DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

ROSTHERN, SASK.

REPORT OF THE SUPERINTENDENT

W. A. MUNRO, B.A., B.S.A.

FOR THE YEAR 1929

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DOMINION EXPERIMENTAL STATION, ROSTHERN, SASK.

REPORT OF THE SUPERINTENDENT, W. A. MUNRO, B.A., B.S.A.

SEASONAL NOTES

The season of 1929 might be characterized as very dry although by no means the worst on record. There was abundance of moisture for germination in the spring and very little interruption due to bad weather during seeding, which allowed the seeding to be completed in good time and the plants to get away to a good start. During June there was sufficient moisture to provide good growth but during July and August there was only about an inch and a half of rainfall. The dry weather did not have its effect until after the grain was in the shot blade. There seemed to be enough heads formed to require a continuation of the moisture supply that was available in June, with the result that many crops developed very shrunken kernels. This applied particularly to barley and oats that were sown under favourable conditions and developed a heavy stand of straw. Hay crops were fair but corn and sunflowers were almost a failure. Root crops were only fair.

Most garden crops suffered considerably. All the early crops were average but such late crops as cucumbers, parsnips, corn, cabbage, celery, and potatoes were below average. A few, such as beets and carrots were up to average.

The apples and plums did not seem to be much affected by dry weather but the high winds of late June and July caused a heavy drop of green apples. Strawberries were a light crop and raspberries were almost a failure.

METEOROLOGICAL RECORDS AT ROSTHERN, 1929

Month	Temperature F.				Precipitation				Evaporation
	Highest	Lowest	Mean 1929	Mean 19-year average 1911-1929	Rain	Snow	Total precipitation 1929	19-year average 1911-1929	1929
	°	°	°	°	in.	in.	in.	in.	in.
January	30·8	−43·9	−13·8	− 3·2	.....	7·5	0·75	0·74	.....
February	32·0	−36·9	− 4·5	2·2	.....	5·0	0·50	0·43	.....
March	56·5	−25·1	16·0	14·6	.....	6·5	0·65	0·61	.....
April	67·5	− 3·2	33·4	36·8	0·10	19·5	2·05	0·94	.....
May	84·0	19·7	47·0	50·3	1·13	.....	1·13	1·59	3·17
June	87·5	38·1	60·1	59·3	3·05	.....	3·05	2·26	3·57
July	92·0	42·0	65·5	63·6	0·72	.....	0·72	2·67	4·19
August	91·5	39·5	63·6	60·8	0·81	.....	0·81	1·85	5·34
September	78·0	25·5	48·9	50·2	1·44	.....	1·44	1·57	2·24
October	72·2	15·0	43·1	37·8	.....	.....	.....	1·43	.....
November	56·9	−18·2	23·9	20·7	.....	7·5	0·75	0·57	.....
December	32·0	−36·9	− 0·7	0·0	.....	16·5	1·65	0·59	.....
Totals	.....	.....	.....	.....	7·25	62·5	13·50	15·25	18·51

5451—1½

ANIMAL HUSBANDRY

HORSES

At the close of the year 1929 there are twenty-two horses at the Dominion Experimental Station, Rosthern; two grade Clydesdale mares, two foals which were sired by Oxbow Bruce owned by Mr. Smith of Prud'homme, Sask., one yearling colt and four two-year-old colts also sired by the same horse, making a total of seven colts sired by Oxbow Bruce, a grandson of The Bruce. The remainder are twelve draught geldings and mares of Percheron and Clydesdale blood and one aged general-purpose mare. There has been no mortality from disease or sickness but it was necessary to dispose of one horse because his period of usefulness was passed.

The four two-year-old colts were weighed at birth and at monthly intervals until they were two years old and a record kept of the feed that they consumed during this period. The feed which was consumed by the mares while nursing their colts is also included in the cost to rear these colts to two years of age.

GROWTH AND FEEDING DATA OF COLTS

Number of animal	Weight at birth	Weight at age of 2 years	Total gain for period	Average daily gain	Total cost of feed for period	Cost of feed per day	Feed cost per 100 pounds gain
	lb.	lb.	lb.	lb.	$ cts.	$ cts.	$ cts.
1	126	1,163	1,037	1·42	80 35	11·0	7 75
2	130	1,064	934	1·28	80 35	11·0	8 60
3	130	1,138	1,008	1·38	79 69	10·9	7 91
4	118	1,153	1,035	1·42	75 73	10·4	7 32
Average	126	1,129·5	1,003·5	1·37	79 03	10·8	7 88

In estimating the cost of feed the following values were used:—

Bran	$ 30 00 per ton
Oats	0 40 " bushel 1928
Oats	0 55 " " 1929
Hay	7 00 " ton 1928
Hay	10 00 " " 1929
Pasture	2 00 " month
Straw	2 00 " ton
Sunflower ensilage	3 00 " "
Oat sheaves	0 05 " sheaf

The yearling colts lost weight during the months of December, January, and February, 1927-28, as they received only choice oat straw, and they developed excessive paunchiness. From the first of March, 1928, they received, along with the oat straw, eight pounds of sunflower ensilage of good quality per colt per day and four pounds of oat chop and by the first of April they showed marked gains, not so much paunchiness and the hair and skin showed more lustre, whereas when they were receiving only the oat straw their coats became very dry and tight. The sunflower ensilage was fed during the months of March, April and May at the rate of 10 pounds per colt per day and during that time it showed no detrimental effects on the system. The colts relished the sunflower ensilage even more than the green oat sheaves. They were wintered in corrals where they were protected from the cold winds and they had plenty of straw to give them a comfortable, dry bed. This system of wintering colts proved satisfactory, economical, and healthful. The oat straw undoubtedly accounted for the low average daily gains made as yearlings. A

varied ration in which there is included some succulent fodder, free from moulds, has a place in the ration of the growing colt.

COST OF HORSE LABOUR

During the months of June, July, August, September, and October a daily check was kept on ten work horses of the amount of hay, oats, and bran consumed, the cost of maintenance, and the number of hours they were at work during this period. The total cost of feeding and maintenance per head during this period was $84.85. During the same period each horse worked an average of seven hours per day, the cost of horse labour being estimated at eight cents per hour. The horses would average about 1,550 pounds in weight and they were of Clydesdale and Percheron breeding.

Number of horses on test	10	
Number of days on test	153	
Total quantity of hay consumed	28,632	pounds
" daily quantity of hay consumed	187	"
Average daily consumption	18·7	"
Total quantity of oat chop consumed	21,817·0	"
Total daily quantity of oat chop consumed	143	"
Average daily oat chop consumption	14·3	"
Total quantity of bran consumed	438·0	"
" daily quantity of bran consumed	2·9	"
Average daily bran consumption	0·3	"
Total cost of feed	$ 502 65	
Total daily cost of feed	3 29	
Average daily feed cost	0 33	
Manual labour 765 hours at 25 cents per hour	191 25	
Horse labour, 76 hours at 8 cents per hour	6 08	
Shelter at $8 per horse	80 00	
Shoeing	0 00	
Veterinary fees	0 00	
Combs, brushes, etc	2 35	
Interest on investment of $1,250 at 5%	62 50	
Total cost	848 45	
Cost per horse	84 85	
Total number of hours worked	10,413·0	hours
" " daily	68·0	"
Average number of hours worked daily	7·0	"
Cost of horse labour per hour	8·0	"

Oat chop is charged at 55 cents per bushel.
Bran is charged at $30 per ton.

Oat chop has been fed dry for over a year and during that time there has been no sickness from indigestion or colic. The oat chop is coarse in texture, not a fine, dusty powder. The object in feeding oat chop to the horses is to prevent the spread of weed seeds as much as possible through the manure.

HORSE BREEDING

During the past three years the brood mares have been bred to foal in the months of June, July, and August, chiefly because there was no stallion in the district which we considered a good individual in type and so after the breeding season was practically over we were able to bring in a stallion to breed to the Clydesdale mares. The colts born in July and August never have the same chance as those born earlier in that their dams do not milk as heavy as the pastures have practically dried up and the feeding of grain does not compensate for the lack of the soft, green, luscious grass that is generally abundant in the month of June. When the cold weather sets in the colts have not the growth nor have they acquired the habit of eating grain and roughage as freely as colts born in April and May. In the western provinces where we have extremely cold weather during the late fall and winter months the colts born in the late summer must be housed and given careful attention in order that they may develop into horses of the same size as those born in the spring.

The two Clydesdale mares foaled respectively on July 23 and August 5, the weight of the colts being 110 and 126 pounds at birth. At the age of four months they weighed 552 and 500 pounds respectively, making an average daily gain of 3·59 pounds and 3·07 pounds from birth until four months of age. The cost of the feed consumed by the mares during this period was $17.55 and $18.68 and the mares each worked 131 hours on the land at which time they received a heavier feed of meal, which increased the cost of raising these colts for the first four months.

DAIRY CATTLE

The Holstein-Friesian herd has shown a marked increase in numbers from thirty-five at the end of the year 1928 to forty-four head at the end of the year 1929. This can be accounted for first, by the higher percentage of heifer calves born during the year; second, by the low mortality in the herd and only one abortion.

At the close of the year 1929 the herd consisted of one two-year-old bull, one yearling bull, five bull calves, twenty mature cows, one two-year-old heifer, five yearling heifers, and eleven heifer calves.

The former herd sire, Agassiz King Pietje Canary 63093, was sold for beef as there was no further use for him in the herd and he became very unmanageable. There are fifteen of his daughters in the herd which are very uniform in type and which show prospects of improving the herd. Another year a further report can be given on some of them as two-year-olds in their first lactation period.

The senior herd sire, Colony Wimple Sir Bessie 73928, was sired by Hazelwood Heilo Sir Bessie, an XX bull in Advanced Registry, and out of the cow Colony Wimple Koba 105238, a cow which produced 20,927 pounds of milk from which there was produced 847·5 pounds of butter. This bull is developing into a very promising herd sire. He has not been graded in Advanced Registry. There are two young bull calves in the herd sired by him. This bull shows more refinement in type and more Holstein-Friesian character than the former herd sire.

The junior herd sire, Rosthern Canary Sylvius 76776, was sired by Agassiz King Pietje Canary, an XX bull in Advanced Registry and out of the cow R. E. S. Johanna Sylvia 68179, a Gold Medal cow in Advance Registry which produced 15,219 pounds of milk testing 3·41 per cent butterfat as a two-year-old in the 365-day division of the Record of Performance Test and as a six-year-old in the 365-day division produced 17,315 pounds of milk testing 4·0 per cent butterfat. This cow has not only been a high producer with a high butterfat test, but a regular and consistent breeder. She has four daughters in the herd, three of which have qualified on the R.O.P. They are not so high in production but very high in butterfat for the breed. R.E.S. Johanna Sylvia was calved in August, 1918, and she has raised eight strong, healthy calves and is with calf again. She has qualified regularly on the R.O.P. and she is again entered on test. Her son, Rosthern Canary Sylvius, has been mated to granddaughters of Bonnieview Gypsy Keyes, from which we hope to get some daughters which will perpetuate the blood lines of the two foundation cows, Mayflower Sylvia and Bonnieview Gypsy Keyes. It may also be of interest to breeders to know that the cows to which we are mating this bull are daughters of R. E. S. Madrigal Gypsy Keyes 68180, born in April, 1917, a cow which has raised nine calves, seven of which were heifers and two of these full sisters produced as two-year-olds in 305 days 12,711 pounds and 12,948 pounds of milk with butterfat tests of 3·86 and 3·46 per cent, respectively. R. E. S. Madrigal Gypsy Keyes produced over 20,000 pounds of milk with a butterfat

test of 4·23 per cent, which was the Saskatchewan Record for 1925. This cow is strong and healthy and is with calf again to Colony Wimple Sir Bessie 73928.

Agassiz Sir Pietje 51064, a former herd sire which has a number of daughters in the herd at the present time, deserves a great deal of credit, especially as to the type and smoothness of his progeny. He added strength and straightness to the top lines, smoothness at the shoulders, and improved greatly on the length and levelness of the quarters of his progeny. His daughters, as a whole, are the most uniform from whatever angle you may take them, whether production, butterfat, type, colour, etc., which denotes the great prepotency of a proven sire; that is, the ability to transmit his desirable characteristics to his progeny.

The bull, Inferno Woodcrest 35725, which was used in the herd following Agassiz Sir Pietje, has ten daughters in the herd, five of which have completed their two-year-old records on the 305-day test with an average production of 9,528 pounds of milk and an average butterfat percentage of 3·86. Inferno Woodcrest is responsible for the improvement in the attachment of and balance of the udders of his daughters over their dams. His progeny are strong and rugged with plenty of capacity, the latter being closely allied to production.

The average weight of twenty-nine calves at birth, sired by Agassiz King Pietje Canary, was 93·9 pounds. The average weight of the fourteen bull calves was 96·2 pounds and the average weight of the fifteen heifer calves was 91·8 pounds.

The Holstein-Friesian herd successfully passed its ninth accreditation test in November, 1929.

CONTAGIOUS ABORTION

(Project A660)

During the year blood samples were taken by a qualified veterinarian from each individual in the herd during the months of January, May, and September. These were forwarded by him to the Animal Pathologist at Lethbridge for examination. In every instance the entire herd gave negative reactions. This examination was made for bacillus abortus of Bang, a casual organism of contagious abortion.

SALES OF BREEDING STOCK

As yet the herd has not increased in numbers sufficiently to allow for the disposal of any females and besides it is necessary to do some culling every year and make allowance for mortality which occurs in practically every large herd during the year. A number of pure bred bull calves were disposed of on reaching six months of age, the greater percentage of them going to farmers who were purchasing pure bred sires for the first time and especially to farmers who had settled in some of the recently opened districts where, undoubtedly, they will have a great influence on improving the class of stock and increasing the average production of their herds.

WHITE SCOURS

As we have experienced a great deal of difficulty with this disease and tried different methods to prevent it, we feel it may be of interest to others to know how we managed to clean it up.

The first outbreak of scours was not given as careful attention as it should have had. The result was that we paid the penalty. The first outbreak occurred rather suddenly. The calf refused to take its milk and upon examination was found to be suffering from diarrhoea. A tablespoonful of castor oil was administered but no check was noticeable and a teaspoonful of formaldehyde

was then given in a small quantity of warm milk. A check was noticeable but after a few days the calf was as bad as ever. The calf was isolated and everything thoroughly disinfected with lime and creolin. The calf received but one quarter of its normal supply of milk with the addition of a teaspoonful of castor oil and finally the scouring disappeared.

The important factors to be noted in the control of White Scours are:—

(1) Isolate the calf from the rest of the herd;

(2) Scrub the pen with hot water and lye;

(3) Disinfect the pen with lime and creolin every few days. Keep everything clean and sanitary;

(4) Cut down from one-quarter to one-half on the quantity of milk fed to the calf and give milk from the same cow until after the calf is making good gains;

(5) Feed the milk at the same temperature and if the calf is old enough encourage it to eat whole or crushed oats;

(6) At intervals of one week feed a teaspoonful of castor oil;

(7) A rectal injection of a salt solution (one ounce of salt in one quart of warm water) may assist in checking the disease.

INFECTED NAVEL

Of late infected navels have been given considerable attention. A very pronounced swelling was noticed at the seat of the navel cord on a heifer a month old. On examination it was found to be loose and soft with a very hard centre. It was bathed thoroughly for a week with hot water containing a little carbolic acid. As it appeared to be drawing to a head it was lanced and a large quantity of matter taken from it. It was bathed thoroughly every day with hot water and any matter which had formed was drawn out. After bathing it was treated with Churchill's iodine to prevent any further infection and examined closely from day to day. It is a good policy to keep close watch on the navels of the young and if swelling appears it is well to call a veterinarian, especially in the case of very valuable animals.

PROGRESS IN BREEDING HOLSTEIN-FRIESIAN CATTLE

(Project A502)

The development of the Rosthern herd of pure bred Holstein-Friesian cattle has been partially analyzed and the results tabulated in the following tables.

The two foundation Holstein-Friesian heifers were purchased in the spring of 1914 and from these two individuals the herd has grown to its present status.

Table 1 is a statistical summary of the progeny of the two foundation cows, Mayflower Sylvia 28018 and Bonnieview Gypsy Keyes 30689.

TABLE 1.—STATISTICAL SUMMARY OF THE PROGENY OF TWO FOUNDATION COWS

Generation	——	Descendants	
		Mayflower Sylvia	Bonnieview Gypsy Keyes
1st	Total number of daughters	3	5
	" " sons	0	0
	" " abortions	2	1
	" " abnormal births	2	0
2nd	" " granddaughters	9	11
	" " grandsons	12	6
	" " abortions	0	0
	" " abnormal births	0	1
3rd	" " great granddaughters	5	12
	" " great grandsons	11	10
	" " abortions	4	5
	" " abnormal births	1	2
4th	" " great great granddaughters	2	9
	" " " grandsons	2	6
	" " abortions	0	2
	" " abnormal births	0	1
5th	" " great great great granddaughters	0	2
	" " great great great grandsons	1	4
	Total number of females	19	39
	" " males	26	26
	" " abortions	6	8
	" " abnormal births	3	4

Total number of females born in herd	58
" " males " "	52
" " abortions "	14
" " abnormal births	7

The total number of calves born alive in the herd numbers 110, all descendants of one of the two foundation cows Mayflower Sylvia or Bonnieview Gypsy Keyes.

Table 2 gives the number of daughters, granddaughters, great granddaughters, and great great granddaughters of Mayflower Sylvia with their total average milk production, total average percentage butterfat, and total average number of pounds of butterfat as two-year-olds on the 305-day test as compared with her own record at the same age and on the same test.

TABLE 2.—PERFORMANCE OF DESCENDANTS OF MAYFLOWER SYLVIA

——	No.	Average milk production	Average per cent butterfat	Average number pounds of butterfat
		lb.	%	lb.
Daughters	3	8,816	3·40	300
Granddaughters	5	8,170	3·79	310
Great granddaughters	1	8,083	3·90	316
Great great granddaughters	1	11,375	3·91	445

Mayflower Sylvia produced 8,095 pounds of milk on the 305-day test as a two-year-old.

Table 3 gives the number of daughters, granddaughters, great granddaughters and great great granddaughters of Bonnieview Gypsy Keyes with their total average milk production, total average percentage butterfat, and total average number of pounds of butterfat as two-year-olds on the 305-day test as compared with her own record at the same age and on the 305-day test.

TABLE 3.—PERFORMANCE OF DESCENDANTS OF BONNIEVIEW GYPSY KEYES

—	No.	Average milk production	Average per cent butterfat	Average number pounds of butterfat
		lb.	%	lb.
Daughters	3	9,638	3·56	343
Granddaughters	6	9,941	3·71	369
Great granddaughters	5	9,347	3·62	338
Great great granddaughters	2	8,711	3·93	342

Bonnieview Gypsy Keyes produced 7,992 pounds of milk on the 305-day test as a two-year-old.

Table 4. In this table is inserted the names and registration numbers of the Holstein-Friesian sires which have been responsible, when they were mated with Mayflower Sylvia, Bonnieview Gypsy Keyes and their descendants, for the building of this herd. In the table is also listed the number of daughters of each sire with their total average milk production and in some cases the total average percentage fat and total average number of pounds fat in milk on the 305-day test as two-year-olds.

TABLE 4.—HOLSTEIN-FRIESIAN SIRES

Name and registration number	Number of daughters	Number of pounds of milk produced	Percentage butterfat in milk	Number of pounds of butterfat in milk
		lb.	%	lb.
Lorena's Sarcastic Lad 20581	1	7,608	.....	.....
Sir Madrigal Dekol 26590	2	6,418	.....	.....
Sir Johanna Pontiac of Ottawa 27263	5	12,105	3·49	422
L. E. S. Abbekerk Mechthilde 41326	7	8,780	3·95	347
Agassiz Sir Pietje 51064	7	8,290	3·80	315
Inferno Woodcrest 35725	5	9,528	3·86	367
Total	.....	52,729	.....	.....
Average	.....	8,788	.....	.....

Deduction.—From this table can be drawn the great influence the sire, Sir Johanna Pontiac of Ottawa, had in transmitting to his daughters high production and fairly high butterfat as compared with the other five sires, but his true value was not realized until he was slaughtered. This goes to show what wonderful progress can be attained by using a sire which has proven himself able to transmit to his offspring those desirable characteristics which we are seeking to attain.

ADVANCED REGISTRY

The herd has been subjected to inspection under the Advanced Registry rules of the Canadian Holstein-Friesian Association since 1928. During that time one XX bull has qualified from this herd, two "Gold Medal" cows and two "Excellent" and twelve "Good."

DAIRY HERD RECORD OF PRODUCTION

The following table shows the performance of all cows finishing a lactation period in the 365-or 305-day divisions during the year 1929, together with the amount of feed consumed, the cost of milk production, and profit from each cow.

INDIVIDUAL MILK RECORDS DURING THE YEAR 1929

Name of animal	Age at commencement of lactation period	Date of dropping calf	Number of days in lactation period	Total milk for period	Daily average yield of milk	Average per cent fat in milk	Butterfat produced in period	Pounds of butter (85%) produced in period	Value of butter at 40 cents per pound	Value of skim-milk at 20 cents per cwt.	Total value of product
				lb.	lb.	%	lb.	lb.	$	$	$
Rosthern Mechthilde Lass	5 years	April 10, 1928	365	14,264	39·08	3·23	460·73	542·04	216 82	27 61	244 43
Rosthern Abbekerk Sylvia	5 years	July 22, 1928	365	11,160	30·58	4·00	446·40	525·18	210 07	21 43	231 50
Rosthern Pietje Rebecca	4 years, 352 days	April 29, 1928	360	12,583	34·95	3·57	449·21	528·48	211 39	24 27	235 66
Rosthern Pietje Emma	4 years, 311 days	Feb. 2, 1928	365	13,121	35·95	3·51	460·55	541·82	216 73	25 32	242 05
Rosthern Pietje Dollie	4 years, 306 days	Feb. 18, 1928	365	12,165	33·33	3·49	424·56	499·48	199 79	23 48	223 27
Rosthern Pietje Marcelle	3 years, 359 days	June 5, 1928	365	10,438	28·60	3·31	345·50	406·47	162 59	20 19	182 78
Rosthern Pietje Nancy	3 years, 229 days	April 21, 1928	365	15,191	41·62	3·73	566·62	666·61	266 64	29 25	295 89
R.E.S. Johanna Sylvia	9 years	May 16, 1928	305	11,617	38·09	3·59	417·05	490·65	196 26	22 40	218 66
R.E.S. Pontiac Madrigal	8 years	Aug. 2, 1928	305	14,846	48·68	3·46	513·67	604·32	241 73	28 66	270 39
Rosthern Pietje Evelyn	2 years, 95 days	Mar. 5, 1928	305	8,378	27·47	4·01	335·96	395·25	158 10	16 08	174 18
Rosthern Inferno June	2 years, 160 days	Dec. 6, 1928	305	11,375	37·30	3·91	444·76	523·25	209 30	21 86	231 16
Rosthern Inferno Aletha	2 years, 81 days	July 1, 1928	305	9,437	30·94	3·95	372·76	438·54	175 42	18 13	193 55
Rosthern Inferno Collie	2 years, 21 days	Mar. 3, 1928	305	9,728	31·90	3·39	329·78	387·98	155 19	18 80	173 99
Rosthern Inferno Rosie	2 years, 14 days	Aug. 18, 1928	305	9,407	30·84	3·56	334·89	393·99	157 60	18 14	175 74
Total for herd (14 cows)			4,685	163,710			5,902·44	6,944·06	2,777 63	315 62	3,093 25
Average for herd (14 cows)			335	11,693·6	34·94	3·61	421·60	496·00	198 40	22 54	220 95

INDIVIDUAL MILK RECORDS DURING THE YEAR 1929

Name of animal	Age at commencement of lactation period	Date of dropping calf	Amount of meal eaten at $31 per ton	Amount of roots eaten at $1.92 per ton	Amount of ensilage eaten at $5 per ton	Amount of hay eaten at $8 per ton	Months on pasture at $2 per month	Total cost of feed between calvings	Cost to produce 100 pounds milk	Cost to produce 1 pound butter, skim-milk neglected	Profit on one pound of butter, skim-milk neglected	Profit on cow between calvings, labour and calf neglected
			lb.	lb.	lb.	lb.		$	cts.	cts.	cts.	$
Rosthern Mechthilde Lass	5 years	April 10, 1928	4,075	3,985	7,055	3,517	3½	105 70	74	19·5	20·5	138 73
Rosthern Abbekerk Sylvia	5 years	July 22, 1928	3,190	4,780	8,040	4,035	3½	97 28	87	18·5	21·5	134 22
Rosthern Pietje Rebecca	4 years, 352 days	April 29, 1928	3,594	4,118	7,086	3,329	3½	97 70	78	18·5	21·5	137 96
Rosthern Pietje Emma	4 years, 311 days	Feb. 2, 1928	3,749	4,645	7,244	3,599	3½	102 08	78	18·8	21·2	139 97
Rosthern Pietje Dollie	4 years, 306 days	Feb. 18, 1928	3,476	4,565	7,281	4,024	3½	99 56	82	19·9	20·1	123 71
Rosthern Pietje Marcelle	3 years, 359 days	June 5, 1928	2,982	4,780	8,132	4,158	3½	94 77	91	23·3	16·7	88 01
Rosthern Pietje Nancy	3 years, 229 days	April 21, 1928	4,340	4,225	7,442	3,722	3½	111 83	74	16·8	23·2	184 06
R.E.S. Johanna Sylvia	9 years	May 16, 1928	3,319	3,360	5,251	2,518	3½	84 87	73	17·3	22·7	133 79
R.E.S. Pontiac Madrigal	8 years	Aug. 2, 1928	4,242	4,780	8,040	3,489	2	108 40	73	17·9	22·1	161 99
Rosthern Pietje Evelyn	2 years, 95 days	Mar. 5, 1928	2,394	4,035	7,600	3,630	3½	81 50	97	20·6	19·4	92 68
Rosthern Inferno June	2 years, 160 days	Dec. 6, 1928	2,844	3,520	6,020	2,855	3½	80 93	71	15·5	24·5	150 23
Rosthern Inferno Aletha	2 years, 81 days	July 1, 1928	2,696	4,820	6,310	2,880	2½	78 72	83	18·0	22·0	114 83
Rosthern Inferno Collie	2 years, 21 dyas	Mar. 3, 1928	2,777	4,030	7,579	3,658	3½	87 49	90	22·6	17·4	86 50
Rosthern Inferno Rosie	2 years, 14 days	Aug. 18, 1928	2,688	4,780	6,860	2,780	2	78 52	83	19·9	20·1	97 22
Total for herd (14 cows)			46,366	60,423	99,940	48,194	45	1,309 35				1,783 10
Average for herd (14 cows)			3,312	4,316	7,139	3,442	3·2	93 53	80	18·9	21·3	127 36

The profit column shows a comparison only between the cost of feed and the value of milk produced. The cost of labour, the interest on the investment, and the value of the calf at birth are not included in the statement of production.

Butter is computed at 40 cents per pound, which is the average wholesale price received by the local creamery during the year 1929, and 20 cents per 100 pounds for skim-milk.

The average milk production of the seven cows completing their records in the 365-day division was 12,703·14 pounds of milk and the average fat production was 450·51 pounds. The average milk production of the five four-year-old daughters of Agassiz Sir Pietje 51064 (an XX bull in Advanced Registry) in the 365-day division was 12,699·6 pounds of milk and the average fat production was 449·29 pounds.

The average milk production of the four two-year-old daughters of Inferno Woodcrest 35725 on the 305-day division was 9,986·75 pounds of milk, and the average fat production was 370·55 pounds.

The average feed cost to produce one hundred pounds of milk was 80 cents and the average cost to produce one pound of butter, skim-milk neglected, was 18·7 cents.

In estimating the cost of feeds the following values were used:—

Hay	$ 8 00 per ton
Roots	1 92 "
Silage (corn)	5 00 "
Meal	31 00 "
Pasture per month	2 00 per head

These values represent the cost of production in the case of home-grown feeds and the actual cost price in the case of concentrates which were purchased.

GROWTH OF DAIRY CALVES

The following table shows a comparison of gains made by dairy calves on various feeds from birth until six months of age. The calves were all weighed at birth and again at the age of six months. The feed given during this period was weighed each day and the weights recorded.

GAINS AND FEED CONSUMPTION OF CALVES

Calf	Date of birth	Weight at birth	Weight at six months	Sex	Average daily gain for period	Amount of new milk fed	Amount of skim-milk fed	Amount of meal fed	Amount of hay fed	Amount of roots fed	Total cost of feed	Cost of feed for 1 pound gain
		lb.	lb.		lb.	lb.	lb.	lb.	lb.	lb.	$	cts.
1	July 22, 1928	93·0	611	Male	2·83	2,010	1,007	360·5	759	498	50 32	9·7
2	Aug. 2, 1928	100·5	584	Male	2·63	1,870·5	1,227	372·5	724	564	47 85	9·9
3	May 17, 1929	106·0	480	Male	2·03	1,656	1,625	242·0	535	.....	40 64	10·9
4	July 22, 1928	83·0	542	Female	2·51	2,012	1,007	360·5	706	498	50 14	10·9
5	Aug. 18, 1928	82·0	554	Female	2·57	1,620	1,547	360·5	649	570	42 69	9·0
6	Mar. 2, 1929	75·0	482	Female	2·21	2,448	752	148·0	256	.....	53 02	13·0
7	Mar. 10, 1929	88·0	518	Female	2·34	2,355	920	164·0	278	.....	51 67	12·0
8	Mar. 18, 1929	92·0	481	Female	2·11	2,210	1,880	185·0	356	.....	50 37	12·9
9	Mar. 22, 1929	78·0	455	Female	2·05	2,088	1,184	210·0	402	.....	47 81	12·7
10	April 6, 1929	100·0	423	Female	1·77	1,741	1,499	234·5	531	.....	42 07	13·0
11	May 27, 1929	88·5	420	Female	1·80	1,604	1,718	256·0	447	.....	39 56	11·9
12	June 7, 1929	100·0	490	Female	2·13	1,359	2,024	305·0	580	.....	36 25	9·3
	Total	1,086·0	6,040·0	.....	.....	22,973·5	16,390·0	3,198·5	6,223·0	2,130·0	552 39	
	Average	90·5	503·3	.....	2·29	1,914·5	1,365·8	266·5	518·6	177·5	46 03	11·2

From the growth and feed table it can be clearly seen that the four calves which received roots made higher daily gains at a lower cost of feed for one pound gain than the calves receiving no succulent roughage.

The average cost of feed to produce one pound gain for all calves during the period was 11·2 cents in 1929 as compared with 9·55 cents in 1928.

From this table it can also be observed that new milk is the vital factor in regulating the cost of rearing dairy calves. Another year, if possible, we will try to arrange to substitute the whole milk by some by-product of milk, after the calf is one month old, which should materially reduce the cost and at the same time give very comparable results as to gains.

SHEEP

The breeding flock at the close of 1929 consists of sixty breeding ewes and ewe lambs and one pure-bred Suffolk ram, Darnbrough Jr. 244 —7938— triplet, sire Clarendale 227 —6033—, dam Paterson 215 —5606—.

No trouble whatever was experienced with goitre at birth during the 1929 lambing season.

RESULTS OF 1929 LAMBING SEASON

Breeds	Number ewes bred	Number of ewes lambed normally	Number lambs born	Number lambs raised
Suffolk	3	3	8	4
Leicester	18	16	32	23
Leicester ewe Suffolk ram	16	15	28	24
Suffolk-Leicester ewe Suffolk ram	4	4	6	4
Suffolk-Leicester ewe, Leicester ram	1	1	2	2
Total	42	39	76	57

Forty-two ewes were bred in the fall of 1928 and the increase at lambing time was 180·95 per cent. The net increase at the end of 119 days was 135·71 per cent. One Leicester ewe failed to conceive and two Leicester ewes died at lambing time from expulsion of the uterus. There was a 10 per cent mortality at birth and thirteen died during the time from birth to the 119th day, of which eleven were Leicesters and two Suffolk-Leicester crosses.

The following table gives the comparative weights of pure-bred and cross-bred lambs at the time they were born and at the 119th day after birth:—

COMPARATIVE WEIGHTS OF PURE BRED AND CROSS-BRED LAMBS

Items		Suflolk dam and sire	Leicester dam and sire	Leicester dam Suffofk sire	Suffolk-Leicester dam, Suffolk sire	Suffolk-Leicester dam, Leicester sire
Ewe lambs	No.	3	14	14	3	2
Ram lambs	"	5	18	14	3	0
Total lambs	"	8	32	28	6	2
Average weight of ewe lambs at birth	lb.	9·3	9·0	9·9	10·5	11·9
Average weight of ram lambs at birth	"	10·3	9·8	10·3	9·1	0
Average weight of all lambs at birth	"	10·0	9·4	10·2	9·9	11·9
Ewe lambs living at the 119th day	No.	1	12	12	2	2
Ram " " 119th "	"	3	11	12	2	0
Total " " 119th "	"	4	23	24	4	2
Average weight of ewe lambs at 119th day	lb.	70·0	59·7	76·1	75·8	68·5
Average weight of ram lambs at 119th day	"	75·0	63·6	74·2	71·9	0
Average weight of all lambs at 119th day	"	73·8	61·6	75·1	73·8	68·5
Average percentage of lambs living at 119th day	%	50·0	71·9	85·7	66·7	100·0

The total average gain made by twenty-three pure-bred Leicester lambs in the first 119 days after birth was 52·2 pounds, while that of 24 cross-bred Suffolk-Leicester lambs in the first 119 days after birth was 64·9 pounds, which shows a margin of 12·7 pounds in favour of the cross-bred Suffolk-Leicester lamb.

The above table shows that the lambs produced from the Leicester-Suffolk cross were heavier at birth, growthier, and earlier maturing with a lower percentage mortality during the first 119 days than the pure-bred Leicester lambs. When slaughtered they also showed more finish at the required market weights and graded, on the average, higher on the rail. The pure-bred Leicester lambs were from the ewes which were considered to be the best in the flock in the fall of 1928, while the Leicester-Suffolk lambs were from Leicester ewes which were considered more or less culls, off type and thin. The Leicester ram was an XXX ram and as a representative of the breed would be ranked at the top, whereas the Suffolk ram was only a fair individual for the breed. The Leicester lambs appeared to be very dry in the fleece and were not as active and vigorous as either the cross-bred lambs or the Suffolks. They were also more subject to sickness.

It is impossible to make as fair a comparison between the Leicester-Suffolk cross and the pure-bred Suffolks because there were only four Suffolks which lambed and they were very mediocre in type and size for their breed. As far as weight of the lambs at birth and at the 119th day is concerned, the two lots agree rather closely. The high percentage mortality in the Suffolks may be accounted for in that one ewe had three dead lambs at birth.

From all information collected and analyzed at this Station, we would conclude that the pure-bred Leicesters are not to be compared with the Leicester-Suffolk cross or the pure-bred Suffolk in hardiness, rapidity of gains, and early maturity when kept under identically the same conditions.

WOOL

The average wool clip per head for 1929 was as follows:—

Leicesters	8·34 pounds
Suffolk	6·93 "
Suffolk-Leicester	9·27 "

Each fleece was labelled as it was removed from the sheep with a tag supplied by the Live Stock Branch and the wool was shipped to the Canadian Co-operative Wool Growers at Regina. Each fleece was graded separately and the accompanying table shows the amount of wool in each grade. The full returns have not yet been received.

WOOL GRADING, 1929

Grades of wool	Amount of wool in each grade		
	Leicester	Suffolk	Suffolk-Leicester
	lb.	lb.	lb.
Medium staple (⅜ blood Sta.), bright	.....	34·0	7·35
Low medium staple (¼ blood Sta.), bright	.....	66·0	65·15
Low medium staple (¼ blood Sta.), semi-bright	.....	.....	27·5
Low staple (low ¼ blood staple), bright	92·5	.....	.....
Common and braid, semi-bright	7·5	.....	.....

The Leicester fleeces, with the exception of three, graded low one-quarter staple which is the standard for this breed. The three fleeces grading coarse were from ewes three years of age and over and their age may have been the cause of the lower grade.

Three of the Suffolk fleeces graded three-eighths staple which is the standard for this breed. The others grading one-quarter staple are one grade lower. A large percentage of the Leicester fleeces were under weight for their breed.

WEIGHT OF FLEECES 1929

Average weight of mature Leicester fleeces (24 fleeces)	7·74	pounds
Average weight of two-shear Leicester fleeces (8 fleeces)	8·53	"
Average weight of one-shear Leicester fleeces (4 fleeces)	10·63	"
Weight of Leicester ram's fleece (1 fleece)	12·25	"
Average weight of mature Suffolk fleeces (3 fleeces)	6·67	"
Weight of two-shear Suffolk fleece (1 fleece)	6·5	"
Weight of two-shear Suffolk ram's fleece (1 fleece)	8·5	"
Weight of one-shear Suffolk ram's fleece (1 fleece)	6·5	"
Average weight of two-shear Suffolk-Leicester fleeces (5 fleeces)	7·75	"
Average weight of one-shear Suffolk-Leicester fleeces (6 fleeces)	10·71	"
Average weight of wool-clip per head for the flock of 55 sheep (55 fleeces)	8·35	"

From January 23 to May 31, 1929, a check was kept of the feed consumed by thirty-five ewes, the majority of which lambed early in April. The ewes consumed 20,720 pounds of sunflower ensilage (free from mould) during this period, which is an average of 4·6 pounds of ensilage per ewe per day. The ewes relished this feed and no trouble was experienced from scouring or indigestion. The quantity of meal fed during this same period was 3,996 pounds of oat chop, 1,696 pounds of bran, and 587 pounds of oil cake meal. The greater portion of the grain was fed from lambing time until May 31 at which date the ewes and lambs were turned out on brome grass pasture. From the 27th day of April to May 31 the thirty-five ewes received an average of 12 oat sheaves per day. Previous to this date the dry roughage consisted of oat straw.

The total cost of feed for the thirty-five ewes during this period of 128 days was $147.42 which amounted to $1.15 feed cost for thirty-five ewes for one day or 3·3 cents feed cost per ewe per day. The ewes would average about 170 pounds in weight. The quantity of sunflower ensilage fed did not increase the percentage of soft flabby lambs at birth as the percentage was lessened somewhat from 1928. In 1928 they received no sunflower ensilage but in place a very small quantity of swede turnips. The ewes were not kept under confined conditions.

A properly cured succulent roughage has a very important place in the ration of the breeding ewe, especially where a high percentage of dry, bulky roughage with a low food value is fed.

SWINE

The swine on hand December 31, 1929, totalled one hundred and forty-six head of pure-bred Yorkshires, consisting of one aged boar, one two-year-old boar, nineteen brood sows of which seventeen had pigs entered on the Advanced Registry Test, fourteen pure-bred Yorkshire gilts, and one hundred and eight feeders.

During the past year no breeding stock has been purchased. Eleven pure-bred Yorkshire boar pigs and a few pure-bred Yorkshire gilts were sold for breeding purposes in the vicinity of the Station.

COMPARISON OF THE PROLIFICACY OF OLD SOWS AND GILTS OF THE YORKSHIRE BREED AS SHOWN BY THE 1929 LITTERS

Items	Old sows second litter or more	Gilts first litter
Number of litters farrowed in 1929	7	16
Total number of pigs farrowed	96	168
Number of pigs per litter (average)	13·71	10·5
Number of pigs dead at birth	10	13
Number of pigs dead at birth per litter (average)	1·43	0·81
Number of pigs died before weaning per litter (average)	4·71	1·44
Number of pigs weaned per litter (average)	7·57	8·31
Percentage of pigs raised of those farrowed alive....%	61·62	85·81

The above table shows that the number of pigs per litter at farrowing time was high and that the number of pigs dead at birth was low as compared with former years. In the district served by this Station, during the past year, the number of pigs farrowed per litter and the number dead at birth was higher than during the two years previous, which may be accounted for in that boars or sows were in poor condition at time of breeding, that the sows during the pregnant period were improperly fed, or that they were not forced to take sufficient exercise to keep them in a strong, healthy, thrifty condition. The high percentage of mortality in the litters farrowed by the old sows during the first eight weeks after birth can be accounted for in that two sows had seventeen strong, healthy pigs each at birth but the sows had only eleven and thirteen teats, respectively. We have found from past experience that it is a poor policy to allow a sow to nurse more pigs than she can accommodate because it often results in the death of some of the stronger pigs in the litter and the survival of the under-sized or runts. We have found that a sow which has more pigs than she can nourish properly becomes very uneasy and restless and will not allow her pigs to suckle at regular intervals and it has happened that such a sow would disown her entire litter. In cases where sows have raised more pigs than they had teats for, the pigs were, as a rule, not uniform in size at weaning time. This shows the importance of selecting gilts with twelve to fourteen or more normal teats for breeding purposes.

FEED COST OF RAISING PIGS FROM BIRTH TO WEANING AGE

Twelve mature sows (two years and over) and nineteen sows (one year and under two) were fed during the spring and early summer of 1929 with the object of determining the feed cost of raising young pigs from birth to weaning age. All of the feed which the sows received was carefully weighed from the time of farrowing until the time the pigs were weaned at eight weeks of age (56 days).

The meal ration fed during the suckling period consisted of 100 pounds of oat chop, 100 pounds of shorts, 100 pounds of middlings, and 25 pounds of bran. This meal mixture was fed with water.

The following table gives a detailed analysis of the amount of feed consumed and the cost per pig:—

FEED COST OF RAISING A PIG FROM BIRTH TO WEANING AGE 1929

—		Mature sows	Gilts first litter
Number of sows		12	19
Number of pigs farrowed		148	196
Average number of pigs farrowed per litter		12·33	10·32
Total number of pigs weaned		91	158
Average number of pigs weaned per litter		7·58	8·32
Meal consumed during suckling period	lb.	7,870·5	11,616·0
Meal consumed during suckling period per sow	"	655·88	611·37
Total cost of feed during suckling period	$	118 84	175 40
Total cost of feed during suckling period per litter	$	9 90	9 24
Cost of feed per pig at 8 weeks old	$	1 31	1 11

The value of the meal mixture fed during the suckling period was $30.20 per ton.

The above table shows that the total feed cost to raise a pig from a mature sow from birth to weaning age was $1.31 when an average of 7·58 pigs per litter were weaned, as compared with $1.11 for raising a pig from a young sow with her first litter when an average of 8·32 pigs per litter were weaned. The number

of pigs weaned is a highly important factor in raising or lowering the cost per pig. As a general rule, the mature sows raise more pigs than the young sows with their first litter. The high mortality in the litters of the mature sows is accounted for in the above case in that three two-year-old sows proved to be poor mothers.

THE VALUE OF FROZEN WHEAT FOR FINISHING MARKET HOGS

In view of the general need in the western provinces for more information as to the value of frozen wheat as a substitute for the more expensive feeds, an experiment was conducted at this Station to ascertain the value of frozen wheat as compared with barley chop for finishing market hogs.

Two lots of five pigs each were used for this work. These lots were almost identical as to breeding, age, and general thrift and were kept under exactly similar conditions. One lot was fed frozen wheat chop with eight per cent tankage, and the other lot barley chop with eight per cent tankage. Both lots received the same quantity of feed per day throughout the experiment and had access to the standard mineral mixture.

All the hogs were weighed individually at the commencement of, and at weekly intervals throughout, the test. The duration of the test was twenty-eight days. The average weight of the hogs at the beginning of the test was 144·65 pounds and at the completion 189·4 pounds.

The results of this experiment are tabulated below.

FROZEN WHEAT VS. BARLEY FOR FINISHING MARKET HOGS

		Lot 1, frozen wheat	Lot 2, barley chop
No. of pigs in lot		5	5
No. of days on test		28	28
Total initial weight of pigs	lbs.	725	721·5
Average initial weight of pigs	"	145	144·3
Total final weight of pigs	"	946·5	947·5
Average final weight of pigs	"	189·3	189·5
Average gain per pig	"	44·3	45·2
Average daily gain	"	1·58	1·61
Amount of feed: tankage	"	81·2	81·2
Amount of feed: barley chop	"	.....	933·8
Amount of feed: frozen wheat chop	"	933·8	.....
Total cost of feed	$	9 14	8 83
Cost per 100 pounds gain	$	4 13	3 91

The feed costs are based upon the prices paid at the local elevator during the period when these hogs were on the test. At this time the price of frozen wheat was 47 cents per bushel and feed barley 36 cents per bushel. The price of tankage was $45 per ton.

The pigs which were fed the frozen wheat cleaned up their feed more quickly each day than did those fed the barley chop.

The difference in finish and grading in the two lots was negligible. The dressing percentages of both lots were the same, that is, 79 per cent.

The cost per hundred pounds gain was 26 cents higher for the lot on frozen wheat than for the lot on feed barley.

The similarity of the gains of both lots is noteworthy in that there was a difference only of 0·03 pound in average daily gain.

From this trial it might be inferred that the difference between using frozen wheat and barley would be dependent upon the relative quality and market values of the two feeds.

FROZEN WHEAT AS A FEED FOR GROWING PIGS

An experiment comparing the economy of gains made by growing pigs fed frozen wheat with protein supplement from the time they reached 50 pounds in weight until the weight of 180 pounds was attained, and those fed a mixture of barley and oat chop, and also to determine whether there were any detrimental effects from the feeding of frozen wheat to growing pigs was carried on this year.

Thirty cross-bred Yorkshire-Tamworth pigs were divided into five groups of six pigs each. These groups were as nearly identical as it was possible to make them with respect to age, weight, and thrift. They were kept under identically the same conditions except for the feed. The feeding and housing of the pigs before the beginning of the test were practically the same. The test was begun November 7, 1928, and completed on February 12, 1929.

They were divided into groups as follows:—

Lot 1—Frozen wheat.
Lot 2—Frozen wheat 3 parts, oat chop 1 part.
Lot 3—Frozen wheat 1 part, oat chop 1 part.
Lot 4—Oat chop 1 part, barley chop 1 part.
Lot 5—Frozen wheat 2 parts, oat chop 1 part, and barley chop 1 part.

All lots received eight per cent of tankage in the meal mixture. They all received the same quantity of feed at regular intervals each day throughout the experiment. A mineral mixture consisting of the following ingredients was kept before the pigs at all times: coal dust, slaked lime, bonemeal, and common salt.

Prices charged for feeds were:—

Ground frozen wheat	$	0 78 per cwt.
Ground barley		0 75 "
Ground oats		1 18 "
Tankage		2 25 "

The prices charged for frozen wheat, barley, and oats are the same as those paid by the agents at the local elevators during the period the hogs were on test—November 7, 1928, to February 12, 1929.

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

EXPERIMENT WITH FROZEN WHEAT

—		Lot 1, frozen wheat	Lot 2, frozen wheat, 3 parts; oat chop, 1 part	Lot 3, frozen wheat, 1 part; oat chop, 1 part	Lot 4, oat chop, 1 part; barley chop, 1 part	Lot 5, frozen wheat, 2 parts; oat chop, 1 part; barley chop, 1 part
Number of pigs in each lot	No.	6	6	6	6	6
Total initial weight	lb.	295	299	300	301	303
Average initial weight	"	49·17	49·83	50	50·17	50·5
Total finished weight	"	984·5	937·5	1,016·5	1,084·0	1,036·0
Average finished weight	"	164·08	156·25	169·42	180·67	172·67
Total gain in weight	"	689·5	638·5	716·5	783·0	733·0
Number of days on test	days	97	97	97	97	97
Average gain per hog	lb.	114·92	106·42	119·42	130·5	122·17
Average daily gain per hog	"	1·185	1·097	1·231	1·345	1·259
Total meal consumed	"	2,492·0	2,492·0	2,492·0	2,492·0	2,492·0
Total tankage consumed	"	217·0	217·0	217·0	217·0	217·0
Pounds of meal consumed per pound gain	"	3·61	3·90	3·48	3·18	3·40
Pounds of tankage consumed per pound gain	"	0·31	0·34	0·30	0·28	0·30
Total cost of feed	$	24 32	26 81	29 29	28 93	26 62
Cost of feed per head	$	4 05	4 47	4 88	4 82	4 44
Cost of feed per head per day	cts.	4·18	4·61	5·03	4·97	4·58
Cost of feed per pound gain	"	3·53	4·20	4·09	3·69	3·63

Deductions.—It will be noted that the total gain per lot was in favour of lot 4, the check lot, which showed a gain of 93·5 pounds over lot 1, 144·5 pounds gain over lot 2, 66·5 pounds over lot 3, and 50 pounds over lot 5.

The meal required for 100 pounds gain was 318 pounds for lot 4 as compared with 361 pounds for lot 1, 390 pounds for lot 2, 348 pounds for lot 3, and 340 pounds for lot 5.

The cost of feed for 100 pounds gain showed a difference of only 16 cents between lot 1 fed frozen wheat and lot 4, the check lot, which received equal parts of oat chop and barley chop.

A study of the results of this experiment leads to the following conclusions:—

(1) That all lots of fall pigs made fair gains;

(2) That frozen wheat with a protein supplement has a place in the ration of the growing and fattening pig and gives good results as compared with a feed mixture composed of equal parts oats and barley;

(3) That oats was the expensive feed and accounted for the increased cost per hundred pounds gain in those lots which made the greatest gains during the period;

(4) That the feeding of frozen wheat produces no ill effects on the health of the pigs nor does it produce any marked difference in the type of the hog as compared with other feeds.

HULLESS OAT CHOP VS. COMMON OAT CHOP

A number of farmers in our district have inquired as to the value of hulless oats as compared with common oats as a feed for pigs from weaning until reaching 150 pounds in weight. An experiment to obtain this information was carried on this year.

Ten pigs, all from the same litter, were used in this experiment. They were divided into two lots of five pigs each, as nearly identical with respect to weight, general thrift, etc., as possible. The two lots received exactly the same quantity of meal and skim-milk, the only difference being that lot 1 received hulless oat chop and lot 2 common oat chop. They were kept under exactly the same conditions with respect to housing.

A summary of the results of this experiment is as follows:—

COMPARISON OF GAINS AND COST OF FEEDING HULLESS OATS AND COMMON OATS TO SWINE

—		Lot 1, hulless oats	Lot 2, common oats
Number of pigs in each lot	No.	5	5
Total initial weight	lb.	137	140
Average initial weight	"	27·4	28
Total weight at end of first 30 days	"	298·5	290
Average weight at end of first 30 days	"	59·7	58
Total weight at end of first 60 days	"	525	508
Average weight at end of first 60 days	"	105	101·6
Total weight at end of first 90 days	"	725·5	690
Average weight at end of first 90 days	"	145·1	138
Total gain per lot (90 days)	"	588·5	550
Average gain per pig (90 days)	"	117·7	110
Average daily gain per pig	"	1·308	1·222
Total quantity of meal consumed	"	1,661·0	1,661·0
Total quantity of hulless oats	"	361·0	.....
Total quantity of common oats	"	.....	361·0
Total quantity of skim-milk	"	2,181·0	2,181·0
Total cost of meal mixture	$	27 92	26 33
Total cost of hulless oats at $2.06 per cwt. (included in cost of meal mixture)	$	7 44	.....
Total cost of common oats at $1.62 per cwt. (included in cost of meal mixture)	$	.....	5 85
Total cost of skim-milk at 2 cents per gallon	$	4 36	4 36
Total cost of all feed	$	32 28	30 69
Meal required per 100 pounds gain	lb.	282·2	302·0
Skim-milk required per 100 pounds gain	"	371·0	397·0
Cost of feed per head per day	cts.	7·17	6·82
Cost of all feed per 100 pounds gain	$	5 49	5 58

Deductions.—The lot fed hulless oats made more rapid gains during the 90-day test, showing an average gain of 7·7 pounds per pig or an average daily gain per pig of 0.086 above the lot fed common oats.

It required 20 pounds more of common oats and 26 pounds more skim-milk for every 100 pounds gain in the case of the second lot.

The variation in the cost of feed per head per day was very slight—0·35 cents—and the cost of feed per 100 pounds gain showed a difference of only 9 cents in favour of the lot fed hulless oats.

The value of the common oats was figured at their value on the open market or $1.62 per hundred pounds, and the hulless oats were figured as worth between one-third and one-quarter more per hundredweight.

Valuing both the hulless and common oat chop at $1.62 per hundred-weight there was a variation in the cost of 39 cents per 100 pounds gain in favour of the lot fed hulless oat chop in which case this lot would show a profit of $2.30 over the other, whereas when hulless oat chop was valued at $2.06 per hundred pounds, this lot showed a profit of only 53 cents above the other.

At the beginning of the test those pigs fed hulless oats appeared to relish their feed more than those which received common oats and showed a steady gain of a few pounds per pig each month above them. The difference in feed produced no difference in type but those fed hulless oats had a glossiness about the skin and hair which was not so noticeable in the others.

Where no other concentrate than oats is fed after weaning, undoubtedly hulless oat chop has a greater place in the meal ration than common oat chop from which the hulls have not been sifted out.

ADVANCED REGISTRATION OF SWINE

During the year 1929 nineteen litters of pure-bred Yorkshire swine were set aside for experimental work in connection with the policy of the Dominion Government for the Advanced Registration of Swine.

For the benefit of those who are not familiar with the outline of this policy, it may here be stated that its objects are to collect data in reference to the breeding possibilities of sows in the various pure-bred herds in Canada, to systematize this information into a permanent official record, and in this way to make available information as to the merits of a registered sow and boar and their offspring in the same way as information can be at present obtained as to the merits of registered dairy cattle, e.g. R.O.P. cows and bulls with their qualified sons and daughters.

The policy has at the present time no fixed standard. It is a co-operative project not reported on by the Dominion Live Stock Branch but the combined data of the Experimental Farms and the Live Stock Branch are likely to appear in print soon. Further insight into this policy may be obtained by writing the Dominion Experimental Farms or the Dominion Live Stock Branch, Ottawa.

In the following table is tabulated a portion of the information which was carefully compiled at this Station on fourteen sows entered on this test, from the time the sows farrowed until the pigs reached two hundred pounds in weight, at which time they were shipped to the Harris Abattoir, Winnipeg, for a slaughter test.

SWINE ENTERED UNDER ADVANCED REGISTRY POLICY FOR SWINE

Litter No.	Registration number of sow	Registration number of sire of litter	Litter data						
			Number born	Number weaned	Weight of litter		Feed consumption of sow and litter: farrowing to weaning	Cost of feed consumed by sow while nursing litter	Cost to raise one pig from birth to weaning
					Birth	Weaning			
					lb.	lb.	lb.	$	$
1	129852	122625	14	5	38·0	136·0	641·5	9 69	1 94
2	129358	122625	13	12	36·3	269·0	681·0	10 28	0 86
3	129398	122625	17	9	44·5	219·0	684·0	10 33	1 15
4	103746	122625	13	9	33·0	238·0	698·5	10 55	1 17
5	134280	135390	10	5	21·0	118·5	483·5	7 30	1 46
6	134282	135390	11	6	25·0	145·0	489·0	7 38	1 23
7	134284	135390	14	11	33·7	217·0	601·5	9 08	0 83
8	135383	135390	8	7	26·4	209·0	652·0	9 85	1 41
9	135384	135390	10	9	28·7	273·5	649·5	9 81	1 09
10	135386	135390	9	9	23·2	222·5	568·0	8 58	0 95
11	135387	135390	13	11	26·1	259·5	547·0	8 26	0 75
12	135388	135390	6	6	16·7	165·0	526·5	7 95	1 33
13	135389	135390	12	8	28·2	185·5	588·0	8 88	1 11
14	135404	135390	7	7	19·3	184·5	507·0	7 66	1 09

SWINE ENTERED UNDER ADVANCED REGISTRY POLICY FOR SWINE

Litter No.	Registration number of sow	Registration number of sire of litter	Weights of 5 feeder pigs					Average number of days from birth to finish	Feed consumption and cost of feed for 5 feeder pigs from weaning to finish			
			Weaning	120th day	Finish	Total gain	Average weight at end of period		Meal consumed	Skim-milk consumed	Total cost of feed	Feed cost per 100 pounds gain
			lb.	lb.	lb.	lb.	lb.		lb.	lb.	$	$
1	129852	122625	136·0	918·5	1,027·5	891·5	205·5	194	3,289·5	2,039	55 64	6 24
2	129358	122625	108·5	899·0	1.019	910·5	204	188	3,099	2,044	52 73	5 79
3	129398	122625	120·5	917·5	1,027	906·5	205	184	3,396	1,611	56 42	6 22
4	103746	122625	145·5	997·5	1,011	865·5	202	180	3,129	1,928	52 97	6 12
5	134280	135390	118·5	779·0	1,001	882·5	200	216	3,464	1,559	57 31	6 49
6	134282	135390	116·5	796·5	1,021	904·5	204	223	4,076	1,715	67 15	7 42
7	134284	135390	113·5	855·0	1,034	920·5	207	208	3,803	1,505	62 51	6 79
8	135383	135390	145·5	831·5	1,038	892·5	208	207	3,878	1,822	64 36	7 21
9	135384	135390	150·0	870·5	1,039	889·0	208	211	3,762	1,446	61 77	6 95
10	135386	135390	120·0	817·0	1,009	889·0	202	216	3,407	1,512	55 33	6 22
11	135387	135390	129·0	818·0	1,025	896·0	205	217	3,980	1,316	64 82	7 23
12	135388	135390	139·5	905·0	1,024	884·5	205	195	3,245·5	1,675	54 18	6 13
13	135389	135390	123·5	888·0	1,029	905·5	206	203	3,317·5	1,340	54 57	6 03
14	135404	135390	142·5	796·5	1,018	875·5	204	221	3,531	1,647	58 55	6 69

As may be seen by the above table the pigs representing litters 1, 2, 3, and 4 show the highest gains during the period from weaning to the 120th day. These litters were sired by King W. H. F. 242, while the other ten litters were sired by Rosthern King John. The first four litters were also from sows which had raised two or more litters while the others were from sows with their first litters. The number of days from birth to finished weight is in favour of the litters sired by King W. H. F. 242.

The time required to finish five pigs in each of four litters in which the sows were full sisters is as follows: 195, 203, 216, and 217 days, respectively, which goes to show that there may be a variation in litters which are very closely related, raised under the same conditions, and receiving the same meal mixtures, etc.

The feed cost for one pound gain in the fourteen litters varies from 5·79 cents to 7·42 cents from weaning time to the time they reached two hundred pounds in weight and the cost to raise one pig to weaning (56 days) in the fourteen litters varied from 75 cents to 194 cents, the number of pigs in the litter from birth to weaning time causing most of this variation.

FIELD HUSBANDRY

Though the fields were clear of snow late in March, work did not commence on the land until April 27, due to cold, broken weather. The soil being very dry the previous fall, practically all the snow water was absorbed and supplied sufficient moisture for even germination. Seeding was general early in May and though there was no surplus of moisture the various crops had a good start. The weather in June was nearly ideal, there being an abundance of rainfall and fairly high temperatures. July was dry throughout, but the crops did not commence to suffer from this cause until a series of warm winds started about the 20th of the month and continued at odd intervals for several weeks. These winds sapped the moisture from soil and plants and, as most of the grain was just past the flowering stage, caused decidedly premature ripening. Yields were reduced from this cause by at least forty per cent. Little rain fell from July to freeze-up, which lowered the yields of green feed, ensilage crops, and roots, and in some cases they were nearly a failure. The dry fall allowed for harvesting and threshing in good time and condition, and a light rain in September promoted growth of weeds where fall cultivation of stubble was practised. Due to early harvesting and threshing, a great deal of this fall cultivation was done which should aid in checking annual weeds.

The yields of wheat, oats, and barley were below average but, due to better grades, the wheat crop showed a greater profit in many cases than in 1928. The oats and barley crops, as well as being poor in yield, were very poor in grade and showed much less profit. Corn, sunflowers, and roots yielded very low, due to the dry summer and fall when the greatest growth of these crops is made. The hay crop was fairly good due to abundant precipitation in June, but the aftermath was a total failure. Several fields sown to western rye grass in 1928 failed to produce a profitable catch due, apparently, to the very dry fall. For this reason the area in hay at this Station this year was much lower than usual. Where the catch of grass failed the land was sown to oats or barley for feed.

ROTATIONS

Seven rotations are being conducted at this Station, ranging from three to eight years in duration. Some one of these should be suitable for most farming conditions in the West and where not directly suitable, can be readily modified

to apply to individual conditions. The actual cost and returns are tabulated for each crop and for each rotation so that a true monetary comparison can be made for each. The return values are based on actual value of cereals at the time of threshing and the comparable value in dry matter with hay for ensilage crops and roots.

The cost and return prices used for 1929 were as follows:—

RETURN VALUES

Wheat	$ 1 26 per bushel
Oats	0 55 "
Barley	0 45 "
Western rye grass hay	9 00 per ton
Oat or barley straw	2 00 "
Sunflower and corn ensilage	3 00 "
Turnips	1 50 "

COST VALUES

Rent and taxes	$ 3 00 per acre
Barnyard manure	1 00 per ton
Seed wheat	1 50 per bushel
Seed oats	1 00 "
Seed barley	1 25 "
Seed turnips	0 90 per pound
Seed sunflowers	0 11 "
Seed sweet clover	0 12 "
Seed western rye grass	0 07 "
Seed corn	0 08 "
Machinery	1 35 per acre
Horse labour (single horse)	0 08 per hour
Manual labour	0 25 "
Tractor operator	0 40 "
Use of tractor	1 00 "
Rent of ensiling machinery	0 18 per ton
Twine	0 145 per pound
Threshing wheat	0 13 per bushel
Threshing oats	0 11 "
Threshing barley	0 12 "

COST OF PRODUCING CROPS

The costs in producing wheat, oats, barley, corn, sunflowers, and turnips are itemized in the following tables. The value, profit or loss and yields are also shown and give a good indication of the comparative yields which can be expected from the various crops and treatments. A seven-year average is inserted for the totals but since the itemized charges are nearly constant or vary in accordance with the yields, they have not been shown. No charge is made for summer-fallowing where wheat follows hoed crop and hay, as in these rotations no summer-fallow is used. The cost of manure is small where wheat follows summer-fallow and wheat follows wheat as no manure is applied on some of the rotations in this average. The cost of summer-fallow is charged in the ratio of two-thirds to the first crop and one-third to the second crop following.

COST PER ACRE OF PRODUCING WHEAT

Items	Wheat after fallow	Wheat after wheat	Wheat after hoed crop	Wheat after rye grass	Wheat after sweet clover
	$	$	$	$	$
Rent and taxes	3 00	3 00	3 00	3 00	3 00
Manure	0 40	0 50	2 20	2 00	.....
Seed	1 88	1 88	1 88	1 88	1 88
Machinery	1 35	1 35	1 35	1 35	1 35
Twine	0 32	0 18	0 18	0 17	0 20
Manual labour	0 97	1 30	0 82	1 45	1 30
Horse labour	0 54	1 27	0 64	1 47	1 22
Threshing	2 88	2 26	2 16	2 07	2 43
Cost of summer-fallow	5 28	2 59	.....	.....	.....
Total cost per acre, 1929	16 62	14 33	12 23	13 39	11 38
Total cost per acre, 7-year average	17 85	15 42	14 67	14 10	.....
	bush.	bush.	bush.	bush.	bush.
Yield per acre, 1929	22·1	17·3	21·0	15·9	18·7
Yield per acre, 7-year average	25·6	20·4	24·0	18·1	.....
	$	$	$	$	$
Value per acre, 1929	27 87	21 86	25 83	20 03	23 56
Value per acre, 7-year average	27 95	22 04	25 71	19 29	.....
Profit per acre, 1929	11 25	7 53	13 60	6 64	12 18
Profit per acre, 7-year average	10 10	6 62	11 04	5 19	.....
Cost per bushel, 1929	0 76	0 86	0 60	0 84	0 54
Cost per bushel, 7-year average	0 70	0 76	0 61	0 78	.....

For this year only it cost most to produce a bushel of wheat following wheat and least after sweet clover hay. In a seven-year average, wheat following western rye grass hay was the most expensive to produce and after hoed crop the most economical.

COST PER ACRE OF PRODUCING OATS AND BARLEY

Items	Oats after wheat	Barley	
		After hoed crops	After oats
	$	$	$
Rent and taxes	3 00	3 00	3 00
Manure	0 88	2 00	2 40
Seed	2 00	2 50	2 50
Machinery	1 35	1 35	1 35
Twine	0 17	0 44	0 17
Manual labour	1 58	1 25	1 52
Horse labour	1 64	0 67	1 57
Threshing	2 77	3 26	3 04
Cost of summer-fallow	.....	2 20	.....
Total cost per acre, 1929	13 39	16 67	15 55
Total cost per acre, 7-year average	16 12	18 12	15 82
	bush.	bush.	bush.
Yield per acre, 1929	25·1	27·2	25·3
Yield per acre, 7-year average	54·0	35·8	30·8
	$	$	$
Value per acre, 1929	15 00	13 52	12 57
Value per acre, 7-year average	24 33	19 99	17 98
Profit or loss per acre, 1929	1 61	−3 15	−2 98
Profit or loss per acre, 7-year average	8 21	1 87	2 16
Cost per bushel, 1929	0 54	0 61	0 61
Cost per bushel, 7-year average	0 30	0 51	0 51

Barley was produced at a loss after both hoed crop and oats this year, due mainly to the low yields. Horse and manual labour were much lower after the hoed crop as the land was not ploughed but the share of summer-fallow increased the cost. Oats were produced more cheaply than barley as there was no summer-fallow charge and the charge for manure was also less.

COST PER ACRE OF PRODUCING CORN, SUNFLOWERS AND TURNIPS

Items		Corn	Sunflowers	Turnips
		$	$	$
Rents and taxes		3 00	3 00	3 00
Manure		2 00	2 00	2 00
Seed		2 56	2 64	1 80
Machinery		2 20	2 02	1 35
Twine		0 44	0 29	.....
Manual labour		10 24	10 17	19 42
Horse and tractor labour		5 62	5 17	3 94
Cost of summer-fallow		2 19	.....	4 39
Total cost per acre	1929	28 25	25 29	35 89
	7-year average	29 12	29 06	36 54
		tons	tons	tons
Yield per acre	1929	4·73	3·72	9·82
	7-year average	7·56	7·50	15·96
		$	$	$
Value per acre	1929	14 19	11 16	.....
	7-year average	22 68	22 69	.....
Loss per acre	1929	−14 06	−14 13	.....
	7-year average	− 6 44	− 6 38	.....
Cost per ton	1929	6 09	6 80	3 65
	7-year average	3 85	3 87	2 29

Sunflowers and corn with the average yields in this district cannot be produced at a profit when the value is taken at three dollars per ton. For purposes where it is necessary to have a succulent feed in the ration the value may be higher and if worth four dollars per ton a profit could be shown. No value or profit or loss is shown for roots as the value varies greatly with the conditions. They are very expensive to produce and unless required as a special feed are more costly than the same amount of food value in sunflower or corn ensilage. A great deal of hand labour is required for both ensilage crops and roots which raises the cost of production. All costs are included until the ensilage is in the silo and the roots in the root cellar.

SUMMARY OF ROTATION RESULTS

For the purposes of a more accurate comparison all the rotation results have been averaged for the past eight years with the exception of two new ones which have been under way only three years, and rotation C which was not in its present location in 1922. Several of the rotations have been under way seventeen years.

Following is a table showing the average profit per acre for each rotation for eight years with the above exceptions.

Rotation "J"	—Fallow, wheat, wheat, oats seeded down, hay, and hay	$ 4 25
Rotation "F118"	—Corn, wheat, oats, barley seeded down, sweet clover, and rye grass hay	3 84
Rotation "Y"	—Wheat, hoed crop, wheat, oats seeded down, hay, and hay	3 08
Rotation "P"	—Fallow, wheat, wheat, fallow, hoed crop, barley seeded down, hay, and hay	2 62
Rotation "C"	—Seven-year average: Fallow, wheat, and wheat	7 32
Rotation "D"	—Three-year average: Fallow, wheat, wheat, and oats	10 91
Rotation "F244"	—Three-year average: Fallow, wheat seeded down, sweet clover hay, wheat, and oats	7 19

Following is a summary chart showing in some detail the manner in which the profit from the various rotations is compiled. The following shows a chart for rotation " J ".

SUMMARY OF YIELDS, VALUE, AND PROFIT AND LOSS (per acre)

Rotation year	Crops	Yield per acre		Value of crop 1929	Cost of production 1929	Profit or loss per acre	
		1929, bushels or tons	Average 8 years, bushels or tons			1929	Average 8 years
				$	$	$	$
1	Summer-fallow						
2	Wheat	28·0	23·1	35 28	17 93	17 35	7 39
3	Wheat	14·0	17·8	17 64	13 66	3 98	4 19
4	Oats seeded down	20·6	45·3	12 29	12 14	0 15	7 43
5	Hay	1·24	0·73	11 16	7 47	3 69	3 46
6	Hay		0·95	11 28	11 44	−0 16	3 01
	Totals for rotation			87 65	62 64	25 01	25 48
	Average per acre			14 61	10 44	4 17	4 25

Where the catch of grass is a failure, as it was on this rotation in 1928, the land is ploughed and re-sown to oats and grass. The value of the oat crop is put to the credit of the hay.

In an eight-year average, rotation " J " has shown the highest net returns and has also proven very satisfactory for the control of wild oats. This rotation is being used with considerable success on many farms in the West and where hay can be raised successfully is very suitable. One-third of the land is in wheat each year and while there is a high percentage of hay this serves a very beneficial purpose in improving the land and assisting in the eradication of weeds.

The five-year rotation, " F118," has also shown a good profit. Where precipitation is higher than at this Station the profit would no doubt run considerably higher. Though there is no summer-fallow the corn serves well for this purpose, being the best summer-fallow substitute at this Station. Where considerable stock is raised this should prove a useful rotation.

Rotation " Y " is similar to " J " excepting that the summer-fallow is replaced by corn. The wheat crop following immediately after hay is usually light when the rainfall is low but is surprisingly clean and matures early and evenly. Where perennial weeds with running root stalks are present the rotation without a bare summer-fallow is not suitable.

The profit from rotation " P " is low, mainly because the hoed crop is half turnips which are expensive to produce. Also there are two summer-fallows which lower the percentage of crop. This rotation is too long for most conditions in the West.

The net returns from rotation " C " are high and would no doubt be higher than any of the others in any average which could be compiled at this time. Weeds appear to gain prominence in this rotation, however, and after a number of years may prove a menace.

The two new rotations for which we have only three year's results are showing good profits and the five-year rotation " F244 " in particular should prove satisfactory for many farmers. The rotations for which we have an eight-year average include two very dry seasons which make them show to a disadvantage when compared with the last two which do not include results from these dry years.

YIELDS OF GRAIN FOLLOWING CORN, SUNFLOWERS, AND TURNIPS

The various hoed crop fields in three of the rotations have been planted half to sunflowers and half to corn in one case, corn and turnips in another, and sunflowers and turnips in another. The yields from the crops following have been as below:—

A five-year average of wheat following corn has yielded 20·7 bushels per acre and after sunflowers 15·4 bushels per acre.

A three-year average of barley following sunflowers has been 19·2 bushels per acre and after turnips 22·8 bushels per acre.

This year's results of barley following corn were 30·4 bushels and after turnips 24 bushels per acre.

The foregoing results are very conclusive in showing sunflowers as the most exhaustive crop, turnips as next and corn as the least exhaustive. This is no doubt a moisture factor rather than fertilizer element, the sunflowers and roots using more of the available moisture than corn.

CULTURAL EXPERIMENTS

Upwards of thirty cultural experiments are being conducted at this Station. Some have been under way for a number of years and show conclusive results while other are only started. In this report only those which have shown fairly conclusive results will be mentioned.

MANURE FOR HAY.—An application of twelve tons of rotted manure has shown a decided increase in the first and second year hay yields. This increase is, however, not sufficient to pay one dollar per ton for applying.

MANURE FOR WHEAT.—Twelve tons fresh manure applied in winter on first year wheat stubble and ploughed in the spring has given the highest returns showing a profit over the cost of application. If there are weed seeds present in the feed which is fed it is not desirable to use fresh manure however.

MANURE FOR SUNFLOWERS.—Twelve tons rotted manure applied on the summer-fallow has given the highest yields but not sufficient over no manure to pay the cost of applying. The conservation of moisture during the fallow year has more effect in increasing the yield than manure for sunflowers.

GREEN MANURE.—Sweet clover ploughed down as green manure has given better returns than manured summer-fallow when the cost of manuring and fallowing are considered.

SUMMER-FALLOW SUBSTITUTES.—Bare summer-fallow has given the highest yield, corn land next, sunflowers next, and grain in rows nearly as poor as solid grain.

DATES OF PLANTING CORN AND SUNFLOWERS FOR ENSILAGE

Corn is best planted the third or fourth week after work commences on the land. This would be about the twentieth of May in an average season. With sunflowers the earliest possible date of planting has given the best results.

DATES OF SEEDING WHEAT, OATS, AND BARLEY

Wheat gives best results when sown about a week after work commences in the spring or as soon as the soil is warm and in a mellow condition. The yields from oats and barley vary more with the season but as a rule early seeding is best.

DATES OF SEEDING FALL RYE

September 1 to 15 is the best time to seed fall rye when it is not to be pastured. Good stands have been secured from the above dates until freeze-up but the crop ripens later.

RATES OF SEEDING WHEAT

The rate of sowing wheat varies with the variety and the percentage germination of the seed. One and one-half to one and three-quarter bushels of good Marquis seed has given best results on this soil.

DISTANCE BETWEEN ROWS AND DISTANCE OF THINNING SUNFLOWERS

Sunflowers planted in rows 30 inches apart and left as sown have proven most economical at this Station. In planting the drill should be adjusted to drop the seed about every three inches.

MIXTURES OF WHEAT, OATS AND BARLEY FOR GRAIN

Wheat, oats, and barley have been grown in various mixtures for six years. The resulting yields go to show that in point of yield there is no advantage in growing grain in a mixture rather than alone.

MIXTURES OF WHEAT AND FLAX

The yields from the various mixtures run in accordance with the mixture used, the higher the percentage of wheat the greater the yield. This mixture, however, shows an advantage in that the flax appears to induce earlier and more even ripening in the wheat. This mixture is also easily separated for marketing. A mixture of 45 pounds of wheat and 14 pounds of flax, sown at the rate of one bushel to the acre of wheat on the drill appears to be most satisfactory.

METHODS OF SEEDING GRASSES AND LEGUMES

Mixtures of eight pounds rye grass and six pounds alfalfa were sown with various nurse crops. The highest yields of hay have been obtained from seeding alone after one year of wheat but the most economical method is by sowing with wheat after fallow. Good results have been obtained by seeding with the new stand of fall rye in the spring, the rye having been sown in the fall.

HORTICULTURE

Experimental work with annual flowers consists of three main projects as follows: (1) Variety tests with the plants started in hotbeds; (2) Variety tests with the seed sown in the gardens; (3) Annual flowers used as border plants.

Included in the first section are Petunias, Phlox, Snapdragons, Stocks, Verbenas, Dianthus, and other annuals that require a comparatively long season to reach their blooming period as well as many others that transplant well and may be brought into bloom earlier in the season by sowing in heat. In these tests seeding is done early as the hotbeds can be prepared for planting, which is usually during the first week in April. The seed is sown in flats to facilitate recording, seeding, pricking out, and transplanting to the garden of the different varieties included in the tests. A total of 268 seed cultures were handled in this way in 1929. Transplanting to the open is done when danger from late frosts is thought to be past. This is usually during the first week of June but the time is governed to some extent by the moisture present in the soil and by local

weather conditions, advantage being taken of dull days or showery weather. Annuals raised in this way in 1929 were well rooted before the dry weather came and bloomed profusely, although it was unusually hot and dry from July 16 till the end of August.

In 1929 annual flowers were sown in the open on May 20, 21, and 22. Many of them had germinated by the end of the month and by June 7 only a few that require a long time to start were not up.

For those who have time and facilities for such work, starting seeds indoors offers a fascinating pastime and adds materially to what is possible in the cultivation of annual flowers. However, sowing in the open requires less labour and, if the right varieties are selected, a wealth of bloom may be had by this method from early in July until frost. Realizing that many homemakers on the prairies have but little time to devote to raising bedding plants indoors, the Rosthern Station has been paying special attention to those that may be sown in the open. As a result of this work the following list of annuals is submitted as well adapted for this purpose:—

Agrostemma coeli-rosa (Rose of Heaven); *Alyssum maritimum* (Sweet alyssum), vars. Little Gem and Snow Carpet; *Amaranthus tricolor splendens* (Joseph's Coat), *A. melancholicus ruber, A. caudatus* (Love-Lies-Bleeding); *Anchusa capensis* (Cape Forget-me-not); *Asperula azurea setosa; Bartonia aurea; Calendula officinalis* (Pot Marigold); *Companula macrostyla* and *C. attica; Calandrina grandiflora; Centaurea suaveolens* (Yellow Sweet Sultan); *C. Imperialis* (Sweet Sultan), and *C. cyanus minor* (Bachelor's Button); *Chrysanthemum coronarium* (Annual Crysanthemum); *Clarkia elegans;* Cosmos, early flowering varieties; *Coreopsis drummondi,* var. Golden Wave, *C. atrosanguinea,* and *C. tinctoria; Cynoglossum amabile* (Chinese Forget-me-not); *Delphinium ajacis* (Annual Larkspur); *Dimorphotheca aurantiaca* (African Daisy); *Eschscholtzia californica* (California Poppy); *Gaillardia picta* and *G. picta lorenziana* (Blanket Flowers); *Godetia; Gypsophila elegans* (Annual Baby's Breath); *Helichrysum bracteatum* (Strawflower); *Layia elegans; Leptosyne stillmani; Iberis coronaria* (Annual Candytuft); *Lavatera splendens rosea* (Annual Mallow); *Linum grandiflorum rubrum* (Scarlet Flax); *Lathyrus odorata* (Sweet Pea); *Lupinus hartwegii* (Annual Lupin); *Mathiola bicornis* (Night-scented Stock); *Nolana grandiflora;* Oxalis, var. Cloth of Gold; *Papaver rheas* and *P. somniferum* (Annual Poppies); *Schizanthus retusus* and *S. wisetonensis;* (Butterfly Flowers); *Statice spicata* and *S. suworowi* (Sea Lavender); *Tagates pumila* (Tagates); *T. patula* (French Marigolds), vars. Legion of Honour and Josephine; *Tropaeoleum major* (Tall Nasturtiums), *T. Minus* (Dwarf Nasturtiums); *Viola cornuta* (Bedding Violas), *V. tricolor* (Pansy); *Malcomia maritima* (Virginia Stock); *Viscaria oculata.*

PERENNIAL FLOWERS

Herbaceous plants wintered well and bloomed freely until late in July. During August drought and high temperatures robbed the border of much of its beauty. Violas, the first perennials to bloom, opened their first blossoms on May 5 and flowered continuously until destroyed by frost in October. Early single tulips made a fine showing from May 25 till late in June. Iceland poppies began to bloom May 30 and made a brilliant display during the month of June. Peonies and delphiniums were at their best from July 1 to 15 and added a wonderful riot of colour to the perennial plantings.

A list of the best perennials for this district may be found in the 1927 Annual Report of this Station and also in Dominion of Canada Department of Agriculture Bulletin No. 113—New Series, "Herbaceous Perennials With Lists of Varieties for Special Purposes and Districts."

TREES AND SHRUBS

A list of trees and shrubs that are thriving at Rosthern was published in the Station Report for 1927. This list remains unchanged to date with the following notes added: Named varieties of the common lilac (*Syringa vulgaris*) were injured by the winter of 1927-28 and, although many of these bloomed in 1929, few of them have made complete recovery. Charles X has proved to be one of the hardiest varieties under test. *Lonicera alberti* also suffered considerable injury in 1927-28 but the plants have made new growth from the lower part of the stems.

VEGETABLES

JERUSALEM ARTICHOKE

A white skinned variety has been grown here for ten years. When planted in rows three feet apart with the tubers spaced fourteen inches apart, the average yield from thirty feet of row is 16 pounds, 1 ounce. The tubers are formed at considerable depth in the soil and occupy a wide area in the row making them difficult to harvest. When the comparatively small yields secured and the labour of harvesting are taken into consideration, there seems little likelihood of this vegetable becoming popular in Northern Saskatchewan.

ASPARAGUS

Asparagus was ready for use May 25 and cutting was continued until June 29. The yield from thirty feet of row was 8 pounds, 2 ounces. The average yield from the same area for the past six years is 7 pounds. Although asparagus has not produced heavy crops here it is considered worthy of a place in the prairie garden because it is relished by most people and is ready for use at a season when fresh vegetables are scarce.

BEANS

Bush Varieties.—As a result of the prolonged drought after July 15 the pods were small and the yield of green beans below the five-year average. All varieties were sown May 25. Challenge Black Wax and Princess of Artois were the earliest varieties and were ready for use August 1. The last picking was made August 24, making the season for green beans twenty-four days which is just two days less than the five-year average. With due regard for quality and the average yield for five years the following varieties have been selected from thirty-five tested as well suited for planting here: Challenge Black Wax, Round Pod Kidney Wax, Davis White Wax, Stringless Green Pod, Refugee, Masterpiece and Red Valentine. Yellow Pod Bountiful, grown for the first time in 1928, produced pods of good quality and was the highest yielding variety in 1929.

Pole Varieties.—Kentucky Wonder Wax and Kentucky Wonder Green Pod were the earliest varieties and produced the heaviest crops. Planted May 27 these varieties were ready for use by the middle of August. Pole beans usually outyield the bush varieties and extend the season for green beans from the time the latter have finished bearing until frost.

Broad Beans were planted May 5 and were ready for use August 6. Long Pod Seville and Broad Windsor were the heaviest producers with yields of 15 and 14 pounds of green beans, respectively, from thirty feet of row.

Distance of Planting.—Two varieties, Round Pod Kidney Wax and Stringless Green Pod, were planted with the seed spaced 2, 4, and 6 inches apart in rows 24 inches apart. For a seven-year period ending 1929 the 2-inch spacing

has given the highest and the 6-inch spacing the lowest yields of green beans. Some seasons the lighter seedings have compared favorably with the 2-inch spacing, but other years they have given a poor stand of plants because of cutworm damage or poor germination of the seed, and as a result low yields.

A project to determine whether successive sowings of an early variety, or sowing several varieties of different seasons on the same date would give the longest season of green beans was begun in 1921. Round Pod Kidney wax was used as the early variety in the succession of sowings. The first planting was made as soon as soil and weather conditions would permit each spring and the others followed at ten-day intervals until a total of four sowings were made. For the single sowing of several varieties Round Pod Kidney Wax, Stringless Green Pod, Red Valentine, and Refugee were used. These varieties were planted each year on the same date that the first planting of Round Pod Kidney Wax was made for the succession of sowings. The results show that while the length of the picking season was much the same from both treatments the heaviest yields were obtained from sowing several varieties of different seasons on the same date. Data collected from this experiment show that sowings made during the last week of May have given heavier yields than were obtained from earlier or later plantings. Therefore, it would seem that the best way to have green beans over a long period of the summer and at the same time obtain maximum yields would be to make an early sowing of an early variety such as Princess of Artois followed by a later sowing of one or more late varieties.

BEETS

Varieties.—Crosby Egyptian and Early Flat Egyptian were the best of the early sorts. Early Model was equally early but lacked the quality of the Egyptian varieties. Detroit Dark Red was again listed as the most satisfactory main crop variety with Black Red Ball in second place in this class. Detroit Half Long was the best of the half-long varieties.

Dates of Seeding.—Results indicate that for early beets the seed should be sown as soon as the land is in good condition for planting. For the main crop sowings made during the last week of May have produced beets closely approaching the size desired for winter storage. Earlier seedings have produced a high percentage of beets too large for the market and later sowings have shown a marked falling off in yield.

Thinning.—In this experiment seed of the variety Detroit Dark Red was planted early in May in rows 24 inches apart and the young plants thinned to 2, 3, and 4 inches in the rows. The rows thinned to two inches have given the highest yields of marketable beets. Thinning to three and four inches has increased the size of the beets so that a high percentage were too large for market requirements and did not increase the total yield.

BRUSSELS SPROUTS

Varieties.—Long Island Improved has produced the best sprouts during 1928-29, with an average yield of 10 pounds from a 30-foot row. This has not proved a profitable crop here but by starting the plants in the hotbed edible sprouts may be produced most seasons.

CELERY

Varieties.—As a result of dry weather in August and September the celery crop was below average. The weight of twelve heads of celery for five of the highest yielding varieties for the years 1925-29 and also the average weight is as follows:—

WEIGHT OF TWELVE HEADS OF DIFFERENT VARIETIES OF CELERY

Variety	Weight of 12 heads										5-year average	
	1925		1926		1927		1928		1929			
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz
Paris Golden Yellow	35	0	10	0	20	0	17	8	10	1	18	8
Easy Blanching	24	0	11	0	17	0	15	7	12	8	16	0
Golden Plume	22	0	12	4	16	0	14	4	11	0	15	2
Golden Self Blanching	24	0	12	0	12	0	13	2	10	4	14	4
White Plume	23	0	12	0	13	0	12	0	9	7	13	14

Paris Golden Yellow is attractive in appearance, has a fine flavour, and is early and easily blanched, always being in prime condition by late September. Golden Plume and Golden Self Blanching are early varieties also and are usually found to be well blanched by late September. Easy Blanching has yielded well, is a medium late variety here and usually requires further blanching after harvesting, making it suitable to store for winter use. White Plume is an early variety but in dry seasons the plants are small with small side shoots.

CABBAGE

Varieties.—For early cabbage the seed was sown in the hotbed April 10 and the young plants set in the garden May 28. Each variety was represented by one 30-foot row containing 20 plants spaced 18 inches apart. The rows were 30 inches apart.

Golden Acre and Early Krop were ready for use July 16, Early Summer and Copenhagen Market on July 18, Early Jersey Wakefield, Early Express, Early Winnigstadt and Fordhook Forcing on July 24.

Variety yields are as follows: Copenhagen Market 100 pounds, Early Krop 95 pounds, Early Summer 89 pounds, Early Jersey Wakefield 65 pounds, Golden Acre 54 pounds, Early Winnigstadt 49 pounds, Fordhook Forcing 45 pounds, and Early Express 39 pounds.

To test their suitability for the main crop when seeded in the garden, thirty varieties were sown May 8 in 30-foot rows thirty inches apart and thinned June 21 to approximately eighteen inches in the row. Owing to the dry season yields were much below average, late varieties showing the most marked falling off. All varieties were harvested October 5 when the following yields were recorded: Succession 73 pounds, Early Krop 70 pounds, All-Head Early 65 pounds, Early Summer 59 pounds, Brunswick Short Stem 58 pounds, All Seasons 55 pounds, Early Jersey Wakefield 52 pounds, and Copenhagen Market 43 pounds.

Two varieties of red cabbage, Red Dutch Pickling and Danish Stonehead yielded 45 pounds and 22 pounds, respectively, from 30 feet of row when the plants were started in the hotbed. When seeded in the garden these varieties produced 26 pounds and 14 pounds from the same area.

Two varieties of savoy cabbage, Chester Savoy and Improved American Savoy, have been grown for a number of years. Chester Savoy has produced the heaviest crops.

Varieties recommended for planting on the strength of their performance over a number of years are: Golden Acre, Early Express, Early Summer, Early Jersey Wakefield, or Fordhook Forcing for early cabbage; Copenhagen Market for the main crop; Danish Ballhead for winter storage; Red Dutch Pickling for pickling cabbage, and Chester Savoy for savoy cabbage.

CARROTS

Varieties.—Of nine varieties tested Chantenay and Danvers Half Long stand at the top of the list with practically the same yield for a three-year period. Both varieties are suitable for home or market gardening.

The earliest varieties tested are Scarlet Horn and French Forcing.

Scarlet Nantes is recommended for trial in the home garden or where quality may be a more important factor than yield.

Dates of Seeding.—Sowing as early as the soil may be worked in spring has produced the earliest carrots but the second sowing made ten days later has usually given a better stand of plants and produced smoother roots.

For the main crop sowings made during the last half of May, the date depending to some extent on the relative earliness of the spring, have produced roots of the most desirable size for market or storage. Earlier planting has produced heavier yields but the roots are usually too large to meet market demands. Seeding after June 1 has resulted in a marked decrease in the yields accompanied by an increase in the percentage of immature roots.

Thinning.—Carrots have been thinned to one, two, and three inches in the row to determine the effect on the yield and quality of the crop produced.

From the results of this test it seems to be unnecessary to thin early carrots to more than one inch in the row while the main crop need not be thinned to more than two inches. Thinning to three inches has reduced the yield and increased the percentage of roots too large for market.

CAULIFLOWER

Early Dwarf Erfurt and Early Snowball are good early varieties. Of the later varieties tested Veitch Autumn Giant and Danish Dry Weather have given the heaviest yields with Veitch Autumn Giant leading when sown in the hotbed and Danish Dry Weather the heaviest cropper when sown in the open. The records offer an explanation of this apparent anomaly, showing that some growing seasons are too short for Veitch Autumn Giant to produce a full crop when sown in the open, while Danish Dry Weather, which is a second early or mid-season variety, has usually completed growth before killing frosts occur. With the season artificially lengthened by sowing in the hotbed Veitch Autumn Giant, no longer at a disadvantage, has produced heavier heads and outyielded Danish Dry Weather.

CUCUMBERS

Cold wet weather with low night temperatures in late June gave cucumber plants a severe check. With warm weather in July a partial recovery was made and the vines grew rapidly until the extreme drought in August again checked them and cut down the yield of fruit. Large-fruited or table varieties producing the best crops were Early Fortune, Davis Perfect, and Improved Long Green. Pickling varieties that produced the most fruits were Early Green Cluster, Chicago Pickling, and Early Russian. Plants from seed sown in small pots in the hotbed May 27 and transplanted to the garden June 7 outyielded those grown from seed planted in the open May 28. Data from this experiment are presented in the following table.

CUCUMBERS SOWN IN HEAT VS. PLANTED IN THE OPEN

Variety	Sown May 27 in heat and transplanted to garden June 7			Sown May 28 in the garden		
	Number of hills Sept. 1	Number of fruits harvested	Weight of fruits harvested	Number of hills Sept. 1	Number of fruits harvested	Weight of fruits harvested
			lb. oz.			lb. oz.
Davis Perfect	5	42	22 8	3	16	6 11
Improved Long Green	5	47	22 3	4	13	6 7
Chicago Pickling	5	55	16 10	2	9	3 11
Early Russian	5	47	13 6	4	49	11 2
Giant Pera	5	23	11 7	3	0	0 0
Total	25	214	86 2	16	87	27 15

SWEET CORN

Thirty-one varieties were planted May 23 in hills three feet apart each way, each variety being represented by two 30-foot rows. Warm weather followed planting and germination was practically complete by June 7 when all varieties excepting Black Mexican were showing above ground. When the plants were large enough so that they were considered safe from cutworm damage, all varieties were thinned to a uniform stand of four plants to each hill. The first ears were harvested from Banting, ready for use August 17, and the second lot from Pickaninny and Improved Squaw ready on August 19. Other early varieties were Alpha ready August 21, Early June ready August 23, Improved Early Dakota, The Burpee, Burleigh County Mixture, and Golden 60-Day ready August 27. Data on ten of the highest yielding varieties are given in tabular form as follows:—

RESULTS OF VARIETY TEST OF SWEET CORN

Variety	Ready for use	Length of ears	Number of rows	Quality	Average yield per 30-foot row, number of ears
		in.			
Improved Squaw	Aug. 19	5·85	8	Medium	71·5
Pickaninny	" 19	4·6	8 to 10	Very good	70·5
Burleigh County Mixture	" 27	6·5	10	Medium	63·0
Early June	" 23	4·6	10	No test	61·5
Golden Bantam	" 31	6·0	8	Excellent	52·0
Banting	" 17	5·2	8	Very good	51·5
Golden 60-Day	" 27	6·45	12	Very good	51·0
Alpha	" 21	5·45	8	Medium	51·0
Improved Early Dakota	" 27	5·3	12	No test	48·0
The Burpee	" 28	6·2	12	No test	46·5

SWEET CORN MULCHED VS. NO MULCH

Two plots were planted to Banting corn on May 29. Each plot contained three 30-foot rows three feet apart with the hills spaced three feet in the rows. On one plot mulch paper was applied at the time of planting. No mulch was applied on the other plot but it was given sufficient cultivation to control all weed growth during the growing season. In putting down the mulch paper a small piece was removed at each hill along the edge of each strip of paper to permit complete covering of the mulched plot. The total yield from the mulched

plot was 206 ears of green corn while from the unmulched one 148 ears were harvested. There was practically no difference in the dates at which the corn on the two plots was ready for use although the corn on the mulched plot germinated and showed the silk on the cobs one day in advance of that on the unmulched plot. Hot weather early in June caused all corn to germinate quickly so that the effect of the mulch paper on the rate of germination was not marked. During a cool season such as 1928 mulch paper would probably have a more pronounced effect on the germination of the seed. Although mulching increased the yield of green corn it is doubtful if it would prove a profitable practice with the paper selling at present prices. Further tests are necessary, however, before coming to a definite conclusion regarding the use of mulch paper.

LEEKS

Three varieties, Musselburgh, Giant Carentan and Monstrous were sown in the hotbed April 11 and transplanted to the open June 20. The yields were 520, 432, and 372 ounces, respectively, per 30-foot row. When sown in the open the order of yield was reversed, Monstrous yielding 464, Giant Carentan 368 and Musselburgh 208 ounces. Dobbie's International Prize produced fine leeks but a poor germination resulted in a low yield.

LETTUCE

Head Lettuce.—From sowings made May 3 Golden Queen was ready for use July 4, May King on July 6 and Big Boston on July 8. Many plants of Golden Queen bolted to seed without forming heads. May King headed well the heads being small but of good quality. Big Boston formed good heads but rotting inside spoiled many of them.

Of the later varieties Iceberg, New York and Denver Market formed large, firm heads of high quality. Early Prize Head, ready for use July 15, had excellent quality but smaller heads than the other varieties mentioned.

Leaf Lettuce.—Grand Rapids and Early Curled Simpson produced fine, crisp leaves in abundance, Early Curled Simpson producing the stronger growth.

Cos Lettuce.—All varieties produced good heads with White Paris giving the heaviest crop.

ONIONS

Varieties.—When grown from seed sown in the open all varieties were damaged by the Onion Maggot to such an extent that no significance may be attached to the yields obtained. As a control measure for maggots the "Cull Onion Treatment" proved a failure. A good crop of onions was harvested, however, from plants started in the hotbed and transplanted to the garden May 25. Three varieties, Prizetaker, Large Red Wethersfield, and Danvers Yellow Globe, were treated in this way and yielded 29, 29, and 25 pounds, respectively, from thirty feet of row. The seed was sown March 28 in flats in a cellar where the temperature was approximately 50° F. On April 8 the hotbeds were ready for use and the seed flats were then placed in them. When the young plants were three to four inches tall they were transferred to a cold frame and given plenty of air. No "pricking out" was done so that the only heavy labour item was transplanting to the garden. Where onion maggots are troublesome this method of growing offers a partial solution of the problem. Heavier crops have been secured from transplanted onions than from seed sown in the open and this increase in yield helps to offset the increase in production costs attendant on sowing in heat and transplanting.

SEED VS. SETS

Onions from sets were also damaged by maggots but not to the same extent as those grown from seed sown in the garden.

PARSNIPS

The parsnip crop was light with a high percentage of small immature roots. The highest yielding varieties were Early Round, Guernsey and Hollow Crown with yields of 20, 15, and 14 pounds, respectively, from 30 feet of row.

Early Round is a new variety here and the name describes the shape of the roots. On heavy soils the Early Round should be much easier to harvest than the long-rooted sorts. The roots had large centres but were of good quality when cooked.

PEAS

Varieties.—Sixty-seven varieties were planted May 6 in thirty-foot rows. The rows were spaced three feet apart and the plants supported by brush stakes to prevent mixing. Twenty feet of each row was harvested as green peas and the yields recorded represent the weight of green pods picked from this area. The balance of the rows were allowed to ripen for seed. All varieties made strong vine growth and the early varieties produced a heavy crop of pods. Late varieties suffered from drought and a severe infestation of powdery mildew (*Erysiphe polygoni*) so that the yields secured were disappointing.

The first picking was made on July 11 from Pedigree Extra Early and Alaska. Other early varieties were Gregory Surprise, ready July 13, Early Six Weeks, ready July 14, and American Wonder, Blue Bantam, Little Marvel, Laxton Progress, and Carter Eight Weeks, ready July 16.

Some of the best of the varieties ready for use July 18 and classed as second early sorts were: English Wonder, Laxtonian, Hundredfold, Gradus, Thomas Laxton, Pioneer, and Director.

Late varieties that have given good crops for a number of years are: Lincoln, Bruce, and Stratagem.

Bruce, Director, Invermere No. 3 and Invermere No. 6 are Dominion Experimental Farm productions from the Windermere Station and are worthy of special mention. Bruce has a higher average yield for the past six years than any other variety, produces medium sized pods well filled with large peas and is of practically the same season as Stratagem.

Director has produced good crops, bears medium sized pods well filled with medium sized peas and is ready for use from five to six days earlier than Bruce. Invermere No. 3 and No. 6 have given the same yields and stand second to Bruce among the varieties. No. 3 is a large podded variety with good quality and was ready for use July 21 in 1929. No. 6 has medium sized pods packed with medium sized peas and is a little earlier than No. 3.

VARIETIES OF DIFFERENT SEASONS VS. ONE VARIETY PLANTED AT DIFFERENT DATES

To determine whether a succession of sowings of one early variety or a single sowing of varieties of different seasons would give the longest season for green peas, Thomas Laxton was planted each season as early as weather and soil conditions would permit and at intervals of ten days thereafter until four sowings had been made. For comparison, Thomas Laxton, Advancer, Gradus, and Stratagem were planted on the same date that the first sowing of Thomas Laxton was made in the other plot.

The results show that the season over which green peas were harvested was of practically the same duration from each treatment. The total crop was much heavier, however, from the single sowing of different varieties than from the succession of sowings of Thomas Laxton.

YIELDS FROM PEAS OF DIFFERENT SEASONS AND OF ONE VARIETY SOWN AT DIFFERENT DATES

—	*1925	*1926	*1927	1928	1929	Total for five years	Yearly average
	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
Total yield from a single sowing of four varieties.....	53 1	40 15	45 6	48 2	46 1	233 9	46 11
Total yield from four successive sowings of Thomas Laxton.....	40 14	35 10	37 6	34 2	24 12	172 12	34 15

* Only three sowings of Thomas Laxton were made in 1925, 1926, and 1927 and the total yield from only three varieties is compared with that from these three sowings for these years. When four sowings were made the difference in the total yield was greater since the last sowing of Thomas Laxton always gave the smallest crop.

This is in agreement with Jones* and Rosa who have quoted Boswell (1926) to show that the later the planting date in spring the shorter is the interval between seeding and harvest and that this shortening of the growing period is accompanied by a decrease in yield.

That the smaller aggregate returns from the succession of sowings of the variety Thomas Laxton as compared with those from several varieties of different seasons sown early may not all be attributed to varietal differences is also shown by comparing the yields obtained from the various sowings of Thomas Laxton made on different dates. By using these data this experiment provides information on the effects on the crop of planting peas at different dates and shows this to be an important factor in growing profitable crops of peas. The first planting was usually made during the first week of May and the last one during the last week of May when only three were made, or about the end of the first week in June when four were made. The results given in the following table show that the later the planting date in spring the lower was the yield of green peas.

DATES OF SEEDING GARDEN PEAS (THOMAS LAXTON) 1925-29

—	Yield of green peas from 20 feet of row						Average yield
	1925	1926	1927	1928	1929	Aggregate yield	
	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
First seeding.....	16 8	15 4	22 11	10 10	9 2	74 3	14 13
Second seeding.....	15 0	10 7	9 1	10 5	7 14	52 11	10 9
Third seeding.....	9 6	9 15	5 10	9 9	4 15	39 7	7 14
Fourth seeding.....	.....	.....	.....	3 10	2 13	*6 7	*3 3

*Two years' results.

DIFFERENT DISTANCES OF PLANTING PEAS

To determine the distance of planting giving the highest yield of green peas three varieties, English Wonder, Thomas Laxton, and Stratagem, were sown in 20-foot rows spaced three feet apart with the seed spaced one, two, and three inches in the rows. These varieties were also included in the variety tests where the seed was sown thickly in a wide drill, the amount used averaging

* Jones, Henry Albert, and Rosa, Joseph Tooker: Truck Crop Plants, McGraw-Hill Book Company, Inc., New York, 1928.

more than one seed to the inch. The yields from these tests have been included for comparison with those from the plantings where the seed was planted at the distances cited.

PEAS—AVERAGE YIELDS FOR THREE VARIETIES FOR 7 YEARS

	lb.	oz.
Sown thickly in variety tests	13	5
Sown 1 inch apart in the row	15	6
Sown 2 inches apart in the row	14	3
Sown 3 inches apart in the row	12	1

PEPPERS

Only a few fruits ripened before frost. Varieties showing the most promise as judged from the set of fruit were: Hamilton Market, Harris Earliest, Giant and Golden Dawn.

PUMPKINS

From seed planted in small flower pots in the hotbed on May 25 young plants were transplanted to the garden on June 8. Yields secured from five hills were as follows: Connecticut Field 28 fruits weighing 356 pounds, Pie 38 fruits weighing 167 pounds, Fort Berthold 38 fruits weighing 110 pounds, Sugar 22 fruits weighing 98 pounds, Winter Luxury 22 fruits weighing 87 pounds. These varieties were sown in the garden also on May 29 but failed to produce a crop of ripe fruits.

RADISH

The variety tests of this vegetable show that most of the commercial varieties produce radish with good table quality if the season is suitable. In 1929 the first sowings, made on May 3, produced a crop ready for use from June 6 to July 1. During this period the weather was cool and moist and as a result all the varieties sown produced roots that were firm fleshed and mild in flavour.

A second sowing made July 4 and ready for use August 6 produced radish that were hot to the taste and of poor quality.

Winter Varieties.—From the first seeding, made on May 27, White Strasburg was ready to use June 17 and continued in season till July 13, Rose China was ready to use June 21 and remained in good condition till July 13. A second seeding made June 13 produced roots of the Strasburg variety by July 23 and of Rose China by August 1. These continued in good condition until August 13 when seed stalks began to appear. Later sowings were made to provide roots for winter storage, making four in all.

The first two sowings of White Strasburg and Rose China produced radish of excellent quality. All sowings of Long Black Spanish were poor and were damaged by root maggot as were the last two sowings of Strasburg and Rose China.

SPINACH

Seed was sown May 3 and the varieties Victoria, Bloomsdale and Viroflay were ready June 6 and were followed by Noble Gaudry and King of Denmark on June 8 and Juliana on June 10. Victoria and Viroflay were in good condition for 9 days, Bloomsdale for 11 days, Noble Gaudry for 9 days, King of Denmark for 13 days and Juliana for 12 days.

Half of each variety was cut when in prime condition for market and the plants allowed to produce a second growth. The second growth from all varieties produced small leaves and while this practice may help to prolong the season for spinach in the home garden it seems to have little value for the market gardener.

New Zealand spinach provides leaves of good quality during the late summer and fall months.

SQUASH AND VEGETABLE MARROWS

Plants started in the hotbed yielded a fair crop but those sown in the open produced only a few fruits that were sufficiently mature for table use. The highest yielding varieties were: Golden Hubbard, Warted Hubbard, Green Hubbard, English Vegetable Marrow, and Boston Marrow.

TOMATOES

In the variety tests the plants were set three feet by three feet and pruned to a single stem. Each variety tested was represented by ten plants with half of them supported by stakes and half unsupported. One hundred varieties and strains have been tested in recent years. Average yields for a five-year period from eighteen of the highest yielding of these varieties, with the yields from the staked and unstaked plants included, were published in the Annual Report of this Station for 1928. Some of these that again fruited well in 1929 are: Bonny Best, Bolgiano, Alacrity, Burbank, Avon Early, and Earliana.

Little difference in the yields of ripe fruit from the staked and unstaked plants is shown in the records, when the average production for a number of years is taken. Unstaked plants have produced more ripe fruit during the first two weeks of the picking season but this has been offset by the yields obtained from the staked plants later in the season. More cracked and decayed fruits are harvested from the unstaked plants in wet weather and the fruit is often dirty while that from the staked plants is clean. Unstaked plants have frequently been injured and sometimes broken off entirely by the wind when planted in an exposed position while those given support have escaped this injury. More damage from the first light frosts has been noted among the fruits on the untrained plants.

Recent introductions that ripened good crops of fruit in 1929 are: Sutton Earliest of All, Sutton Open Air, Grand Rapids, Canadian, Herald, Hawkin Australian Dwarf and Fargo.

Sutton Earliest of All outyielded all other varieties. The fruits were medium in size and smooth but ripened unevenly, coloring quite slowly about the stem end so that the blossom end was over-ripe by the time the other end of the fruit was in good table condition.

Sutton Open Air produced solid fleshed fruits of medium size and rather rough.

Grand Rapids had medium sized, smooth fruits with very little cracking in evidence.

Canadian, a recent introduction from the Ontario Agricultural College, bore medium-sized fruits that were smooth and of good quality but with some crackling about the stem end.

Hawkin Australian Dwarf resembled Sutton Earliest of All so closely in both leaf and fruit characters that one could not be distinguished from the other.

Fargo, introduced by the North Dakota College of Agriculture, is unique in habit of growth, branching freely with the main stem and each branch terminating in a flower cluster so that the plants are dwarf and do not require support. Pruning to a single stem reduced the yield of ripe fruit from this variety. When allowed to grow unpruned it bore a heavy crop of rather small, smooth, attractive fruits. It is a few days too late in ripening to compete in yield of ripe fruit with the earliest varieties grown here.

The following varieties have been discarded as too late for this district: Albino, White Beauty, Cooper Special, Crimson Cushion or Beefsteak, Early Market, Fordhook First, Dwarf Stone, June Pink, Livingston Globe, Pink Peach, Ponderosa, Royal Pink, Self Pruning, Trucker Favourite, and Yellow Giant.

POTATOES

Potatoes made a normal growth during the first half of the growing season or until late in July. Lack of moisture in August prevented the tubers from sizing well and cut down the yield. Rain on September 2 to 4 induced a second growth of late varieties, so that they outyielded the early varieties, which were prematurely ripened by the hot dry weather and made no growth response after the rain. Weekly diggings of Early Ohio, Early Bovee, and Irish Cobbler showed no increase in weight from August 16 till September 13. Early potatoes were a fairly good sample but rather small, while the late varieties sized up fairly well but were badly cracked as a result of the second growth period in September. The effect of the drought was most pronounced on a section of the potato experiments planted on fall ploughed land following two crops of grain. Variety tests and increase plots from tuber unit selections, planted on old garden land that had been manured frequently but received no manure in 1929, produced an average crop. Part of this land had been planted to potatoes in 1928 and part to corn. The corn land produced the finest sample of potatoes, the tubers showing a smaller percentage of scab than those from the potato land. In the variety test Early Ohio yielded at the rate of 277 bushels per acre, while following two crops of grain the yield was 92 bushels per acre. When the cost of seed and the labour required to produce the crop are reckoned on it would seem a profitable practice to plant potatoes on summer-fallow or garden land.

On land that had not previously grown a crop of potatoes common scab (*Actinomyces scabies*) was the only disease in evidence. Where the land had been planted to potatoes in 1928 considerable rhizoctonia (*Rhizoctonia solani*) was present. One lot of Bliss Triumph was rogued for mosaic plants and the seed discarded at digging time.

All seed was treated with corrosive sublimate used at the rate of four ounces to twenty-five gallons of water.

Yields from seven of the highest yielding varieties for the years 1928-29 are presented in the following table:—

POTATO YIELDS IN BUSHELS PER ACRE 1928-29

Variety	Season	Yields per acre		
		1928	1929	Average
		bush.	bush.	bush.
Early Ohio	Early	340	277	308·5
Bovee	"	352	251	301·5
Green Mountain	Late	220	379	299·5
Wee McGregor	"	254	344	299·0
Carman No. 1	"	252	310	281·0
Gold Coin	"	234	290	262·0
Irish Cobbler	Midseason	243	253	248·0

An examination of the above table shows that varieties marked as early gave the largest returns in 1928, while those marked as late were the highest yielding sorts in 1929. These seasonal differences in yields between late and early groups of varieties were caused by early frosts in 1928 which killed the tops of late varieties before they had completed growth, so that the early

varieties gave the heaviest yields and, as already pointed out, in 1929 late varieties made growth after rain in early September whereas early varieties had been brought to maturity by drought and hot weather so that they made no growth response after the rain came. When the averages for the two seasons are taken there are no marked differences in yields between the first four varieties. Early varieties produced the best sample of potatoes in each year. In 1928 the tubers from late varieties were immature when the plants were frozen, while, as already cited, in 1929 the tubers of these varieties were badly cracked as a result of the plants being forced into a second growth.

TREE FRUITS

APPLES

Crabapple varieties wintered well and set a fair crop of fruit. High winds in June and July caused a heavy drop of the green fruits and drought in August prevented the fruits from sizing well. Prince, Jewel, Columbia, Tony, and Pioneer all made a partial recovery from the setback received during the severe winter of 1927-28. Osman, reported in 1928 as having come through the previous winter without injury, had many dead limbs this year. Evidently it took two years for the full extent of the injury sustained to become fully apparent to the eye. A number of seedling crabapples originated at Rosthern again fruited, and a few of these strengthened the good impressions created in previous years. Some of these seedlings compare favourably in size and quality of fruit with the named varieties fruiting here, and in addition appear to have a greater degree of hardiness than the latter. A number of them have been propagated and are being distributed for further trial.

Hardy varieties of standard apples showed some winter injury, but less than in the previous season and probably less than usual. Even the hardiest of these seldom come through a winter without showing some damage and none of them have fruited here.

Crabapples budded in 1927 made good growth and are now sturdy two-year-old trees. Very few of the apple stocks budded in 1928 grew. Extremely dry weather in May of that year at the time of transplanting the stocks was probably responsible for the poor set of buds obtained. If stocks are budded in the same year that they are lined out it seems to be more important to have ample moisture when the stocks are planted in spring than in August when the budding is done. If the stocks are not too large, transplanting them the year previous to the one in which they are to be budded has proved a good practice. Stocks transplanted in 1929 made good growth since there was plenty of moisture at planting time and during the following two months. Some of these were budded in August and although the weather was extremely hot and dry when the buds were set, the results seem to be quite satisfactory.

Five hundred additional young trees representing eighty-five varieties were planted in the trial orchard during the past season. With a few exceptions these trees were propagated in the Station nursery with budwood from other stations and nurseries.

As a beginning in co-operative fruit trials seven varieties of crabapples and four varieties of raspberries were distributed to eight co-operators.

PLUMS

A number of Cheney seedlings ripened crops of fruit and a few of these were judged to have sufficient merit to warrant their propagation for further trial.

The following varieties from the South Dakota College of Agriculture are worthy of mention in that they all bore some fruit in 1929:

Tom Thumb, a dwarf plum-sandcherry hybrid, produced two pounds, three ounces of fruit per plant.

Opata, another hybrid plum, bore a few fruits on the lower branches. The fruitbuds above the snow line were all winter killed.

Sioux, a sandcherry selection, although quite dwarf in habit of growth so that a single plant produces only a few quarts of fruit, is deserving of some attention. It has proved hardy here so far and bears fruits that, although rather small, are sweet and practically free from the natural astringency of this species.

Champa, another selected sandcherry, ripened its fruits so late in the season that they failed to develop their natural flavour.

A shipment of 150 trees made up of twenty varieties was received from the Dominion Experimental Station at Morden, Manitoba. This brings the total of named varieties under test up to 85.

SMALL FRUITS

RASPBERRIES

Raspberries set a heavy crop of fruit but, owing to the dry weather at picking time, the berries were small and rather seedy and the yield was poor.

Sixteen varieties were set out in a new plantation and although the transplanted canes practically all lived very few new ones were produced for next year's crop. The stock planted was grown here for two years in nursery rows subject to regular and careful inspection for virus diseases and from which all unthrifty plants were removed.

STRAWBERRIES

Considerable winter killing occurred in the strawberry plots so that the number of fruiting plants was much reduced. Losses were much heavier in the plots that had fruited in 1928 than in the new plots that had not produced a crop. Dakota proved to be the hardiest variety and wintered with practically no loss of plants. Senator Dunlap stood second in this respect with a loss of 35 per cent in the two-year-old plantation and 20 per cent in the new plots.

At the beginning of the picking season the crop of fruit was good where the plants had not killed out but hot, dry weather soon reduced the size of the berries and caused a sharp drop in yield.

New plantations made in May produced a poor stand since the weather was too dry at the time of runner formation to favour rooting of the young plants.

Dakota and Senator Dunlap are recommended for planting in this district. A detailed report on these varieties is contained in the 1928 Report of this Station.

CEREALS

All cereal varieties did well during May, June, and most of July. Lack of moisture, and warm winds, caused great havoc, commencing about the twentieth of July, and all varieties and classes of grain could be seen to suffer from this time until they were prematurely ripened. Grain on good summer-fallow, where the reserve of moisture was greatest, suffered least, but even in such cases the loss due to shrunken grain was enormous. The spread in time of maturity between early and late varieties was much less this year than usual, due to the dry period striking when the early sorts were farther advanced than

the late ones. We would infer that that the late varieties suffered greatest for this reason, though the yields do not bear out this inference in all cases. There was no rust damage, though a trace was present on most varieties of wheat.

WHEAT

Although the warm, dry weather in late July caused some irregularity in the usual order of variety yields, the more commonly grown and better varieties were near the top of the list as usual. Red Bobs, Garnet, Marquis, and Ceres all yielded high and stand up well in an average of seasons. Red Fife and Reward were low and are also low in the average. The good points and defects of Bobs, Marquis, and Red Fife are well known and no mention need be made of them here. Ceres is a new wheat, developed in North Dakota, which is showing considerable promise because of its resistance to rust. Besides being relatively resistant to rust, it yields about as well as Marquis here, is slightly earlier and mills well, but is slightly weaker in the straw. The heads are awned, which is objected to by some growers. Garnet yielded higher than Reward in most of our tests this season and is also higher on the average. Reward ranks high in milling quality, is somewhat stronger in straw, but slightly later than Garnet. Marquis is recommended where it can be grown clear of frost most seasons and where rust is not a menace. Ceres can replace Marquis where rust is troublesome most years. Garnet or Reward should be grown where there is danger of early fall frosts.

Following is a table of yields and days to mature for six of the more important varieties. These results were taken from the rod-row tests as they were considered more comparable than the large plots this year. The yields and days maturing are given for 1929 and for a two- and five-year average.

WHEAT VARIETY YIELDS

Variety	1929		2-year average		5-year average	
	Days to maturity	Yield per acre	Days to maturity	Yield per acre	Days to maturity	Yield per acre
		bush. lb.		bush. lb.		bush. lb.
Red Bobs	112	40 04	113	48 34	115	43 51
Garnet Ott. 652	107	44 47	107	44 47	108	41 29
Marquis Ott. 15	113	42 26	115	46 11	115	40 33
Red Fife Ott. 17	116	33 57	118	40 33	119	36 47
Reward Ott. 928	107	34 54	108	35 51	110	34 26
Ceres	113	40 04	114	44 19	.....	.....

OATS

The most promising oat varieties as to yield this year were Gopher, Victory, Laurel, and Leader. In a two-year average Victory was highest, with Banner next, which is also the order in a longer average. On stubble, Banner has given the highest yield on an average of years. As late oats, Victory or Banner are to be recommended, being high yielding and good quality white oats. Gopher is very promising as an early oat, being a high yielder and thin in the hull. Laurel, a hulless sort, has yielded exceptionally well this year, and for a hulless oat stands high in the average.

Following is a table showing the yields and days maturing for several of the more promising varieties of oats grown on summer-fallow and stubble:—

OAT VARIETIES

Variety	On fallow 1/100 acre			On stubble 1/50 acre		
	1929 yield per acre	2-year average		1929 yield per acre	6-year average	
		Yield per acre	Days to maturity		Yield per acre	Days to maturity
	bush. lb.	bush. lb.		bish. lb.	bush. lb.	
Victory	55 05	69 17	103	44 29	52 07	103
Banner Ott. 49	48 29	67 22	103	52 32	59 08	102
Leader	54 14	64 24	104	53 23	53 00	103
Gopher	59 19	63 22	96			
Laurel Ott. 477	54 27	59 20	96	51 29	44 04	98
Liberty Ott. 480	39 12	47 09	95	25 00	30 24	98

Liberty and Laurel are hulless varieties.

BARLEY

The results from barley varieties were much more reliable from the rod-row tests this year than from the larger plots. This was due to the great variation in the soil of the large plots, which was not overcome by the number of replicates in use. In the rod-row tests eight replications were used and stands in all were good, which allows for reliable deductions. A five-year average of results places Trebi and Hannchen at the head of the list. Trebi is primarily a feed barley which produces exceptionally well over a large district. Hannchen also yields well, but where the straw grows tall is inclined to go down, making harvesting difficult. Chinese Ottawa 60, a variety somewhat like O.A.C. 21, has yielded lower than the latter this year but stands high on the average. These two appear to be most popular for malting purposes in Canada at the present time. Bearer is also a six-rowed type but is considerably later than O.A.C. 21. Himalayan, a hulless barley, has yielded very well this year and is early. This should be a very good variety for use in combating wild oats. We have grown velvet for three years only, but to date it has not yielded as well as O.A.C. 21. It has the advantage over the latter of having no barbs on the awns, which makes the straw more valuable for feed.

Following is a table giving the yields for this year and also a five-year average. A five-year average of days to mature is also shown.

BARLEY VARIETIES

Variety	Type	1929 Yield per acre	5-year average	
			Days maturing	Yield
		bush. lb.		bush. lb.
Trebi	6-row	63 02	97	64 40
Hannchen	2-row	61 43	102	64 12
Chinese Ott. 60	6-row	50 05	98	58 45
O. A. C. 21	6-row	54 11	97	56 00
Bearer Ott. 475	6-row	50 33	100	55 19
Himalayan Ott. 59	6-row	67 39	92	53 02
Velvet	Hulless 6-row	53 02		

PEAS

The yields of peas were reduced more than other cereals by lack of rainfall and they matured about a week earlier than normal. The sample of threshed peas was good, though smaller in size than is usual. Lemaire, a very early

variety, gave the largest yield this year but in a four-year average is low. It can be recommended only for conditions which require a very early ripening variety. Mackay yielded well in comparison this year and is high in the average. It is to be recommended for most conditions. Field peas where grown in the West are used almost entirely as hay and for this purpose Mackay is hard to surpass. In a mixture of peas and oats, which is the common method of growth, they ripen at about the same time as Banner or Victory oats. Dashaway and Chancellor, which are both small peas, have yielded well and are considerably earlier than Mackay.

Following is a table showing the yields and days to mature of the various varieties for 1929 and a four-year average.

PEA VARIETY YIELDS

Variety	1929 results		4-year average		Remarks on grain
	Yield per acre	Days to maturity	Yield per acre	Days to maturity	
	bush. lb.		bush. lb.		
Mackay Ott. 25	17 10	97	33 15	108	Creamy, large.
Dashaway	15 30	90	32 13	99	White, small.
Prussian Blue	14 10	96	31 55	106	Blue, medium.
Champlain Ott. 32	16 30	96	31 01	107	White, large.
Chancellor Ott. 26	17 30	93	30 59	100	White, small.
Cartier Ott. 19	16 40	97	30 53	107	White, large.
Arthur Ott. 18	15 10	97	30 18	106	White, large.
Lemaire	18 20	93	30 11	85	White, medium.

BEANS

All the field beans did well this year with the exception of Navy, ripening before frost and yielding well. Norwegian, Beauty, Burbank, and Large White can be recommended for these conditions. Norwegian is the highest yielder and produces a good quality cooking bean though brown in colour. Beauty is a small white pea bean with a yellow spot at the eye (hilum). Burbank is a small white bean and Large White a large white bean. Navy is a medium-sized white bean but rather late for these conditions.

FLAX

Four varieties of flax, namely, Premost, Novelty, Crown, and Linota, were under test this year. All yields were low due to the dry season but the quality of grain was excellent. Any one of the above varieties should prove satisfactory for grain production though Linota is recommended where flax wilt is prevalent.

CO-OPERATIVE WORK WITH CEREALS

The co-operative work with various varieties of cereals has been extended considerably during the past season. Tests were conducted by forty-three farmers at various points in our district and in most cases the information gained was reliable. Most co-operators tested six varieties of oats and barley as well as wheat this year and some of the new early sorts give good promise for the north and eastern parts of this district. After two more years of reliable results we hope to be able to make fairly accurate recommendations as to the most suitable varieties for the various zones. The present information on wheat varieties is quite reliable and while we cannot make any general recommendations in this regard, we can advise farmers in specific districts as to the most suitable variety for them to grow.

FORAGE CROPS

Due to a plentiful supply of moisture during June and lack of rainfall the remainder of the growing season, perennial and biennial grasses and clovers did much better this year than annuals. The annual hay crops were only well started in growth when checked by dry weather and produced low yields as a consequence. Corn, sunflowers, and roots yielded low as they make a great deal of their growth late in the season and require abundant moisture for normal development. Sunflowers had practically stopped growth and commenced to shed their lower leaves early in August and, while corn did not visibly suffer so much, the growth was checked late in the summer. The stands in the root variety tests were exceptionally good but the roots very small and the yields much below average. There were no damaging frosts until September 6 which allowed ample time for good growth of most tender forage crops produced here.

ANNUAL HAYS

No annual hay crop tried at this Station gives as certain a crop or as good a yield as common oats cut before matured and fed in the sheaf. Some of the millets do quite well but are readily frozen and do not yield as well as oats. A summary of trials with oats and barley for hay are given in the following paragraphs and tables.

OATS AND BARLEY FOR ANNUAL HAY

Eight varieties of oats and Feeder, an awnless variety of barley, have been tested for a number of years as annual hays. The varieties of oats include the standard and late sorts and some of the common early and mid-early types. The highest yields were obtained from the later varieties, as Victory and Banner, and the quality of feed in most cases was excellent. The Feeder barley produced a good quality of feed but yielded lower than most of the oats. A four-year average of yields of the various varieties as cured hay is as follows:—

RESULTS OF TESTS OF OATS AND BARLEY FOR ANNUAL HAY

Name of variety	Cut when heading		Cut two weeks later		Cut when turning		Average of three stages	
	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Victory	1	1,821	2	806	2	1,869	2	832
Gerlach	2	32	2	686	2	1,594	2	771
Gold Rain	1	1,772	2	1,050	2	1,407	2	743
Banner	1	1,739	2	403	2	1,844	2	662
Leader	1	1,628	2	547	2	1,118	2	431
Longfellow	1	1,222	2	36	2	1,209	2	156
Alaska	1	1,258	2	356	2	805	2	140
Feeder barley	1	1,108	2	753	2	427	2	96
Liberty	1	820	1	1,571	2	393	1	1,594
Average	1	1,489	2	468	2	1,185	.....	

In the above table the average yields for the various varieties are shown at three stages of cutting. The yields have gradually increased as the stage of maturity advanced excepting with the barley where there was a decrease after the second cutting. The highest total yield was obtained at the stage when the grain was turning colour and the fodder was still fairly palatable and appeared to be of good feeding value. We would, therefore, conclude that,

unless for special feed, it is best to cut oats for hay when they are turning colour. With Feeder barley the largest yield is obtained before the turning stage and in any case it should be cut rather green as the heads shatter very easily. The loss of a great deal of the grain at the last cutting may account for the loss in weight to some extent.

DATES OF SOWING OATS AND FEEDER BARLEY FOR HAY

Banner oats and Feeder barley have been sown at week intervals commencing about the last week in May in each case and the last sowing being made about the last of June. All plantings were cut when turning colour.

Following are the yields of cured hay from the different dates of sowing, averaged for six years:—

RESULTS FROM DIFFERENT DATES OF SOWING OATS AND BARLEY FOR ANNUAL HAY

Date of sowing	Oats, 6-year average		Barley, 6-year average	
	tons	lb.	tons	lb.
1st date	2	515	2	110
2nd date	2	762	1	1,717
3rd date	2	241	1	1,873
4th date	2	50	1	1,537
5th date	1	1,701	1	1,360
6th date	1	1,646	1	1,334

After the first two sowings the yield of oat hay has decreased with each succeeding date. The quality of the hay from the later sowings is also often inferior to the earlier ones, due to rust or early fall frosts. The earliest sowing of barley has given the highest yield but variation between succeeding sowings has been rather erratic. Rainfall has a greater influence on the yield of barley hay due to its shallow rooting habit, which accounts for the irregular variation in yield between dates. For this reason it is impossible to definitely advise the best date to sow barley but if the only motive is to obtain feed we would recommend sowing as early as possible.

Where oats or barley are grown for green feed and to control weeds, the final yield must be given secondary consideration. Late sowing for this purpose is necessary and from the results obtained at this Station we assume that either oats or barley can be sown with fair assurance of a crop until nearly the end of June. The menace from rust and frost is greater from late sowings however.

MIXTURES OF PEAS AND OATS FOR HAY

Where a pea and oat mixture is desired in the drier areas in the West, it is best to sow the peas at least one week earlier than the oats. In most seasons this results in the oats being sown as the peas are emerging from the ground. It has been found that by sowing in this manner the peas are able to compete with the oats in regard to moisture and sunlight. When sown at the same time the oats invariably outdistance the peas in growth and because of shading and depletion of moisture the pea vines are small and weak. This can be overcome somewhat by sowing a higher percentage of peas than oats but the peas in this case are likely to fall to the ground from lack of support. Mackay peas and either Victory or Banner oats make a desirable combination, the pea pods being well filled when the oats are turning.

The following table shows the yields for three years of the various mixtures and methods of sowing peas and oats:—

YIELDS OF DIFFERENT MIXTURES OF PEAS AND OATS FOR HAY

Mixtures by weight	Remarks	Yield per acre							
		1927		1928		1929		Average	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.
Peas alone		5	1,273	2	799	1	1,733	3	62
Peas 7, oats 3	About 42 per cent pea vine	5	1,388	3	1,025	1	1,133	3	1,182
Peas 5, oats 5	About 26 per cent pea vine	3	251	1	548	1	1,916	2	238
Peas 3, oats 7	About 12 per cent pea vine	2	1,416	3	1,473	1	1,382	2	1,424
Alternate rows	About 42 per cent pea vine	4	363	3	1,438	1	1,587	3	463
Oats one week late	About 60 per cent pea vine	4	1,905	3	479	2	278	3	887
Oats two weeks late	About 72 per cent pea vine	3	1,986	5	328	1	866	3	1,060
Oats alone		5	11	4	1,563	2	32	3	1,869

The above yields are all for cured hay and all mixtures were cut when the oats were turning colour at which time also the peas were well filled. The oats alone have given the highest yield but where a mixture was used the early sowing of peas and the high percentage of peas in the mixture have yielded highest.

METHODS OF SOWING GRASSES AND CLOVERS FOR HAY AND SEED

Western rye grass, brome grass, alfalfa and sweet clover have been sown broadcast and in rows with a nurse crop and alone for hay and seed. The following summary tables give a synopsis of the results derived from several years' trial:—

WESTERN RYE GRASS

The following table gives a six-year average of cured hay and seed yields for the first and a three-year average for the second year crops:—

Method of sowing	1st year crop				2nd year crop			
	Nurse crop		Sown alone		Nurse crop		Sown alone	
	Hay	Seed	Hay	Seed	Hay	Seed	Hay	Seed
	lb.	lb.	tons lb.	lb.	tons lb.	lb.	tons lb.	lb.
Broadcast	1,684	300	1 1,176	443	1 54	355	1 499	501
6-inch rows	1,737	317	1 1,959	539	1 352	341	1 447	495
24-inch rows	1,208	221	1 1,201	700	1 782	482	1 1,088	549
30-inch rows	1,401	291	1 808	623	1 498	572	1 589	443
36-inch rows	1,081	213	1 691	478	1 427	500	1 572	452

By the above table it can be seen that though the yield is considerably larger from the grass seeded alone the first year, the yields from the two treatments tend to equalize the second year. The loss of the nurse crop the year sown, and the difficulty of checking weeds the same year more than offset any advantage in the first year hay crop and we recommend seeding rye grass with a nurse crop. The yields do not vary greatly between broadcast or wide spaced rows but when sown in rows the grass must be cultivated to kill weeds which is an added expense with not sufficient added return. We recommend seeding broadcast or in six-inch rows. Seed production does not vary greatly under the different methods and the same recommendations as for hay would be applicable.

BROME GRASS

The following table gives a six-year average of cured hay and seed yields for first, and a three-year average for second year crop:—

Methods of sowing	1st year crop				2nd year crop			
	Nurse crop		Sown alone		Nurse crop		Sown alone	
	Hay	Seed	Hay	Seed	Hay	Seed	Hay	Seed
	lb.		tons lb.	lb.	tons lb.	lb.	tons lb.	lb.
Broadcast	1,560	Failure	1 338	145	0 1,857	149	1 378	154
6-inch rows	1,605		1 1,199	235	0 1,788	158	1 914	147
24-inch rows	1,070		1 708	370	1 202	252	1 885	251
30-inch rows	821		1 306	379	0 1,848	295	1 460	337
36-inch rows	572		1 5	375	0 1,409	280	1 169	300

The difference in yield between brome sown with a nurse crop and brome sown alone are greater than with rye grass but even here the variation is not great enough to compensate for the loss of the nurse crop. Brome seed, being very light, is difficult to sow evenly unless mixed with heavier seed. When sown with a nurse crop the grass seed and grain can be mixed and the grain will aid in even feed through the drill. The wide spaced rows show no advantage in yield of hay over thicker seeding. Seed yields are somewhat better where sown in rows but at this Station are very low the quality of seed produced poor. The nurse crop sowing produced practically no seed stalks the first year and no seed was harvested.

SWEET CLOVER

The following table gives a five-year average of cured hay and seed yields for sweet clover:—

Method of sowing	Sown with a nurse crop		Sown alone	
	Hay	Seed	Hay	Seed
	tons lb.	lb.	tons lb.	lb.
Broadcast	1 1,175	774	2 168	620
6-inch rows	1 1,237	777	1 1,973	685
24-inch rows	0 1,959	577	1 1,734	425
30-inch rows	0 1,690	832	1 1,461	550
36-inch rows	0 1,732	992	1 1,429	640

As the above table indicates, the yields are somewhat higher where the sweet clover was sown alone. The quality of the hay for feed was however poorer, being coarse and not so palatable. This was particularly noticeable where sown in wide spaced rows. Where the sweet clover forage can be used for ensilage purposes the coarseness is not so objectionable but where it is to be used for hay the finer stalks are desirable. Sowing sweet clover in rows for hay is not advisable for the reason mentioned above. Seed yields are higher where a nurse crop has been used and no marked increase in yield is indicated from sowing in rows rather than broadcast or in six-inch drills.

ALFALFA

The following table gives a three-year average of cured hay and seed yields for first year and second year alfalfa:—

Method of sowing	1st year crop				2nd year crop			
	Nurse crop		Sown alone		Nurse crop		Sown alone	
	Hay	Seed	Hay	Seed	Hay	Seed	Hay	Seed
	tons lb.	lb.	tons lb.	lb.	tons lb.	lb.	tons lb.	lb.
Broadcast	1 919	50	1 1,662	43	1,256	25	0 1,320	35
6-inch rows	1 1,172	14	1 1,717	67	1,326	37	0 1,534	35
24-inch rows	1 651	51	1 1,981	33	1,962	52	1 497	35
30-inch rows	1 290	47	1 1,883	27	1,792	47	1 115	30
36-inch rows	0 1,892	33	1 545	33	1,793	80	1 307	60

The above figures do not show sufficient increase from sowing alone to forego the loss of the nurse crop. Alfalfa develops very slowly the first year in most cases which increased the problem of keeping weeds in check until the alfalfa plants can keep them down. We do not recommend sowing alfalfa alone for hay production. Seeding in rows will usually produce a higher yield than the thick sowing, particularly in a dry season. When the work of cultivating between the rows and the greater amount of dirt which gets in the hay from this cultivation is considered, this method cannot be recommended for hay production. Seed production has been practically a failure with the Grimm strain which was used in this experiment.

ENSILAGE CROPS

SUNFLOWERS

Seven strains of sunflowers were tested this season all of which yielded low due to lack of rainfall. The variation in yield between early and late sorts was less this year than usual due to a limited supply of moisture which was equal for all. The late coarse growing types as represented by the Russian Giant and Mammoth Russian yielded highest, however, and for ensilage purposes are to be recommended for this district. When not thinned in the rows the coarse growing habit is somewhat curtailed and the final yield is affected very little.

CORN

Seventeen varieties or strains of corn were grown this year in a uniform trial. The yields were very low but the stage of maturity reached at harvest time was better than for several seasons. The low yield resulted from the dry season; and the late fall frosts allowed for longer growth and considerably better maturity. A variety of corn which produces a good tonnage of fodder and reaches a fair stage of maturity appears to be best suited for this district. The Northwest Red Dent fills this purpose and others such as North Dakota White Flint are also very suitable. These varieties will produce a good tonnage of fodder and the ears are usually well filled at harvest time.

ROOTS

The yields of all varieties of field roots were low this year. Roots make their greatest growth during late summer and early fall and the decided lack of moisture at this time prevented normal development. Germination was even and stands at thinning time were excellent with the exception of the mangels which suffered to a small extent from cut worms. All roots were planted on May 23 in rows 30 inches apart. Carrots were later thinned to six inches between plants and other roots to one foot. Harvesting was done during September.

SWEDES

Fourteen varieties of swedes were under test representing various types and from different sources. Ditmars from McNutt, Kangaroo from Steele Briggs, and Invicta from Rennie gave the highest yields in the order mentioned. The highest yield was twelve tons per acre which is about half a normal crop at this Station. Swedes are one of the most certain root crops grown here and keep well in storage.

FALL TURNIPS

Fourteen varieties of turnips were tested, representing various types in shape and earliness. Early Six Weeks from Sutton, and Purple Top Mammoth from the same source were among the highest yielders and represent a very early and a later type. Early Six Weeks makes a very rapid growth and is fit for use before most other varieties. The best quality turnips for storage, however, are the Aberdeen or Hardy Green Round which will keep nearly as well as the swedes. The other varieties must be used in their season which is early in the fall when they are sown in May.

MANGELS

Ten varieties of mangels were tested and those worthy of mention in regard to yield were Giant Yellow Oval from Steele Briggs, Giant Rose from McKenzies and Eclipse from McKenzies. All are good quality mangels and will keep well in storage if carefully harvested. Due to their habit of growing a good part out of the ground, all mangels excepting the long types are easily harvested which is a consideration in the labour question. They are generally preferred to swedes for feeding dairy cattle, due to the danger of tainting the milk with swedes if not fed carefully.

CARROTS

Four types of carrots were under test, Danish Champion, a medium long, yellow carrot, gave the highest yield and was also the best quality. White Intermediate and Improved Short White also yielded well but were much coarser, being quite branched in some cases.

POULTRY HUSBANDRY

The correspondence received at this Station during the past year in reference to Poultry Husbandry has shown a marked increase, especially in regard to methods of feeding, housing, treating disease, and inquiries for breeding stock.

The farm flock, consisting entirely of Barred Plymouth Rocks, totalled on December 1, 1929, 584 birds, including 9 cocks, 58 cockerels, 216 hens, and 301 pullets.

During the year 1929 the following poultry has been sold for breeding purposes: 33 cockerels, 140 yearling hens, and 71 pullets.

The number of day-old chicks sold was 900 and the number of hatching eggs sold totalled 3,656 eggs. Besides this there were a number of orders received which we were unable to fill.

A pen of Barred Plymouth Rock pullets was entered in the 1928-29 Saskatchewan Egg-Laying Contest. The birds numbered 1 to 10 inclusive and laid 1,759 eggs with 1,807.1 points. Three birds qualified for registration.

All birds are trap-nested and only those which have laid over 175 eggs in their pullet year with an egg size of 24 ounces or over per dozen are retained for breeding purposes.

PULLORUM DISEASE, FORMERLY KNOWN AS BACILLARY WHITE DIARRHOEA

On August 30, 1929, blood samples were taken from 100 yearling hens and sent to the Capital Laboratories at Ottawa for testing and there were no positive reactors to this disease. On September 24, 200 more blood samples were taken from hens and cock birds in the flock with three positive reactors. The reactors were birds returned from the Egg-Laying Contest and were immediately disposed of.

FIRST FLOOR VS. BASEMENT FOR INCUBATION

Two Imperial incubators of 380-egg capacity each were used in this test. The eggs were taken from different pens and, where possible, eggs from the same hens were put in both incubators so that, as far as eggs were concerned, the test was as fair as we could make it. The incubators were given regular and careful attention by the same man. They were set on the same day and handled in the same manner. Two hatches were taken off on the first floor and two in the basement.

The results show that the percentage of fertile eggs hatched on the first floor was 74·8 and 73·4, respectively, while in the basement the percentage was 76·9 and 78·3, respectively. The relative humidity readings on the first floor ranged from 49 to 60 and from 45 to 58, respectively, while in the basement the relative humidity readings were from 50 to 60 and 58 to 66. From the above results we conclude that there is a variation of a few per cent in favour of the basement which may be accounted for in that the relative humidity readings were slightly higher in the basement. This brings forth the great importance of the regulation of the supply of moisture in incubation. We also found that the temperature was more difficult to regulate over night on the first floor which may partially account for the higher percentage of chicks dead in shell in these incubators. The live chicks were strong and healthy with very few cripples in any of the four incubators.

—	Total number eggs set	First test			Second test		Total hatched	Cripples	Put in brooder	Per cent fertile	Per cent fertile hatched	Per cent total eggs hatched	Number of eggs for chick to brooder
		Infertile	Blood rings	Left in	Dead germs	Left in							
Pullets	1,995	608	72	1,315	104	1,211	932	50	882	69·5	67·2	46·7	2·26
Hens	4,136	1,375	113	2,648	169	2,479	1,954	86	1,868	66·8	70·8	47·2	2·21
Buckeye	2,942	882	60	2,000	146	1,854	1,448	63	1,385	70·0	70·3	49·2	2·12
Imperial	2,368	780	88	1,500	79	1,421	1,147	28	1,119	67·1	72·3	48·4	2·12
Cyphers	821	321	37	463	48	415	291	45	246	60·9	58·2	35·4	3·34
February	979	262	73	644	75	569	410	25	385	73·2	57·2	41·9	2·54
March	2,738	850	58	1,830	121	1,709	1,370	42	1,328	69·0	72·6	50·0	2·06
April	2,012	719	54	1,239	44	1,195	979	54	925	64·3	75·7	48·7	2·18
May	402	152	0	250	33	217	127	15	112	62·2	50·8	31·6	3·59

Discussion.—The hens showed a slightly higher percentage of fertile eggs hatched and total eggs hatched than the pullets. The chicks from the hens, on the average, were stronger and less mortality occurred among them during the first two months after they were hatched. The higher percentage of fertile eggs among the pullets can be accounted for in that they were flock mated, whereas the hens were all in single mating pens and in the single mating pens two males proved to be unsatisfactory as breeders. This brings forth a factor of vital importance; that is, the use of a strong, healthy, vigorous male of the desired type and conformation in order to increase the percentage of fertile eggs, lessen the percentage of dead germs, and increase the percentage of strong vigorous chicks hatched.

In comparing the three incubators, Buckeye, Imperial, and Cyphers, the Buckeye and Imperial gave the best results and there was very little difference in the results from these machines. They were easy to regulate, and the number of eggs required for one chick to brooder was 2·12 eggs for both Buckeye and Imperial while the Cyphers required 3·34 eggs for one chick under the same conditions. The Buckeye and Imperial are hot water machines while the Cyphers is a hot air machine. In the case of the latter machine, we found it difficult to regulate unless the temperature was kept very constant in the incubator cellar. The Buckeye and Cyphers machines have been in operation for a period of years whereas the Imperial has been used for only two seasons.

In regard to the most suitable month for hatching, from all records at this Station the month of April appears to be the best and March second. From this we may draw the conclusion that from the 15th of March to the 15th of April is the ideal time to set the incubator providing suitable accommodation is available for the baby chicks. For the months of February and May the percentage of fertile eggs hatched was low, 57·2 and 50·8 per cent, respectively, while the percentage fertile eggs hatched was 72·6 and 75·7 per cent, respectively, for March and April. The very changeable weather during the month of May may partially account for the very poor hatch. The farmers in the vicinity of the Station who depend on hatching their chicks in May reported a very high percentage of infertile eggs, weak germs, and a high percentage mortality among the baby chicks during 1929. The high percentage of fertile eggs in the month of February may be accounted for in that the males had just been introduced to the pens a few weeks previously.

CRATE FATTENING EXPERIMENTS

A comparison of various proportions of similar feeds for fattening cockerels: On June 27 thirty-six cockerels were divided into three lots of twelve birds each, as nearly alike as possible in regard to weight, general thrift, and breeding.

These lots were placed in fattening crates and fed wet mashes at the rate of one-half meal to one-half skim-milk. The mashes were mixed several hours before feeding time. Complete records were kept of the weights of all the mash fed and at each feeding all that was not consumed was removed and weighed again. The mash was fed at 7 a.m., 11.30 a.m., and 6 p.m. daily.

The three lots were fed as follows:—

Lot 1—One-third shorts, one third hulless barley chop, and one-third hulless oat chop.

Lot 2—One-third shorts, one-half hulless barley chop, and one-sixth hulless oat chop.

Lot 3—One-third shorts, and two-thirds hulless barley chop.

The following table summarizes the results:—

RESULTS OF CRATE FATTENING EXPERIMENT

—		Lot 1	Lot 2	Lot 3
Number of birds		12	12	12
Average initial weight	lb.	3·22	3·26	3·40
Average finished weight	"	3·99	4·11	4·10
Average gain	"	0·77	0·85	0·70
Average dressed weight	"	3·65	3·75	3·76
Average dressed weight	%	91·5	91·2	91·7
Amount of mash consumed	lb.	32·4	34·6	33·6
Cost of feed consumed	$	0·42	0·44	0·39
Average cost per pound gain	$	0·045	0·043	0·046
Selling value of each lot at 30 cents per pound	$	13 14	13 50	13 54
Profit over initial value ot 20 cents per pound and cost of feed	$	4 98	5 25	4 86
Average profit per bird	$	0 42	0 44	0 41

Feed prices on which the above values are based:—

Shorts	$ 1 40 per 100 pounds
Hulless barley chop	1 04 per 100 pounds
Hulless oat chop	1 53 per 100 pounds

Lot 2 which received one-third shorts, one-half hulless barley chop and one-sixth hulless oat chop, made a gain of 1·8 pounds more than lot 3 and only 0·96 pound more than lot 1.

Practically all of them consumed the same quantity of feed during this period.

Lot 2 shows a profit of 2 cents per bird over Lot 1 and 3 cents over Lot 3.

A second experiment was carried on similar to the first except that in this case different feeds were used for fattening the cockerels. On September 9 the experiment was begun and continued for a period of fourteen days, sixty cockerels being divided into five lots of twelve birds each, as nearly alike in all respects as possible.

The feeding methods were the same as in the previous experiment. The five lots were fed as follows:—

Lot 1—One-third oat chop, one-third barley chop and one-third shorts.

Lot 2—One-third oat chop, one-third hulless barley chop, and one-third shorts.

Lot 3—One-third hulless oat chop, one-third barley chop, and one-third shorts.

Lot 4—Two-thirds IXL flour and one-third shorts.

Lot 5—One-third hulless oat chop, one-third ground wheat, and one-third shorts.

Lot 1 made a total gain of 11.2 pounds with an average gain per bird of 0.93 pound.

Lot 2 made a total gain of 9.1 pounds with an average gain per bird of 0.76 pound.

Lot 3 made a total gain of 12.4 pounds with an average gain per bird of 1.03 pounds.

Lot 4 made a total gain of 7.4 pounds with an average gain per bird of 0.62 pound.

Lot 5 made a total gain of 8.2 pounds with an average gain per bird of 0.68 pound.

Deductions—Lots 1 and 3 compare very favourably. They relished their mash more than the other three lots. In previous experiments comparing common and hulless oat chop there was a more marked difference in the gains made by the two lots, those receiving hulless oats making far more rapid gains than those receiving common oats. The similarity in the present two lots may be accounted for in that the percentage of hull was fairly low in the common oats as compared with previous years. Lot 4 which were fed a mash consisting of IXL flour and shorts consumed very little of this feed. At the beginning of the experiment it appeared to be too heavy in texture and required very little of it to satisfy their appetites.

APICULTURE

On the first examination in the spring, twenty-seven colonies of the fifty-eight put into winter quarters were found to be dead. It might be noted that every colony wintered by means of a double brood chamber failed to live through the winter. Of the remaining thirty-one, four were queenless and these were united. One colony was kept at Dr. Seager Wheeler's farm, four colonies were moved to the farm of A. E. Brooks, one colony was moved to Hague and the remaining twenty-one left at the Station. Throughout the season there was an increase of four colonies and this brought the total number of bees in the apiaries up to thirty-one colonies. One of these was badly affected with sacbrood and had to be united with one of the stronger colonies. No package bees were imported as it was thought that the available pasture was not sufficient for more than this number.

OUT-APIARIES

Out-apiaries were situated on the farm of Dr. Seager Wheeler, six miles east of the Station, on the farm of A. E. Brooks, two miles west and two miles north of the Station, and on the farm of A. E. Klaassen at Hague, a distance of fourteen miles. With an examination every ten days, the colonies situated near an abundance of feed all returned a substantial surplus of honey.

HONEY CROP

A very striking example of the importance of sweet clover as a honey producing crop was seen in the out-apiary at the farm of Dr. Seager Wheeler. In 1928 Dr. Wheeler had a field of sweet clover which he kept for seed. There were eight colonies of bees in the out-apiary at his farm that year from which was harvested approximately 600 pounds of honey. In 1929 there was no sweet clover in that locality within reach of the bees and although we had only one colony in that apiary it was necessary to feed them in order to keep them alive. At the Station apiary where pasturage is scarce the average weight of surplus honey stored was forty-one pounds. At the farm of A. E. Brooks where the pasturage was more abundant and yet not sufficient, the average weight of surplus honey was sixty pounds. On the farm of A. E. Klaassen the pasturage was quite sufficient and a surplus of one hundred and thirty-three pounds was stored. In all three cases continued dry weather during the latter part of June and all of July and August materially diminished the possible crop.

The honey was of uniform quality and a report from the University of Saskatchewan showed the honey to have a specific gravity of 1·408 and a moisture content of 19·8. The colour was very fair and the flavour reasonably good.

STUDY OF HONEY FLOW

On May 30 an overwintered colony was placed on scales and the weight recorded every morning at seven o'clock. The table below gives a summarized record of the information obtained from this hive:—

DETAILS OF HONEY PRODUCTION

Month	Number of colony	Number of days showing gain	Number of days showing gain of 1 pound or more	Total gain or loss	Average daily gain	Chief source
				lb.	lb.	
May (2 days).....	233	.....	.....	.....	.....	
June (30 days)....	233	13	8	12·5	0·62	Dandelion, fruit blossom, and flowering shrubs.
July (31 days)....	233	21	17	76·25	2·62	Sweet clover, white Dutch clover, snowberry, and garden flowers.
Aug. (20 days)....	233	7	4	3·0	0·15	Sweet clover, sunflowers, garden flowers.

This colony on scales showed:—

(1) There were two definite flows during the season:—

(*a*) From June 7 until June 20 during which time dandelions, fruit trees, and caragana were in bloom;

(*b*) From July 5 until August 4 during which time sweet clover, white Dutch clover and garden flowers were in bloom.

(2) There were also two definite periods of consumption over production:—

(*a*) From June 21 till July 4 when the average daily consumption was 0·38 pound;

(*b*) From August 5 when the main flow ended until August 20 when the colony was removed from the scales.

The lowest noon shade temperature at which a gain was made was 57·6 degrees Fahrenheit.

SWARM CONTROL

During the season of 1929 two methods of swarm control were used:—

(1) Dequeening and requeening. All colonies that showed preparations for swarming by having larvae in queen cells were treated by removing the old queen and destroying all queen cells. Nine or ten days later all queen cells were again destroyed and a young laying queen introduced.

(2) Raising brood, known as the Damaree system. When a colony had made preparations for swarming by having larvae in queen cells, all brood was raised from the brood chamber to an upper super, leaving the old queen in the original brood chamber on empty combs. A queen excluder was then placed over the brood chamber and ten days later the upper brood chamber examined for cells and any being found were killed.

As in the past these methods were effective although three swarms issued. Queen cells were allowed to mature in the upper super of two of these colonies and consequently swarms issued. The third swarm issued from a colony sixteen days after treatment by the second plan. The original brood chamber had not been examined after treatment.

WINTERING ARRANGEMENTS

No wintering arrangements were made this season as it was thought advisable to kill all the bees instead of wintering them as in former years.