLANTING BEANS IN THE ROW.—Two varieties, Round Pod Kidney Wax and Stringless Green Pod, were used in this experiment. The seed was planted in the garden on May 30, in rows 30 inches apart, three rows of each variety, two, four and six inches apart in the row. With Round Pod Kidney Wax the highest yield was from the 4-inch planting, while Stringless Green Pod gave greatest yields from the 2-inch planting.

BEETS.—Seven varieties of beets were sown in the garden on May 8 and the crop taken up on October 4. Owing to the bountiful rainfall during July and ideal weather in August and September, the crop produced was above the average but the roots were much oversized and somewhat coarse in texture. Eclipse, Crosby Egyptian and Black Red Ball were outstanding in point of yield.

DIFFERENT DATES OF SEEDING BEETS.—In this test the variety used was Detroit Turnip. Commencing on May 8, six seedings were made at intervals of ten days apart. The seedings made in May gave the greatest yields, while the June seedings produced the finest roots for winter keeping, all being of medium size and smooth and free from side roots.

BRUSSELS SPROUTS.—Two varieties, Paris Market and Improved Dwarf, were under test this season. The plants were transplanted from the hot-house on June 4 and the crop was ready for use by October 12. Paris Market produced a small crop of medium quality. This vegetable cannot be recommended very highly as it is seldom that a good crop is obtained.

BORECOLE (OR KALE).—The varieties under test were Dwarf Green Curled and Tall Scotch. The plants were transplanted into the garden on June 4 and the crop was ready for use by September 12. Dwarf Green Curled produced heads of very good quantity, while the heads from Tall Scotch were large but coarse in quality.

CARROTS.—Six varieties were sown in the garden on May 8 and the crop taken up on October 4. Danvers and Nantes Half Long are recommended for heavy yields of uniformly-sized roots.

DIFFERENT DATES OF SEEDING CARROTS.—The variety used in this test was Select Chantenay. Commencing on May 8, six seedings were made at intervals of ten days. The May seedings produced the heaviest yields, while the June seeding produced a much lighter crop but the roots were of very good quality.

CELERY.—Sixteen varieties were in the test. The seed was sown in the hot-house on April 2 and the plants set out in trenches on June 28. The past wet season was an ideal one for celery production and the yield and quality was above the average. White Plume, Giant Pascal, Evans Triumph and French Success are recommended varieties.

A test was also carried on with methods of blanching. Hilling up with soil gave the best results, the celery being tender and well blanched. The stalks covered by paper and boards, while fairly well blanched, were inclined to be tough and stringy.

CELERIAC (TURNIP-ROOTED CELERY).—This vegetable was tested for the first time on this farm. It made a strong growth and promises to be a valuable addition to western gardens. The variety grown was Large Rooted.

CITRON.—Three varieties were started in the hot-house and set into the garden on June 14. Owing to the continued wet weather during blossom time, only a limited amount of fruit set late in the season. The crop matured before frost and, while of medium size, was of good quality. Red Seeded and Colorado O-2982 are promising varieties.

CABBAGE.—Twenty varieties were included in the tests. The seed was started in the hot-house on April 13 and the plants set into the garden on June 4. The plants received a severe check through hail on July 30 but came on rapidly with warm weather and an abundance of rain fall and produced an excellent crop. The rapid growth had a tendency to split the heads in the early sorts but by loosening the roots with a digging fork this trouble was practically overcome. In early varieties Early Paris Market and Early Winnigstadt were outstanding. In later sorts for winter keeping Drumhead, Marblehead Mammoth and Chester Savoy are good varieties.

GARDEN CORN.—Twenty-one varieties were planted in the garden on June 5, in rows 36 inches apart, hills 30 inches apart in the rows. All produced ears suitable for table use. While the Squaw varieties were the only sorts that matured for seed, Extra Early Cory, Golden Bantam, Gehu and Early Adams produced the best green cobs.

CUCUMBERS.—Six varieties were under test. The seed was planted in the garden on June 5 and the first pulling was made on August 1. In spite of the fact that the vines were badly cut with hail on July 30, a very good crop was obtained. Four plants of Rollinson Telegraph were planted in a cold frame and kept under glass during the summer. These plants produced 166½ pounds of fruit during the season, which was below the average of past seasons. Imperial Long Green, Davis Perfect and White Spine were the outstanding varieties of those planted outside.

CAULIFLOWER.—Early Dwarf Erfurt and Early Snowball were started in the hot-house on April 13 and transplanted into the garden on June 4. Owing to the extreme wet weather throughout July, the results were a failure, no heads forming on either variety.

LETTUCE.—Seven varieties were sown in the garden on May 5 and the first pulling was made from Salamander on June 26. All produced a very good crop. In loose-leaf sorts Black Seeded Simpson and Grand Rapids O-1943 were outstanding. In head lettuce, Iceberg, Salamander and Crisp as Ice are recommended.

ONIONS.—Sixteen varieties were in the test this season. The seed was sown in the garden on May 5, in rows 30 inches apart and the plants thinned to 2½ inches apart in the rows. The season was a poor one for onion culture as the plants were held back by wet weather and were not ripe when taken up on October 2. Southport White Globe, Select Red Globe and Mammoth Silver King yielded a fair crop but the keeping quality was very poor.

PARSLEY.—Moss Curled and Triple Curled were sown in the garden on May 5 and were ready for use by July 26. There is little difference between these two varieties and both have given satisfactory results over several years' tests.

PARSNIP.—Five varieties were sown in the garden on May 5, in rows 24 inches apart and the plants thinned to 3 inches apart in the row. The crop was taken up on October 27. The roots were of good size and quality. Cooper Champion, Guernsey XXX Half Long and Hollow Crown No. 1 O-1919 produced the largest yields, in the order named.

PEPPER.—Four varieties were sown in the hot-house on April 13 and the plants transplanted into the garden on June 14. The wet season was not suitable for peppers and the fruit set too late in the season and was caught by frost on September 11 before any had ripened.

PUMPKIN.—Three varieties were sown in the hot-house on May 5 and transplanted into the garden on June 14. Wet weather throughout July and damage by hail set the crop back so far that none of the crop was nearly matured when frost came on September 11. Connecticut Field and Small Sugar were the most promising varieties in the test.

GARDEN PEAS.—Twenty-four varieties of garden peas were sown on May 4. The germination of all sorts was very poor, owing, no doubt, to the excessive moisture which had a tendency to rot the seed. The first picking was made on June 10 from Laxtonian. The crop obtained from all varieties was small and the results of the test most disappointing. Laxtonian, McLean Advancer and Stratagem gave slightly better results than the other sorts.

WATERMELON.—Two varieties, Peerless and Harris Earliest, were started in the hot-house on May 5 and set into the garden on June 16. Some green fruit was on the vines when frost came on September 11.

RADISH.—Ten varieties were sown in the garden on May 5 and the first pulling was made on June 6. The crop was excellent, the roots being evenly-sized and solid. Recommended sorts are Scarlet Turnip White Tip, XXX Round Scarlet Oval and Early Scarlet Globe.

SQUASH.—Six varieties were sown in the hot-house on April 5 and the plants set into the garden on June 14. Fruit set late in the season on most of the vines but none was near maturity when frost came. Those that gave the best showing of a crop were Hubbard, Long White Bush Marrow and Delicious.

SWISS CHARD.—The variety under test was White Silver. The seed was sown in the garden on May 7 and plants were ready for use as greens by June 12. The yield was heavy and the quality excellent. This plant is proving a valued addition to western gardens, the leaves supplying excellent greens, while, later in the season, the stalks, which are self-blanching, may be used for pickling or cooked like asparagus.

SALSIFY.—Two varieties, Long White and Mammoth Sandwich Island, were sown in the garden on May 4 and the roots were ready for use by September 4. The crop was taken up on October 9 and gave a heavy yield of good quality, the roots being practically free from side shoots. Mammoth Sandwich Island produced the largest and cleanest crop.

SPINACH.—One variety, New Zealand, was sown in the garden on May 5 and was ready for use by July 27. Owing to the seed germinating poorly, the crop obtained was much below the average.

TOMATO.—Twenty-one varieties were in the test this season. The seed was started in the hot-house on April 2 and the plants set into the garden on June 14. The plants were pruned to two stems and supported by stakes. All varieties made a vigorous growth and had set an average crop of fruit by July 30, when damaged by hail to such an extent that the resulting crop was of very poor quality. Bonny Best, Earliana and Burbank were the most promising.

Tests were also made with cultural methods of growing tomatoes, as follows: single stem not headed back; single stem stopped at third truss of fruit; single stem stopped at second truss of fruit; single stem stopped at first

truss of fruit. The plants were set out in rows two feet apart and one foot apart in the row, twenty-five plants in each test. Alacrity O-3033 and Danish Export were the varieties used. With each sort the heaviest yields were from plants pruned to third truss. Those not headed back gave a very small yield of green fruit with none ripened.

Owing to the unfavourable season, the work with tomatoes was far from satisfactory.

TABLE TURNIPS.—Two varieties, Golden Ball and Red Top Strap Leaf, were sown in the garden on May 5, in rows 30 inches apart and plants thinned to 5 inches apart in the row. The crop was ready for use by July 12. Golden Ball is an exceptionally suitable variety, being early and well flavoured.

SMALL FRUITS

All the small fruits came through the winter in good condition and set a good crop of fruit which came on well up till July 3, when a severe hail storm battered the fruit and cut the yield down at least fifty per cent and greatly reduced the quality of that left on the bushes. For several past seasons severe loss in currants and gooseberries has been caused by a fruit fly—*Epochra Canadenis*—which deposits its eggs in the green berry, causing premature ripening and finally the affected fruit falling off the bush. This season the plantation was sprayed the second week in May with a solution of one-quarter ounce sodium arsenate, one pint molasses and one gallon of water. This spraying should be done weekly through May and June, but, owing to continuous wet weather, only one application was possible. However, the results in the control of the fly were quite noticeable in the great improvement in the crop over past seasons, especially in gooseberries.

RASPBERRIES.—There are six varieties of raspberries at present under test. These are set out in rows 140 feet long with 24 plants to the row. In the fall the old canes are cut out, leaving from four to five of the strongest canes of the season's growth, which are bent down and covered with earth for winter protection. The Herbert variety is one of the best for this locality, the fruit being large and firm. Sunbeam produces a small berry but quite often outyields the other sorts. Ohta and Early King are also recommended. Golden Queen is a white variety of excellent flavour but a very light yielder.

WHITE CURRANTS.—Six varieties of white currants are under test. Owing to weather conditions this season, the yield and quality of the crop was poor. White Grape, White Cherry and Large White are superior, both in yield and size of fruit. This season the bushes came into gloom on May 27 and the first picking of fruit was made on August 4.

RED CURRANTS.—There are eight varieties of six bushes each at present under test. The first bloom was on May 26 and the first picking was made on August 8. Red Dutch, Victoria Red and Red Cross are recommended varieties.

BLACK CURRANTS.—Twelve varieties of six bushes each are at present under test. The first bloom was on May 30 and the first ripe fruit picked on August 10. Collins Prolific, Victoria Black and Topsy are outstanding this season.

GOOSEBERRIES.—There are at present five varieties of gooseberries in the plantation. The first bloom was observed on May 17 and the first picking of fruit made on October 12. The crop obtained was good, both in yield and quality. Smith Improved, Houghton and Carrie are recommended.

STRAWBERRIES.—The wet season was not suitable for the strawberry beds and only a very limited amount of fruit set. Senator Dunlap and Beder Wood have given the best results over a number of years.

In everbearing strawberries, Superb, Americus and Progressive, have given good results over a three-year test. This fruit is proving a valuable addition to western gardens, providing fresh berries from June to October or later if killing frosts keep off.

TREE FRUITS

The work with tree fruits was continued in 1923. Cross-bred apples bore one of the heaviest crops on record at this Farm, but, unfortunately, hail bruised the young fruit to such an extent that it spoiled immediately after picking. Some of the best yields from individual trees were Prince, 225 pounds; Jewel, 147 pounds; Eve, 110 pounds; Tony, 100 pounds.

The standard seedlings set out in nursery rows in 1912 are beginning to give some fruit. Several of these promise to be a valuable addition to our orchards. One tree, a seedling of Beautiful Arcade, produced a number of apples this season 2¼ inches in diameter and of very good colour and flavour. A seedling of Tetofsky has also produced a fair-sized apple which is much superior to any of the cross-bred sorts now in the orchard. The plum orchard consists of native seedlings and a number of Professor Hansen's selections. The crop was very heavy this season but the quality poor, owing to hail bruises. Some of the yields from individual trees were Hanska, 62 points; Yuteca, 51 pounds; Winnipeg, 52 pounds; Owanka, 49 pounds; Assiniboine, 49 pounds.

FLOWERS

ANNUALS.—About eighty lots of annual flowers were planted in the hothouse the second week in April. With most varieties the germination was rapid and the plants were transplanted into the flower beds the second week in June. Warm weather, with an abundance of rainfall, brought everything on rapidly and made a very fine showing of bloom during the season. Asters were an exception, being affected by rust, and the bloom was very poor. Antirrhinum, Petunia, Verbena, Sweet Pea, Larkspur and Marigold were exceptionally fine.

BULBS.—Some three thousand single and double tulips were received from Holland and planted on October 16, 1922. They came through the winter in excellent shape and commenced to bloom on May 13. The show of bloom was very fine during the latter part of May and early June. The bulbs were taken up and again planted in the late autumn.

PERENNIALS.—The perennial beds had a splendid show of bloom this season, although partly damaged by hail on July 30. Paeonies, Larkspur, Iris, Columbine, Lychnis and Pyrethrum were outstanding in the amount of bloom produced.

TREES AND SHRUBS

The arboretum contains a large collection of hardy trees and shrubs and is greatly admired by visitors from all parts of the province. The specimens growing are the survivors of many hundreds of varieties that have proved too tender for the West and those now growing may be relied on as quite suitable for planting in any part of the province.

CEREALS

WHEAT

Eighteen varieties and strains of spring wheat were grown in 1923, both on fallow and stubble, on one-fortieth-acre plots. A number of different strains

of Marquis were included and, as space was available, duplicate plots of as many varieties as possible were sown. The yields given in the following table show the relative standing of the various varieties:—

WHEAT (FALLOW)—TEST OF VARIETIES OR STRAINS
Date of Sowing, May 4, 1923

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	Weight per measured bushel after cleaning
			Inch.		Lbs.	Bush. lb.	Lbs.
Reward, Ottawa 928	Aug. 15	103	45	10	1,880	31 20	64·0
Crown, Ottawa 353	" 14	102	46	10	1,760	29 20	60·0
Garnet, Ottawa 652	" 12	100	43	7	1,740	29 ..	61·0
Marquis (Indian Head Seed)	" 16	104	43	7	1,740	29 ..	58·0
Kubanka, Ottawa 37	" 24	112	56	7	1,700	28 20	60·2
Marquis, Ottawa 15	" 17	105	44	7	1,600	26 40	57·0
Duchess, Ottawa 933	" 14	102	43	10	1,570	26 10	62·0
Kitchener	" 23	111	50	7	1,520	25 20	56·0
Marquis 10B	" 18	106	47	7	1,520	25 20	57·0
Acme, Sask	" 24	112	51	6	1,440	24 0	58·5
Prelude, Ottawa 135	" 10	98	40	7	1,360	22 40	59·2
Major, Ottawa 522	" 18	106	44	7	1,240	20 40	59·0
Master, Ottawa 520	" 11	99	41	10	1,220	20 20	58·2
Orchards Wheat	" 22	110	46	10	1,140	19	58·2
Ruby, Ottawa 623	" 11	99	44	7	1,140	19	60·0
Red Bobs	" 17	105	41	7	1,120	18 40	57·2
Red Fife, Ottawa 17	" 23	111	52	7	960	16	58·0
Kota, C. J.	" 18	106	41	7	720	12	58·2

WHEAT (STUBBLE)—TEST OF VARIETIES OR STRAINS
Date of Sowing, May 4, 1923

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	Weight per measured bushel after cleaning
			Inch.		Lbs.	Bush. lb.	Lbs.
Acme	Aug. 18	106	42	7	1,770	29 30	63·2
Orchard's Wheat	" 22	110	42½	10	1,700	28 20	61·0
Kubanka, Ottawa 37	" 24	112	49	7	1,660	27 40	62·2
Kitchener	" 24	112	47	7	1,540	25 40	60·0
Marquis 10B	" 18	106	44	7	1,520	25 20	60·5
Crown, Ottawa 353	" 14	102	36	10	1,520	25 20	61·0
Marquis, Ottawa 15	" 17	105	38	7	1,520	25 20	60·0
Kota, C. J.	" 18	106	42	7	1,400	23 20	62·5
Marquis (Indian Head Seed)	" 16	104	41	7	1,360	22 40	60·5
Major, Ottawa 522	" 17	105	47	7	1,340	22 20	60·0
Garnet, Ottawa 652	" 12	100	40	7	1,340	22 20	61·0
Ruby, Ottawa 623	" 11	99	33	10	1,320	22	60·8
Reward, Ottawa 928	" 15	103	38	10	1,290	21 30	64·6
Red Fife, Ottawa 17	" 21	109	49	7	1,280	21 20	59·5
Duchess, Ottawa 933	" 15	103	36	8	1,240	20 40	62·3
Red Bobs	" 18	106	40	7	1,220	20 20	59·1
Master, Ottawa 520	" 17	105	32	10	1,000	16 40	59·0
Prelude, Ottawa 135	" 10	98	40	7	980	16 20	60·0

It will be noted that three of the new varieties of wheat—Reward, Crown and Garnet—head the list on fallow, but, while these varieties show distinct promise, they have not been tested long enough definitely to know their value. It will be noted that the durum wheats and Kota occupy a much better relative position on stubble than on fallow. This is probably due to the fact that they are decidedly weak in straw and lodge badly on fallow land. For that reason, they cannot be recommended for growing on heavy land in districts of fairly good rainfall.

The five-year averages given below show Marquis to occupy the leading position and these tests can be regarded as fairly reliable, as they cover a wide range of seasonal conditions.

WHEAT—FIVE-YEAR FALLOW AVERAGE, 1919-1923

Variety	Days to mature	Length of straw	Strength of straw on a scale of 10 points	Yield per acre
		Inch.		Bush.
Marquis, Ottawa 15	104·5	39·2	8·3	36·2
Kitchener	105·2	44·9	8·8	33·2
Red Fife, Ottawa 17	107·0	40·7	8·2	29·1
Ruby, Ottawa 623	95·6	37·4	7·2	27·1
Prelude, Ottawa 135	96·4	33·4	6·2	24·0

WHEAT—FIVE-YEAR STUBBLE AVERAGE, 1919-1923

Variety	Days to mature	Length of straw	Strength of straw on a scale of 10 points	Yield per acre
		Inch.		Bush.
Marquis, Ottawa 15	103·2	36·4	7·3	26·0
Red Fife, Ottawa 17	107·0	40·4	8·4	26·0
Ruby, Ottawa 623	95·0	33·4	6·7	24·1
Red Bobs	99·2	36·8	6·9	23·1
Prelude, Ottawa 135	94·6	32·6	7·2	16·2

OATS

Banner occupies the leading position again this year in the variety tests of oats, among sixteen varieties. This, together with its position in the five-year averages, fairly well establishes its standing. Some of the other sorts under test for the first time show promise, but require to be tested for some years before establishing their standing. It is notable that the very early oats do not yield as well as the other sorts.

OATS (FALLOW)—TEST OF VARIETIES OR STRAINS
Date of Sowing, May 5, 1923

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	Weight per measured bushel after cleaning
			Inch.		Lbs.	Bush. lb.	Lbs.
Banner, Ottawa 49	Aug. 13..	100	51	7	2,400	70 20	36·5
Gold Rain	" 13..	100	56	5	2,200	64 24	42·0
Moose Jaw	" 21..	99	53	7	2,160	63 18	39·0
Victory	" 13..	100	54	7	2,120	62 12	41·5
Leader	" 17..	104	47	7	2,120	62 12	36·0
Longfellow, Ottawa 478	" 17..	104	58	7	2,080	61 06	39·5
Columbian, Ottawa 78	" 11..	98	51	7	2,020	59 14	43·2
Danish Island	.. 17..	104	52	7	1,900	55 30	38·0
Daubeney, Ottawa 47	" 6..	93	42	5	1,800	52 32	36·2
Prolific, Ottawa 77	" 21..	108	58	7	1,780	52 12	42·2
O.A.C. 72	" 21..	108	59	7	1,760	51 26	41·0
*Laurel, Ottawa 477	" 9..	96	51	10	1,700	50 ..	53·5
Alaska	" 6..	93	46	7	1,660	49 14	39·2
Gerlach	" 17..	104	54	7	1,540	45 10	38·2
*Liberty, Ottawa 480	" 10..	97	50	7	1,520	44 24	52·8
Cole	" 6	93	41	7	1,140	33 18	33·8

*Hulless Variety.

OATS (STUBBLE)—TEST OF VARIETIES OR STRAINS

Date of Sowing, May 5, 1923

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	Weight per measured bushel after cleaning
			Inch.		Lbs.	Bush. lb.	Lbs.
Moose Jaw	Aug. 21	99	47	10	1,760	51 26	41·0
Banner, Ottawa 49	" 21	108	41	10	1,560	45 30	41·0
Gerlach	" 21	108	42	10	1,560	45 30	44·5
Victory	" 20	107	42	10	1,540	45 10	44·0
Gold Rain	" 19	106	44	10	1,460	42 32	44·0
Columbian, Ottawa 78	" 18	105	43	10	1,420	41 26	44·0
Leader	" 19	106	45	10	1,380	40 20	37·5
O.A.C. 72	" 21	108	45	10	1,360	40 ..	43·5
Daubeney, Ottawa 47	" 6	93	39	10	1,340	39 14	36·0
Danish Island	" 17	104	49	10	1,300	38 08	43·0
Longfellow, Ottawa 478	" 19	106	51	10	1,280	37 22	40·2
Prolific, Ottawa 77	" 20	107	46	10	1,220	35 30	45·0
Alaska	" 6	93	39	10	1,140	33 18	40·5
Cole	" 6	93	52	10	980	28 28	36·2
*Liberty, Ottawa 480	" 17	104	39	10	820	24 04	53·0
*Laurel, Ottawa 477	" 17	104	36	10	640	18 28	54·0

*Hulless Variety.

OATS—FIVE-YEAR FALLOW AVERAGE, 1919-1923

Variety	Days to mature	Length of straw	Strength of straw on a scale of 10 points	Yield per acre
		Inch.		Bush.
Danish Island	102·5	43·3	9·0	102·6
Banner, Ottawa 49	101·1	42·9	7·6	94·1
Gold Rain	100·3	44·5	7·0	91·5
Victory	100·9	42·4	8·0	90·5
Leader	99·0	41·5	8·6	87·5
O.A.C. 72	103·3	45·3	7·3	85·2
Daubeney, Ottawa 47	89·4	36·8	6·8	72·6
Liberty, Ottawa 480	101·2	43·4	8·1	53·2

OATS—FIVE-YEAR STUBBLE AVERAGE, 1919-1923

Variety	Days to mature	Length of straw	Strength of straw on a scale of 10 points	Yield per acre
		Inch.		Bush.
Banner, Ottawa 49	102·6	37·2	8·3	69·5
Danish Island	101·0	41·2	9·1	69·4
O.A.C. 72	102·3	40·5	8·1	68·8
Gold Rain	100·7	36·2	8·2	68·5
Victory	103·0	36·9	9·3	64·2
Daubeney, Ottawa 47	91·4	32·0	8·0	54·4
Liberty, Ottawa 480	100·2	35·6	8·6	37·3

STRAIN TESTS OF BANNER OATS

In order to test the yielding ability of various strains of Banner oats which have been developed in various parts of the country, seed of these strains was secured through the Cereal Division at the Central Farm and a total of five strains tested. All strains were sown in triplicate one-fortieth-acre plots on May 8 and harvested on September 5. The test was made on fallow ground and, with the extremely wet season, the growth was very rank and a decided weakness in straw showed in all varieties, which prevented them from filling as well as they would ordinarily have done. The Indian Head seed was originally obtained from the Cereal Division and is of the Ottawa 49 strain. It has been grown on this farm for some years, however.

The results of the test are given in the following table:—

STRAIN TEST OF BANNER OATS

Strain	Date sown	Date cut	Yield per acre, Average of three plots
			bush. lbs.
Banner (Waugh)	May 8	Sept. 5	58 28
Banner (Ottawa 49), Indian Head seed	" 8	" 5	57 02
Banner (Dow)	" 8	" 5	56 09
Banner (Ottawa 49)	" 8	" 5	56 09
Banner (Dixon)	" 8	" 5	45 13

BARLEY

Eleven varieties of barley were under test and were, in the main, led by the varieties which have done well on the average of the past five years. Bearer, a new six-rowed sort, developed by the Cereal Division, has given good results but is not available in commercial quantities. O. A. C. 21, a standard sort, shows up relatively well and is widely available.

BARLEY (FALLOW)—TEST OF VARIETIES OR STRAINS

Date of Sowing, May 5, 1923

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	Weight per measured bushel after cleaning
			inches		lb.	bush. lb.	lb.
Charlottetown 80	Aug. 13	100	41	7	2,240	46 32	52·2
Bearer Ottawa 475	" 6	93	44	7	2,200	45 40	48·0
Stella Ottawa 58	" 6	93	33	10	2,040	42 24	50·0
Hannchen	" 16	103	38	5	1,880	39 08	50·5
O.A.C. 21	" 15	102	44	7	1,880	39 08	48·8
*Junior Ottawa 471	" 4	91	36	7	1,860	38 36	60·5
Feeder Ottawa 561	" 4	91	42	7	1,752	36 24	51·0
*Himalayan Ottawa 59	" 6	93	31	7	1,720	35 42	61·8
Success	" 4	91	39	7	1,680	35 0	48·5
Duckbill Ottawa 57	" 13	100	42	10	1,510	31 22	51·0
Albert Ottawa 54	" 4	91	35	10	1,068	22 12	50·8

* Hulless variety.

BARLEY (STUBBLE)—TEST OF VARIETIES OR STRAINS

Date of Sowing, May 5, 1923

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	Weight per measured bushel after cleaning
			inches		lb.	bush. lb.	lb.
O.A.C. 21	Aug. 21	108	43	10	1,600	33 16	50·0
*Junior, Ottawa 471	" 4	91	30	7	1,380	28 36	60·0
Stella, Ottawa 58	" 6	93	43	10	1,380	28 36	50·0
Bearer, Ottawa 475	" 6	93	38	7	1,220	25 20	47·0
*Himalayan, Ottawa 59	" 6	93	30	7	1,160	24 08	60·2
Hannchen	" 19	106	31	7	1,080	22 24	53·0
Charlottetown 80	" 13	100	31	10	880	18 16	51·2
Success	" 4	91	31	7	860	17 44	48·0
Feeder, Ottawa 561	" 4	91	41	7	780	16 12	49·0
Duckbill, Ottawa 57	" 20	107	30	10	690	14 18	51·0
Albert, Ottawa 54	" 4	91	31	7	560	11 32	50·0

* Hulless variety.

BARLEY—FIVE-YEAR (FALLOW) AVERAGE, 1919–1923

Variety	Days to mature	Height of straw	Strength of straw on a scale of 10 points	Yield per acre
		inches		bushels
Bearer, Ottawa 475	96·2	38·4	7·6	59·7
Charlottetown 80	98·9	34·2	7·2	55·6
O.A.C. 21	93·4	38·7	8·6	53·7
Duckbill, Ottawa 57	96·2	36·4	9·2	53·5
Junior, Ottawa 471	88·6	27·5	7·0	46·8
Success	83·2	33·8	7·6	35·1
Albert, Ottawa 54	85·4	31·7	7·2	27·8

BARLEY—FIVE-YEAR (STUBBLE) AVERAGE, 1919–1923

Variety	Days to mature	Height of straw	Strength of straw on a scale of 10 points	Yield per acre
		inches		bushels
Bearer, Ottawa 475	95·0	31·6	7·6	41·9
Charlottetown 80	97·2	29·6	7·6	38·8
Duckbill, Ottawa 57	98·1	29·3	9·2	35·0
O.A.C. 21	95·4	32·65	9·5	32·7
Junior, Ottawa 471	86·8	23·0	7·0	31·5
Success	83·0	29·0	7·6	23·7
Albert, Ottawa 54	86·0	28·2	7·0	20·1

FLAX

Only three varieties were tested in duplicate one-fortieth-acre plots, on fallow. Premost and Novelty are good and the Longstem is a fibre flax which, naturally, does not yield as well (as far as seed is concerned) as the other sorts.

FLAX—TEST OF VARIETIES OR STRAINS
Date of Sowing, May 25, 1923

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		lb.	bush. lb.
Premost	Sept. 26	124	34½	7	760	13 32
Novelty, Ottawa 53	" 28	126	37½	7	680	12 08
Longstem, Ottawa 52	" 30	128	39	7	500	9 06

FLAX—FIVE-YEAR AVERAGE, 1919-1923

Variety	Number of days maturing	Average length of plants	Yield per acre
		inch	bush.
Premost	94·2	28·1	20·0
Novelty, Ottawa 53	98·0	30·1	19·4

PEAS

Seven varieties of peas were tested and were led, in both cases, by Golden Vine. MacKay, another good sort, did not show up as well as usual, but is one of the best sorts.

PEAS (FALLOW)—TEST OF VARIETIES OR STRAINS
Date of Sowing, May 4, 1923

Name of Variety	Date of Ripening	Number of days Maturing	Average length of Vine	Yield of grain per acre	Yield of grain per acre	Weight per measured bushel after cleaning
			Inch	lb.	bush. lb.	lb.
Golden Vine	Aug. 15	103	54	1,300	21 40	66·0
Arthur, Ottawa 18	" 17	105	58	1,240	20 40	67·0
Champlain, Ottawa 32	" 17	105	44	1,160	19 20	66·0
Chancellor, Ottawa 26	" 13	101	41	1,140	19 0	66·0
Cartier, Ottawa 19	" 14	102	45	1,080	18 0	65·6
MacKay, Ottawa 25	" 17	105	60	1,060	17 40	66·0
Mummy	" 17	105	58	700	11 40	66·0

PEAS (STUBBLE)—TEST OF VARIETIES OR STRAINS
Date of Sowing, May 4, 1923

Name of Variety	Date of Ripening	Number of days Maturing	Average length of Vine	Yield of grain per acre	Yield of grain per acre	Weight per measured bushel after cleaning
			inch	lb.	bush. lb.	lb.
Golden Vine	Aug. 19	107	34	1,480	24 40	66·0
Chancellor, Ottawa 26	" 15	103	39	1,140	19 0	66·0
Champlain, Ottawa 32	" 19	107	44	1,140	19 0	66·0
Arthur, Ottawa 18	" 19	107	48	1,100	18 20	64·5
Cartier, Ottawa 19	" 17	105	40	920	15 20	64·6
MacKay, Ottawa 25	" 18	106	52	700	14 40	66·0
Mummy	" 20	108	54	620	10 20	65·0

PEAS—FIVE-YEAR (FALLOW) AVERAGE, 1919-1923

Variety	Days to mature	Length of Vine	Yield per acre
		Inch	bush.
Golden Vine	104·0	42·2	40·9
MacKay, Ottawa 25	104·4	43·8	40·5
Arthur, Ottawa 18	104·6	44·0	39·3

PEAS—FIVE-YEAR (STUBBLE) AVERAGE, 1919-1923

Variety	Days to mature	Length of Vine	Yield per acre
		Inch	bush.
MacKay, Ottawa 25	104·8	46·8	38·2
Golden Vine	104·2	37·2	36·6
Arthur, Ottawa 18	105·4	40·6	33·8

BEANS

Three varieties of beans were under test and two of them produced exceptional yields. The length of time they took to mature, however, was such as to make rather doubtful their value as a crop in average seasons. Further tests will have to be conducted before they can be recommended as a crop.

BEANS—TEST OF VARIETIES OR STRAINS

Date of Sowing, May 25, 1923

Name of Variety	Date of Ripening	Number of days Maturing	Average length of Vine	Yield of grain per acre	Yield of grain per acre
			inch	lb.	bush. lb.
Navy, Ottawa 711	Sept. 28	126	10	1,520	25 20
Norwegian, Ottawa 710	" 28	126	10	1,140	19 0
Beauty, Ottawa 712	" 28	126	10	490	8 10

FORAGE PLANTS

Variety testing work with forage crops was conducted on a fairly extensive scale during the season of 1923. In the work with grasses and clovers all testing is done on triplicate one-hundredth-acre plots and the yield per acre calculated from the average of these. The winter of 1922-23 proved to be good from a standpoint of winter killing, as very little damage was visible in any of the clovers, even red clover and alsike coming through with practically no damage except to a few of the strains from southern sources. The growing season was excellent, due to the heavy rainfall and good yields are recorded in practically every case.

Corn, sunflowers and roots were tested in duplicate one-hundredth-acre plots and all varieties sown and harvested on the same dates. Except where damaged by flooding, due to excess rainfall, the growth of all these was excellent as well.

GRASSES AND CLOVERS

ALFALFA

A test of three strains of Grimm alfalfa was conducted. One strain was from an alfalfa producers' association in Wisconsin, another from the Ontario Agricultural College, Guelph, Ontario, and the third from Grimm seed grown on the Farm. It will be noted that while the heaviest yield of green fodder was secured from the Wisconsin seed, yet our own surpassed it, both in dry hay and dry matter per acre.

ALFALFA—VARIETY TESTS FOR YIELD AND HARDINESS

Name of variety	Green weight per acre	Well-cured hay per acre	Dry matter per acre
	Tons	Tons	Tons
Guelph	11·7	2·9	2·67
Wisconsin	10·6	2·8	2·51
Indian Head	10·7	3·16	2·74

RED CLOVER

While red clover is not always successful in this district, twelve varieties and strains came through the winter fairly well and were cut for hay. The results of the test are given below and it is notable that the best yields were secured from the Swedish clovers. Through an error, the dry matter and well cured hay weights cannot be given for the Kenora Ontario strain.

RED CLOVER—VARIETY TESTS FOR YIELD AND GENERAL SUITABILITY

Name of Variety	Green weight per acre	Well-cured hay per acre	Dry matter per acre
	Tons	Tons	Tons
Alta Swede	18·8	5·3	4·78
Early Swedish	17·4	4·36	3·96
Late Swedish	15·9	3·8	3·44
Kenora	15·5	.....	.....
Medium Late Swedish	13·7	3·7	3·37
Ottawa District	12·75	3·4	3·15
Ottawa L. R. 21	12·2	3·2	2·92
Ottawa 1917–20	11·9	2·98	2·71
Ottawa 1916–20	11·7	2·8	2·52
St. Casimir, Que.	11·8	2·7	2·44
St. Clet, Que.	11·4	2·7	2·41
France 500	8·55	2·1	1·82

SWEET CLOVER

A comparison of the yield of common white, common yellow and Arctic white sweet clover showed the yields to be in favour of the common white.

SWEET CLOVER—VARIETY TESTS

Name of Variety	Green weight per acre	Well-cured hay per acre	Dry matter per acre
	Tons	Tons	Tons
Common White	20·4	4·4	4·08
Common Yellow	20·0	4·4	4·02
Arctic	20·3	4·0	3·67

ALSIKE CLOVER

A test of three strains of alsike showed comparatively little difference in yield for the various lots.

ALSIKE CLOVER—VARIETY TESTS

Name of Variety	Green weight per acre	Well-cured hay per acre	Dry matter per acre
	Tons	Tons	Tons
Northern Ontario	8·9	2·7	2·40
Quebec	9·25	2·5	2·20
Swedish (Ottawa)	8·55	2·4	2·14

WESTERN RYE GRASS

The Division of Agrostology at the Central Experimental Farm having made a great number of selections of western rye grass, some eighteen strains were sent out for trial at this Farm. A wide variation may be noted in the different strains, both in green weight and dry matter per acre. A number of strains show a great deal of promise and are much superior to the ordinary commercial strains.

WESTERN RYE—VARIETY TESTS FOR YIELD AND PURITY

Variety	Green weight per acre	Well-cured hay per acre	Dry matter per acre
	Tons	Tons	Tons
No. 20	6·3	4·8	4·36
No. 89	6·93	4·7	4·2
No. 93	6·8	4··	4·15
No. 85	5·95	4·18	3·82
No. 15	5·9	4·1	3·8
No. 19	6·45	4·0	3·67
No. 17	5·82	4·0	3·62
No. 98	6·1	4·0	3·62
No. 91	6·1	3·76	3·40
No. 79	5·92	3·7	3·34
No. 118	5·8	3·6	3·28
No. 81	3·95	3·6	3·26
No. 18	5·6	3·5	3·21

WESTERN RYE—1921 SEEDING—VARIETY TESTS FOR YIELD AND PURITY

Strain	Green weight	Well-cured hay	Dry matter
	Tons	Tons	Tons
Western Rye—No. 4	5·7	4·2	3·7
Western Rye—No. 6	4·87	3·6	3·33
Western Rye—No. 5	5·4	3·4	3·06
Western Rye—No. 10	4·27	3·1	2·89
Western Rye—No. 11	4·2	3·1	2·82

HAY AND PASTURE MIXTURES

Mixtures of alfalfa with western rye grass and also with brome grass were tested out in their second year as hays. It is notable that in the majority of cases the lighter seedings gave the best results. The rates of seeding are given in the left-hand column of the following table:—

HAY AND PASTURE MIXTURES, USING ALFALFA AS A BASE

Mixture		Green weight per acre	Well cured hay per acre	Dry matter per acre
Lbs.	Lbs.	Tons	Tons	Tons
Alfalfa, 6;	Western rye, 8	8·27	3·7	3·39
Alfalfa, 4;	Western rye, 8	7·6	3·6	3·3
Alfalfa, 16;	Brome, 8	9·3	3·6	3·30
Alfalfa, 10;	Western rye, 8	8·75	3·5	3·25
Alfalfa, 8;	Brome, 8	9·0	3·55	3·2
Alfalfa, 14,	Western rye, 8	9·8	3·46	3·15
Alfalfa, 10;	Brome, 8	8·8	3·4	3·14
Alfalfa, 10;	Brome, 6	9·7	3·46	3·14
Alfalfa, 10;	Brome, 10	9·2	3·5	3·13
Alfalfa, 4;	Brome, 8	9·3	3·4	3·12
Alfalfa, 10;	Western rye, 2	8·4	3·4	3·1
Alfalfa, 10;	Brome, 14	9·5	3·5	3·1
Alfalfa, 12;	Brome, 8	8·9	3·4	3·09
Alfalfa, 10;	Brome, 4	9·4	3·5	3·07
Alfalfa, 10;	Brome, 12	9·1	3·4	3·06
Alfalfa, 16;	Western rye, 8	9·2	3·4	3·05
Alfalfa, 14;	Brome, 8	8·6	3·3	3·03
Alfalfa, 10;	Western rye, 8	7·6	3·4	3·0
Alfalfa, 6;	Brome, 8	9·0	3·3	3·0
Alfalfa, 12;	Western rye, 8	8·87	3·28	2·99
Alfalfa, 10;	Western rye, 14	7·07	3·1	2·86
Alfalfa, 8;	Western rye, 8	8·33	3·4	2·83
Alfalfa, 10;	Western rye, 4	7·9	3·1	2·8
Alfalfa, 10;	Brome, 8	8·1	3·05	2·75
Alfalfa, 10;	Western rye, 10	7·85	3·04	2·7
Alfalfa, 10;	Western rye, 6	7·6	3·0	2·7
Alfalfa, 10;	Brome, 2	8·9	3·0	2·61
Alfalfa, 10;	Western rye, 12	7·42	2·0	1·8

ANNUAL HAY CROPS—LEGUMES

Comparative tests were made of three strains of Hubam annual sweet clover, yellow blossom biennial, and Arctic white sweet clover (Biennial). The biennial sweet clovers were seeded at the same time as the Hubam and, although not making quite as good a dry weight per acre as the annual, were very close to it. These were compared with green feed oats and sudan grass. The sudan grass failed to grow, so that only the oats remained for comparison and it exceeded the legumes in both dry matter and cured hay weights per acre.

ANNUAL HAY CROPS—LEGUME VARIETIES

Name of Variety	Green weight per acre	Well-cured hay per acre	Dry matter per acre
	Tons	Tons	Tons
Hubam (Brandon)	13·6	2·5	2·21
Hubam (Nebraska)	13·5	2·3	2·13
Yellow sweet clover	12·7	2·18	1·95
Arctic sweet clover (R. G. Thompson)	13·1	2·2	1·92
Hubam	11·1	1·98	1·79
Green feed oats	12·4	2·7	2·45

GRASSES AND CLOVERS ALONE AND IN COMBINATION

A large number of grasses were sown alone and in combination with alfalfa and sweet clover. Rates of seeding are given in the left-hand column of the table following.

It is notable that the white blossom sweet clover mixtures gave much the largest yield, followed by the yellow blossom. This may be partly explained by the fact that, owing to wet weather, it was not possible to harvest these plots when the sweet clover would have made good quality hay.

GRASSES AND CLOVERS ALONE AND IN COMBINATION

Name				Green weight	Well cured hay	Dry matter
	Lbs.		Lbs.	Tons	Tons	Tons
Sweet clover,	10;	Kentucky Blue,	12	21·1	5·9	5·31
Sweet clover,	10;	Western rye	8	20·3	5·8	5·3
Sweet clover,	10;	Brome,	8	20·4	5·8	5·22
Sweet clover,	10;	Canada Blue..	12	20·8	5·7	5·2
Sweet clover,	10;	Orchard grass,	15	21·0	5·4	5·0
Sweet clover,	10;	Red Top,	12	20·8	5·4	4·93
Sweet clover,	10;	Meadow fescue,	15	19·8	5·1	4·69
Sweet clover,	10;	Timothy,	8	20·3	4·9	4·46
Yellow sweet clover,	10;	Brome,	8	16·5	4·6	4·26
Sweet clover,	10;	Tall oat,	15	18·4	4·4	4·06
Yellow sweet clover,	12;	Red top,	12	12·4	4·3	3·92
Yellow sweet clover,	12;	Western rye,	8	14·1	4·2	3·88
Yellow sweet clover,	10;	Kentucky Blue	12	12·4	4·2	3·82
Yellow sweet clover,	10;	Canada Blue....	12	11·7	4·1	3·79
Yellow sweet clover,	10;	Meadow fescue,	15	15·5	4·1	3·77
Yellow sweet clover,	10;	Orchard grass,	15	12·7	4·0	3·61
Yellow sweet clover,	10;	Timothy	8	11·9	3·2	3·24
Brome,	15;			6·8	3·3	3·02
Yellow sweet clover,	10;	Tall oat	15	10·6	3·3	2·98
Alfalfa,	10;	Red top,	12	10·5	3·2	2·93
Alfalfa,	10;	Brome,	8	9·6	3·0	2·73
Alfalfa,	10;	Timothy,	8	9·4	2·8	2·59
Alfalfa,	10;	Orchard grass	15	9·6	2·8	2·57
Alfafa,	10;	Kentucky Blue	12	9·6	2·8	2·55
Red Top,	12;			7·2	2·8	2·53
Alfalfa,	10;	Meadow fescue	15	9·1	2·7	2·51
Alfalfa,	10;	Tall oat,	15	9·2	2·7	2·46
Alfalfa,	10;	Canada Blue,	12	9·3	2·6	2·40
Timothy,	15;			6·6	2·7	2·28
Canada Blue,	24;			5·8	2·2	1·98
Meadow fescue,	30;			5·9	1·9	1·77
Tall oat,	30;			4·9	1·8	1·66
Alfalfa,	10;	Western rye,	8	9·6	1·8	1·59
Kentucky Blue,	24;			4·3	1·6	1·42
Orchard grass,	30;			2·6	0·84	0·77
Western rye,	15;			7·2		

CORN AND SUNFLOWERS

CORN

Eighteen varieties and strains of corn were under test and all made good growth and were sufficiently mature to make good silage. It is notable that the dry matter return per acre bears a close relation to the maturity of the corn. Some of the later varieties did relatively better during the past season than is usually the case.

CORN VARIETIES

Name of Variety	Height of plant	Maturity at harvest	Average yield per acre	Dry matter per acre	Remarks
	ft. inch.		Tons	Tons	
Disco Longfellow—Disco	7′ 9″	Early dough	25·25	4·89	
Parke's Leaming—Parke	9′	Dough	24·87	5·09	
Leaming—Duke	8′ 10″	Early dough	24·0	4·87	
North Western Red Dent—Disco	7′ 11″	Early dough	23·7	4·47	
MacKay's No. 6 Giant Dent	7′ 4″	Ripe	21·6	5·01	Ripe, Sept. 8.
White Cap Yellow Dent	9′ 3″	Late dough	20·97	4·67	
90 Day Western Dent—Disco	8′ 4″	Late dough	20·5	4·3	
North Western Dent—McKenzie	5′ 11″	Dough	19·97	5·0	
Golden Glow—Duke	8′ 8″	Late dough	19·47	4·16	
Wisconsin No. 7—Duke	8′ 2″	Early dough	19·6	4·07	
North Dakota—Steele, Briggs	7′	Early dough	18·97	3·54	
Quebec 28—Macdonald College	6′ 2″	Early dough	18·85	3·77	
Compton's Early—Duke	8′ 3″	Late dough	18·85	3·61	
Longfellow—Duke	7′ 6″	Late dough	18·3	3·69	
Disco Pride Yellow Dent	7′ 7″	Dough	18·25	4·11	
Wisconsin No. 7—Parkes	7′ 6″	Dough	17·17	3·81	
Alta	6′ 8″	Ripe	15·2	3·54	Duplicate plot flooded out.
Indian Head	6′ 1″	Early dough	5·75	1·41	Not more than 20 per cent germination, due to lack of maturity of seed.

CORN—FIVE-YEAR AVERAGE, 1919–1923

Variety	Height	Yield per acre
	Inch.	Tons
Leaming	86·9	19·7
North Western Dent	75·0	16·9
Longfellow	81·9	15·3

SUNFLOWERS

Nine strains of sunflowers were under test and, with the exception of some of the smaller early varieties, did well. The early sorts mature too quickly to be entirely satisfactory in this district, as they would have to be cut and ensiled during harvest time if cut when suitable for best quality silage.

SUNFLOWER VARIETIES

Name of Variety	Date ripe	Maturity at harvest	Average height at harvest	Average yield per acre	Dry matter per acre	Remarks
			ft. inch.	Tons	Tons	
Russian Giant—Disco		Late dough	8 10	22·55	4·5	
Giant Russian—C.P.R.	Sept. 9	Ripe	8 ..	21·6	3·76	
Manteca	" 9	Ripe	7 7	20·8	3·8	
Mammoth Russian—McDonald	" 3	Ripe	9 8	19·5	4·08	
Mixed—C.P.R.	" 9	Ripe	7 3	19·45	3·56	
Black—C.P.R.	" 9	Ripe	7 10	19·1	3·76	
Ottawa 76—Ottawa	Aug. 28	Ripe	7 2	17·25	3·5	Low yield. Matures too early for ensilage.
Manchurian—McKenzie		Dough	7 ..	14·3	2·7	Duplicate plot badly hailed.
Mennonite—Rosthern	Aug. 28	Ripe	6 8	12·6	3·04	Not suitable for ensilage. Original plot hailed.

FIELD ROOTS

MANGELS

A number of varieties of mangels were under test and gave good yields. The large white types, as a class, gave the best yields. The long red sorts are very difficult to harvest and cannot be recommended on that account.

FIELD ROOTS—MANGEL VARIETIES

Name of Variety	Source of seed	Average yield per acre	Per cent dry matter	Dry matter per acre	Remarks
		Tons		Tons	
Runkelrocfro Barres Stryno V 3084	Trifolium, Denmark	29·9	14·44	4·31	
Giant Yellow Globe	Steele, Briggs Seed Co., Winnipeg, Man.	28·0	13·01	2·9	Easy to harvest.
Barres Stryno B.C. 748	D. L. F., Roskilde, Denmark	27·9	12·12	3·66	
Barres Sludstrup B.C.752	D. L. F., Roskilde, Denmark	27·1	14·55	3·94	
New Ideal	Steele, Briggs Seed Co., Winnipeg, Man.	26·87	13·01	3·5	
Giant Yellow Globe	A. E. McKenzie Seed Co., Brandon, Man.	26·5	11·03	2·92	Easy to harvest.
Monarch Sugar	A. E. McKenzie Seed Co., Brandon, Man.	26·4	14·45	3·8	
Runkelrocfro Barres Stryno V 7034	Trifolium, Denmark	26·0	16·21	4·21	
Sugar Mangel B.C. 760	D. L. F., Roskilde, Denmark	25·4	11·36	2·88	
Barres Tystofhe B.C. 749	D. L. F., Roskilde, Denmark	25·0	12·18	3·04	
Giant White Feeding Sugar	Steele, Briggs Seed Co., Winnipeg, Man.	24·85	13·01	3·23	
Golden Globe	Sutton's England	23·7	12·24	2·9	Easy to harvest.
Danish Sludstrup	Wm. Ewing Seed Co., Montreal, Que.	23·5	11·30	2·65	
Royal Giant Sugar Beet	Steele, Briggs Seed Co., Winnipeg, Man.	23·0	8·88	2·04	
Eclipse	A. E. McKenzie Seed Co., Brandon, Man.	22·9	11·96	2·74	Difficult to harvest.
Danish Sludstrup	K. McDonald & Sons, Ottawa, Ont.	22·7	11·96	2·71	
Yellow Intermediate	Central Experimental Farm Ottawa, Ont.	21·9	12·79	2·8	
Golden Tankard	J. A. Bruce & Co., Hamilton, Ont.	21·0	12·85	2·7	
Mammoth Long Red	Steele, Briggs Seed Co., Winnipeg, Man.	20·4	17·15	3·5	Very difficult to harvest.
Giant Long Red	A. E. McKenzie Seed Co., Brandon, Man.	20·0	12·24	2·48	Difficult to harvest
Giant Yellow Intermediate	Steele, Briggs Seed Co., Winnipeg, Man.	19·7	11·69	2·8	
Giant Rose Sugar	A. E. McKenzie Ssed Co., Brandon, Man.	19·1	13·67	2·61	
Manitoba Giant Yellow	A. E. McKenzie Seed Co., Brandon, Man.	18·5	10·91	2·02	
Half Sugar Rose No. 1141	Trifolium, Denmark	18·5	14·28	2·64	

SWEDE TURNIPS

In the swede turnips, varieties from Denmark made excellent showings as compared with Canadian seed. It is notable, however, that the Ditmars variety, which has done so well in the past, was again the best Canadian sort. Unfortunately it is not possible to give dry matter percentages and weights for most of the swede varieties.

FIELD ROOTS—TURNIP VARIETIES

Name of Variety	Source of Seed	Average Yield per acre	Per cent Dry Matter	Dry Matter per acre	Remarks
		tons		tons	
Yellow Tankard, B. L. 351.	D. L. F., Roskilde, Denmark.	18·25	.....	.....	First plot flooded out.
Kaalroc Wilhelmsburger B.L. 770.	D.L.F., Roskilde, Denmark	16·25	.....	.....	First plot flooded out.
Kaalrabifro Bangholm, No. 7021.	Trifolium, Denmark.....	16·0	.....	.....	First plot flooded out. Easy to harvest.
Ditmars.....	H. H. McNutt.....	16·0	12·40	1·98	First plot flooded out. Easy to harvest.
Bangholm Lyngby B.L. 318.	D.L.F., Roskilde, Denmark	15·5	.....	.....	First plot flooded out. Easy to harvest.
Banhgolm Pajbjerg V, No. 7022.	Trifolium, Denmark.....	15·0	.....	.....	First plor flooded out. Easy to harvest.
Jumbo.....	Steele Briggs Seed Co., Winnipeg, Man.	14·6	11·19	1·74	
Hartley's Bronze Top..	J. A. Bruce & Co., Hamilton, Ont.	14·25	12·95	1·85	Duplicate plot flooded out.
Good Luck Purple Top, S/887-23.	Steele, Briggs Seed Co., Winnipeg, Man.	14·1	.....	.....	
Bangholm Studsgaard, B.L. 768.	D.L.F., Roskilde, Denmark	14·0	.....	.....	First plot flooded out. Easy to harvest.
Hasard's Improved, S/964-23.	Steele, Briggs Seed Co., Winnipeg, Man..	13·6	.....	.....	
Canadian Gem S/964-23	Steele Briggs, Seed Co.,Winnipeg, Man.	13·25	14·83	1·95	
Famous Kangaroo Green Top, S/965-23.	Steele, Briggs Seed Co.,Winnipeg, Man.	13·25	.....	.....	
Durham, S/825-23.....	Steele, Briggs Seed Co.,Winnipeg, Man.	13·25	.....	.....	
Superlative 33/249.....	A. E. McKenzie Seed Co., Brandon, Man.	12·75	.....	.....	
Swede Shepherd, No. 2056.	Trifolium, Denmark.....	12·75	.....	.....	First plot flooded out.
Monarch or Elephant 33/239.	A. E. McKenzie Seed Co., Brandon, Man.	12·5	.....	.....	First plot flooded out.
Bangholm.....	Wm. Ewing Seed Co., Montreal, Que.	11·25	.....	.....	Duplicate plot flooded out. Easy to harvest.
Monarch.....	Experimental Farm, Nappan N.S.	11·25	.....	.....	Duplicate plot flooded out.
Bongholm 33/209.....	A. E. McKenzie Seed Co., Brandon, Man.	11·15	.....	.....	Easy to harvest.
Breadstone Green Top 236.	A. E. McKenzie Seed Co., Brandon, Man.	10·5	10·31	1·08	First plot flooded out. Easy to harvest.
Ferguson's Perfection....	Dupuy & Ferguson.....	10·0	.....	.....	Duplicate plot flooded out.
Kangaroo 2706.....	A. E. McKenzie Seed Co., Brandon, Man.	8·9	.....	.....	
Imperial 33/39.....	A. E. McKenzie Seed Co., Brandon, Man.	8·5	.....	.....	Duplicate plot flooded out.
Bangholm.....	Experimental Farm, Charlottetown, P.E.I.	7·9	.....	.....	Duplicate plot flooded out. Easy to harvest.
Fynsk Bortfilder Parti 2660.	D.L.F., Roskilde, Denmark	7·75	12·24	0·95	
Dalis B.L. 773.....	D.L.F., Roskilde, Denmark	7·0	.....	.....	First plot flooded out.
North Western 33/209...	A. E. McKenzie Seed Co., Brandon, Man.	4·5	.....	.....	First plot flooded out. Second plot under water most of season.
White Swede 234.....	A. E. McKenzie Seed Co., Brandon, Man.	Flooded	out.		

FIELD CARROTS

The short and medium length types of field carrots again gave better yields and were easier to handle than the other sorts. It is notable that Canadian seed outyielded the sorts secured from Denmark.

FIELD ROOTS—CARROT VARIETIES

Name of Variety	Source of Seed	Average Yield per acre	Per cent Dry Matter	Dry Matter per acre	Remarks
		tons		tons	
Improved Short White.	Steele, Briggs Seed Co., Winnipeg, Man.	19·4	12·30	2·38	Easy to harvest.
Large White Belgian....	Steele, Briggs Seed Co., Winnipeg, Man.	16·25	12·40	2·01	
Improved Half Long White.	A. E. McKenzie Seed Co., Brandon, Man.	16·0	11·03	1·76	Easiest to harvest.
Danish Champion.....	Central Experimental Farm, Ottawa, Ont.	14·4	11·80	1·70	
Long White Belgian.....	A. E. McKenzie Seed Co., Brandon, Man.	13·75	10·64	1·46	
White Belgian 7016.....	Trifolium, Denmark.....	13·6	14·50	1·97	
White Belgian.....	Dupuy & Ferguson.....	12·9	12·68	1·63	
Cham ion 7031.....	Trifolium, Denmark.....	12·9	13·12	1·69	Badly mixed.
James.....	Harris McFayden Seed Co., Winnipeg, Man.	11·55	13·67	1·57	
Long Orange Belgian....	A. E. McKenzie Seed Co., Brandon, Man.	10·75	15·21	1·63	
James B. L. 781.....	D.L.F., Roskilde, Denmark	9·0	11·91	1·07	Poor development. Difficult to harvest.
Long Red Surrey.....	Steele, Briggs Seed Co., Winnipeg, Man.	8·6	15·50	1·33	

SUGAR BEETS

The growth of sugar beets was very seriously injured by the excessive moisture of the past summer, as they happened to be located on a rather low spot and were covered with water for some time.

FIELD ROOTS—SUGAR BEET VARIETIES

Name of Variety	Source of Seed	Average Yield per acre	Per cent Dry Matter	Dry Matter per acre	Remarks
		tons		tons	
Vilmorin's Improved Selection B.....	Vilmorin-Andrieux & Co., France.	10·75	25·48	2·73	
Kitchener.....	Dominion Sugar Co.....	10·6	22·71	2·41	All plots under water last three weeks of June and first week of July.
Hemming & Harvings, Denmark.	Dominion Sugar Co.....	10·5	24·49	2·57	
Chatham.....	Dominion Sugar Co.....	9·0	23·28	2·09	
Sluice Bros., Holland...	Dominion Sugar Co.....	7·4	22·92	1·69	

POULTRY

The White Wyandotte breed of poultry has been kept at the Farm and special attention has been paid to the development of egg-laying ability, as well as size, constitution and vigour. All birds are trap-nested the year round and only those of good type which have proved themselves good egg producers are used as breeding stock. The flock is housed in two large houses, 16 feet by 32 feet, of the cotton-front, straw-loft type, each of which accommodates one hundred birds, and a number of smaller moveable houses, 10 feet by 12 feet in size, of similar construction. This type of house has proved very satisfactory and is well adapted to use on the prairie.

HATCHING RESULTS—HENS VS. PULLETS

The following table gives the comparison of the results obtained from pullets and hens in hatching:—

HATCHING RESULTS—HENS AND CHICKENS

Ages	Total eggs set	Number fertile eggs	Per cent fertile eggs	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Total eggs required for one chick hatched	Total fertile eggs for one chick hatched
Hens.....	3,294	1,716	52·1	487	14·7	28·4	6·8	3·5
Pullets.....	1,553	814	52·4	219	14·1	26·9	7·1	3·7

From the table, it will be seen that slightly better results were obtained from mature hens as breeding stock. The pullets used in this comparison were all well matured birds that had had good egg production records during the winter.

COMPARISON OF MARCH, APRIL AND MAY HATCHES

Time set	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for one chick hatched	Total fertile eggs for one chick hatched	Total eggs required for one chick when wing banded
March.....	686	285	41·5	62	9·0	22·0	59	97·0	11·0	4·6	11·6
April.....	2,100	1,204	57·3	240	11·4	20·0	175	76·0	8·7	5·0	12·0
May.....	2,061	1,167	56·6	404	19·6	34·6	203	50·2	5·1	2·8	10·1

It will be noted that May hatches gave considerably better results at hatching time but that the percentage of chicks raised was much better in the earlier hatches.

CHICK FEEDING EXPERIMENTS

ORDINARY FEED VS. ORDINARY FEED PLUS COD LIVER OIL FOR CHICKS

Chicks hatched early in March must be confined to the brooder house for a long time before they can be allowed outside and quite often, in spite of careful feeding, some chicks develop leg weakness on account of the confinement.

Two lots of chicks of the same hatch, which came off at the beginning of April, were put on a test to ascertain the value of cod liver oil in the ration. The results are given in tabular form.

COD LIVER OIL FOR YOUNG CHICKS

—	Run 1	Run 2
	Cod liver oil	No cod liver oil
Number of chicks	48	49
Total weight of chicks at beginning of experiment	3 lbs. 12 ozs.	3 lbs. 12 ozs.
Weight per chick at beginning of experiment	1·25 oz.	1·25 oz.
Mortality	2	5
Live chicks at end of experiment	46	44
Total weight at end of experiment	23 lbs. 7·9 oz.	16 lbs. 3·5 oz.
Weight per chick at end of experiment		
Gain (total)	19·4 lbs.	12·4 lbs.
Gain (per chick)	0·4 oz.	0·28 oz.
Feed consumed—		
Milk	49 pints	49 pints
Chick feed	204 oz.	216 oz.
Dry mash	223 oz.	110·5 oz.
Wet mash	317·5 oz.	309·5 oz.
Oat meal	94 oz.	94 oz.
Bran	35 oz.	44 oz.
Grit	34 oz.	23 oz.
General Condition—		
Beginning of experiment	Good	Good
End of experiment	Very good (chicks showed no sign of leg weakness)	Fair (10 per cent of chicks showed sign of leg weakness)

It will be noted that the cod liver oil chicks made very much greater growth and better development than the other lot. The oil was given as two per cent of the wet mash and it will be noted that the chicks receiving the oil showed no sign of leg weakness, while the other lot did, and that the mortality was much less where the chicks received oil. After the conclusion of the experiment the chicks in lot 2 were given cod liver oil and in a very few days all signs of leg weakness disappeared, the chicks all improving in vigour and general thriftiness.

BUTTERMILK VS. WATER

The results of an experiment comparing buttermilk and water as drink for growing chicks are here given in tabular form.

BUTTERMILK FOR YOUNG CHICKS

	Run 1	Run 2
	Buttermilk	Water
Number of chicks at beginning of experiment	50	50
Weight of chicks at beginning of experiment	5 lbs.	5 lbs.
Weight per chick at beginning of experiment	1·6 oz.	1·6 oz.
Live chicks at end of experiment	36	44
Weight of chicks at end of experiment	12 lbs.	12·5 lbs.
Weight per chick at end of experiment	5·3 oz.	4·5 oz.
Gain (total)	7 lbs.	7·5 lbs.
Gain per chick	3·1 oz.	2·7 oz.
Mortality	14	6
Condition at finish	Fairly good	Good
Feed consumed—		
Buttermilk	21 pints	.....
Water	.....	21 pints
Chick feed	150·5 oz. at 24 cents	167 oz.
Dry mash	153·5 oz.	205·5 oz.
Wet mash	165·5 oz.	173·5 oz.
Oat meal	69 oz.	71·5 oz.
Bran	22 oz.	34 oz.
Grit	40 oz.	50 oz.
Value of buttermilk—6 cents per gallon.	$0 93	$1 09

It will be noted that, while there was considerably more mortality in the lot receiving buttermilk, yet the growth and development of the remaining chicks was much better than with the lot receiving water. The value of the buttermilk was found to be approximately six cents per gallon when fed to the chicks.

EXPERIMENTS WITH LAYING HENS

Four experiments with various rations for laying hens were carried on. Owing to a shortage of well matured pullets, some of the later hatched, poorly developed birds had to be used for some of these experiments, which accounts for the relatively high cost per dozen eggs in some of the experiments.

SNOW VS. WATER FOR WINTER

Two pens of ten pullets each were used in this test and the experiment was carried on for five months.

RESULTS OF SNOW VS. WATER EXPERIMENT

	Scratch grain	Mash	Grit	Shell	Charcoal	Value of feed	Eggs	Price per dozen	Value of eggs	Loss or gain per pen	Loss or gain per hen	Cost of one dozen
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	$		$	$	$	c.	$
Water	228	142	14	12	6	6 85	132	0 45	4 95	−1 90	−19·0	0 62
Snow	240	150	14	12	6	7 19	200	0 45	7 50	+0 31	+ 3·1	0 43

The snow gave better results than the water in this test, but, owing to the immaturity of the birds, the results cannot be considered as decisive.

BEEF SCRAP VS. TANKAGE

These two feeds were again compared in a full year's test, as a source of animal protein in the ration.

RESULTS OF BEEF SCRAP VS. TANKAGE EXPERIMENT

	Scratch grain	Mash	Grit	Shell	Charcoal	Value of feed	Eggs laid	Price per dozen	Value of eggs	Loss or gain per pen	Loss or gain per hen	Cost of one dozen
						$		$	$	$	$	$
Beef Scrap.....	385	212	28	24	11	11 15	628	0 34	17 79	+6 64	+0 66	0 21
Tankage.....	396	205	28	24	12	11 22	725	0 34	20 54	+9 32	+0 93	0 18

The results are contrary to those obtained in 1922, in that the tankage gave the best results, whereas, the reverse was true in 1922. This test will have to be repeated several times in order to secure definite data.

COMMERCIAL VS. HOME-MIXED RATIONS

The comparison of a good home-mixed feed, which has been found satisfactory as an egg-producing ration, with a feed put out by one of the milling companies and sold as a good ration for egg production was again carried on this year in a full year's test. Ten pullets were used in each lot.

RESULTS OF COMMERCIAL VS. HOME-MIXED RATIONS EXPERIMENT

	Scratch grain	Mash	Grit	Shell	Charcoal	Value of feed	Eggs laid	Price per dozen	Value of eggs	Loss or gain per pen	Loss or gain per hen	Cost of one dozen
						$		$	$	$	$	$
Commercial feed.....	390	266	28	30	12	15 06	884	0 34	25 05	+ 9 99	+0 99	0 20
Home mixed feed.....	405	240	28	30	12	12 12	903	0 34	25 58	+13 46	+1 34	0 16

The results of the test again prove the two rations nearly equal in egg producing value, but the home-mixed feed is considerably cheaper, even though it includes practically the same feeds as the commercial one.

SASKATCHEWAN EGG LAYING CONTEST

The Saskatchewan Egg Laying Contest, which is conducted at this Farm, is open to all poultry breeders in the province. Ten birds constitute a pen. They must be of a standard breed, true to type and free from disqualifications. All pens are inspected before the opening of the contest and, if found to be satisfactory, the entry is accepted. The contest commences on November first and continues for the following fifty-two weeks. Weekly egg reports showing the production of each bird and each pen are made up at the end of each week and sent to all contestants.

The substantial increase in average production, from year to year, which has been notable since the contest started is one of the most encouraging features in the contest work. This is an indication of poultry development in the province and also an indication that breeders are paying more careful attention to the development of egg production in their birds.

The final standing of the pens and other details will be published in a report on the contests held at the various Experimental Farms throughout Canada. This report will appear in the near future. Bulletin 38, New Series, containing the results of the contests up to and including those of 1921-22 can be had upon application to the Publications Branch, Department of Agriculture, Ottawa.

PLANT PATHOLOGY

The Indian Head Farm co-operated with the Division of Botany in carrying out rust and smut experiments. A report on this work, covering tests at Lacombe, Scott, Indian Head and Rosthern, Dominion Experimental Farms and Stations made by Mr. W. P. Fraser, office in charge of the Dominion Laboratory of Plant Pathology, Saskatoon, will be found in the annual report of the Dominion Botanist, 1923.

EXPERIMENTAL PROJECTS UNDER WAY AT THE EXPERIMENTAL FARM, INDIAN HEAD, SASK.

ANIMAL HUSBANDRY

Project No.	Title.
	BEEF CATTLE
A. 179.	Cost of producing beef for steers of different ages.
A. 181.	Economy of feeding horned vs. dehorned steers.
A. 194.	Cost of beef production.
A. 240.	Indoor vs. outdoor feeding of steers.
A. 254.	Establishing herds of dual-purpose cattle.
A. 255.	Cost of milk production from dual-purpose cattle.
A. 256.	Cost of raising dual-purpose calves and heifers.
A. 349.	Shelter vs. no shelter for steers.
A. 411.	Alfalfa vs. western rye grass for steers.
A. 412.	Rations for cows during pregnancy.
A. 413.	Corn vs. sunflower ensilage for calves and heifers.
A. 414.	Economy of feeding hay to steers.
A. 415.	Grain vs. hay for wintering steers.
A. 416.	Barley vs. screenings for steers.
A. 417.	Dry roughages for steer feeding.
	HORSES
A. 294.	Cost of rearing colts.
A. 297.	Grading up horses with pure-bred sires.
A. 298.	Improving the breeding of pure-bred draft horses.
A. 331.	Cost of maintaining draft horses.
A. 336.	Cost of maintaining brood mares.
A. 340.	Treatment of navel ill in foals.
A. 409.	Wintering horses in barn vs. outside.
	SHEEP
A. 301.	Ensilage vs. roots for market lambs.
A. 310.	Grading up the flock with pure-bred rams.
A. 338.	Cost of rearing market lambs.
A. 385.	Value of sunflower silage for sheep.
A. 386.	Value of corn silage for sheep.
A. 408.	Economy of early vs. late lambs for market.
	SWINE
A. 113.	Value of mineral and protein feeds for hogs.
A. 147.	Inside vs. outside feeding of hogs.
A. 233.	Value of pasture crops for hogs.
A. 406.	Control of hairlessness in litters.
A. 407.	Value of barley for hog feeding.

FIELD HUSBANDRY

	ROTATION EXPERIMENTS
F. 107.	Three-year rotation—Summer-fallow; wheat; wheat.
F. 127.	Six-year rotation—Corn; wheat; hay; hay; hay; wheat; oats.
F. 131.	Eight-year rotation—Summer-fallow; wheat; oats; corn; barley; hay; hay; hay.
F. 135.	Nine-year rotation—Summer-fallow; wheat; oats; hay; hay; hay; corn; wheat; oats.

CULTURAL EXPERIMENTS

Project No.	Title.
F. 144.	Summer-fallow treatment.
F. 145.	Summer-fallow substitute.
F. 146.	Stubble treatment.
F. 147.	Breaking sod from cultivated grasses and clovers.
F. 153.	Place in rotation to seed fall rye.
F. 156.	Dates of seeding corn and sunflowers.
F. 157.	Date of seeding fall rye.
F. 166.	Rates of seeding grasses and clovers.
F. 169.	Methods of seeding grass and clover mixtures.
F. 179.	Cultivation and intertillage of sunflowers.
	MANURE AND COMMERCIAL FERTILIZER EXPERIMENTS
F. 189.	Manure for wheat.
F. 192.	Manure for corn sunflowers or potatoes.
F. 193.	Commercial fertilizers for field crops.
F. 194.	Green manure crops.
	FARM MANAGEMENT EXPERIMENTS
F. 195.	Cost of producing farm crops.
F. 196.	Cost of operating tractor.
	SOIL MOISTURE EXPERIMENTS
F. 200.	Influence of various treatments upon soil moisture as determined by moisture determinations.

HORTICULTURE

	BUSH AND TREE FRUITS
H. 4.	Currant, variety experiment.
H. 6.	Gooseberry, variety experiment.
H. 11.	Raspberry, variety experiment.
H. 21.	Strawberry, variety experiment.
H. 33.	Apple, variety experiment.
H. 48.	Plum, variety experiment.
	VEGETABLE GARDENING
H. 54.	Asparagus, variety experiment.
H. 61.	Bean, variety experiment.
H. 68.	Beet, variety experiment.
H. 70.	Brussels sprouts, variety experiment.
H. 77.	Cabbage, variety experiment.
H. 83.	Carrot, variety experiment.
H. 88.	Cauliflower, variety experiment.
H. 94.	Celery, variety experiment.
H. 309.	Citron, variety experiment.
H. 102.	Corn, variety experiment.
H. 106.	Cucumber, variety experiment.
H. 245.	Cucumber (greenhouse), variety experiment.
H. 116.	Lettuce, variety experiment.
H. 122.	Melon, musk, variety experiment.
H. 125.	Melon, water, variety experiment.
H. 138.	Onion, variety experiment.
H. 140.	Parsley, variety experiment.
H. 145.	Parsnip, variety experiment.
H. 153.	Pea, variety experiment.
H. 186.	Potato, variety experiment.
H. 188.	Pumpkin, variety experiment.
H. 192.	Radish, variety experiment.
H. 195.	Rhubarb, variety experiment.
H. 197.	Salsify, variety experiment.
H. 199.	Spinach, variety experiment.
H. 201.	Squash, variety experiment.
H. 211.	Tomato, variety experiment.
H. 214.	Turnip, variety experiment.
H. 216.	Vegetable marrow, variety experiment.
	ORNAMENTAL GARDENING
H. 263.	Annual flowers, variety experiment.
H. 274.	Perennial flowers, variety experiment.
H. 298.	Hedges, variety experiment.
H. 307.	Trees and shrubs, ornamental and shelter, variety experiment.

CEREALS

Project No.	Title.
Ce. 1.	Common spring wheat; test of varieties or strains.
Ce. 3.	Durum wheat; test of varieties or strains.
Ce. 4.	Winter wheat; test of varieties or strains.
Ce. 5.	Oats; test of varieties or strains.
Ce. 6.	Barley; test of varieties or strains.
Ce. 7.	Field peas; test of varieties or strains.
Ce. 8.	Field beans; test of varieties or strains.
Ce. 9.	Flax, test of varieties or strains.
Ce. 10.	Spring rye; test of varieties or strains.
Ce. 11.	Winter rye; test of varieties or strains.
Ce. 50.	Multiplication of cereals.
Ce. 51.	Importation and testing of foreign varieties of cereals.
Ce. 59.	Tests of peas and oats in combination for grain.
Ce. 62.	Test of farmer's varieties for grain.
Ce. 63.	Smut treatment for hulless oats.

FORAGE PLANTS

Ag. 1.	Indian corn, variety tests for ensilage purposes.
Ag. 16.	Mangels, variety tests for yield and purity.
Ag. 36.	Carrots, variety tests for yield and purity.
Ag. 51.	Swedes, variety tests for yield and purity.
Ag. 66.	Sugar beets, variety tests for yield and purity.
Ag. 76.	Sunflowers, variety tests for yield and purity.
Ag. 126.	Alfalfa, variety tests hardiness yield suitability.
Ag. 131.	Alfalfa, rates of seeding for hay production.
Ag. 133.	Alfalfa, seeding with vs. without a nurse crop for seed production.
Ag. 135.	Alfalfa, depths of seeding.
Ag. 146.	Red clover, variety tests for yield and general suitability.
Ag. 161.	Sweet clover, variety tests.
Ag. 166.	Sweet clover, seeding with vs. without a nurse crop for seed production.
Ag. 178.	Alskie clover, variety tests.
Ag. 212.	Brome grass, rates of seeding for hay production.
Ag. 211.	Western rye, methods of seeding for hay production.
Ag. 223.	Western rye, rates of seeding for hay production.
Ag. 241.	Annual hay crops, variety test for yield and suitability.
	(*a*) Grain varieties, variety test for yield and suitability.
	(*b*) Legume varieties, variety test for yield and suitability.
	(*c*) Other grasses, variety test for yield and suitability.
Ag. 255.	Miscellaneous grasses, variety tests.
Ag. 258.	
	(*b*) Hay and pasture mixtures experiments, alfalfa as a base.
	(*c*) Hay and pasture mixtures experiments, sweet clover as a base.
	(*g*) Hay and pasture mixtures experiments, grasses and clover alone and in combination.

CHEMISTRY

C. 10.	Sugar beet investigation.
C. 11.	Agricultural meteorology.

POULTRY

P. 56.	Pedigree breeding for egg production (W.W.)
P. 58.	Best hatching date for egg production (W.W.)
P. 64.	Egg laying contest.
P. 79.	Standard home-mixed vs. commercial mashes.
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P. 110.	Breeding for standard type (W.W.)
P. 111.	Breeding for fertility, hatchability and livability.
	Exp. (*a*) Hens vs. pullets.
P. 138.	Leg weakness.
	Exp. (*a*) in chicks.
P. 157.	Improving quality of poultry in district.
	Exp. (*a*) Selling hatching eggs.
	Exp. (*b*) Selling male birds.

FIBRE PLANTS

E. 4.	Testing varieties of hemp.

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