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 1930

Four o'clock.

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DOMINION EXPERIMENTAL STATION ROSTHERN, SASK.

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SEASONAL NOTES

The outstanding features of the season of 1930 were:—

1. Absorption of practically all the snow water, due to the dry and therefore unfrozen condition of the soil.
2. No interruptions from bad weather to prevent early seeding.
3. Enough rain during May and June to develop strong growth.
4. Dry weather in late July and August and September to hasten ripening, harvesting, and threshing.
5. A snowstorm on October 15 and 16 which soaked any grain in stook.
6. A remarkably mild autumn and early winter. The average temperature for December, 1930, was 18·7 degrees Fahrenheit. The average temperature for December for the previous 19 years was exactly zero.

The result of such a combination of circumstances was a grain crop seeded under favourable conditions, maturing early, and yielding above average and of very superior quality, if threshed before the snowstorm.

Hay crops were about average in yield but the dry weather at haying time insured a high quality crop.

Ensilage and root crops including potatoes did not fare so well. The dry weather during July, August, and September resulted in low yields in all these crops.

METEOROLOGICAL RECORDS AT ROSTHERN, 1930

Month	Temperature F.				Precipitation				Evaporation
	Highest	Lowest	Mean 1930	Mean 20-year average 1911-1930	Rain	Snow	Total precipitation 1930	20-year average 1911-1930	1929
	°	°	°	°	in.	in.	in.	in.	in.
January	19·0	−50 0	−10·4	− 3·5	.....	4·0	0·40	0·72	.....
February	37·5	−37·0	10·3	2·6	0·25	7·5	1·00	0·45	.....
March	41·0	−20·8	18·1	14·8	.....	14·5	1·45	0·65	.....
April	65·1	14·4	41·7	37·0	0·38	.....	0·38	0·91	.....
May	81·5	22·8	48·7	50·2	1·09	.....	1·09	1·56	3·00
June	90·2	35·0	61·4	59·4	2·47	.....	2·47	2·27	3·97
July	90·2	45·1	65·6	63·7	2·44	.....	2·44	2·65	4·26
August	94·5	30·5	65·3	61·0	0·42	.....	0·42	1·78	5·08
September	83·9	23·0	51·4	50·3	2·73	.....	2·73	1·63	3·23
October	68·2	− 1·0	33·5	37·6	0·65	27·0	3·35	1·52	.....
November	52·4	− 5·2	23·3	20·8	.....	1·0	0·10	0·55	.....
December	36·9	−14·0	18·7	0·9	.....	4·0	0·40	0·58	.....
Totals	.....	.....	.....	.....	10·43	58·0	16·23	15·27	19·54

ANIMAL HUSBANDRY

HORSES

The horses on December 31, 1930, at this station, consisted of twenty-one head. Thirteen were draught geldings and mares, one aged general purpose mare, four three-year-old colts, one two-year-old colt and two yearling colts.

The above colts were bred and raised at this Station, and were sired by the Clydesdale Stallion, Oxbow Bruce. During the past year, no breeding work has been carried on with horses. The horses are kept chiefly for the general farm work, and work on the rotation and experimental plots.

COST OF HORSE LABOUR

The following table gives the cost of feed and maintenance and the total number of hours of horse labour performed for the different divisions during the year 1930:—

Number of work-horses		14
Average value of each horse	$	150 00
Total work done during year by 14 horses	hrs.	18,731
Hours labour per horse	hrs.	1,338
Cost of feed for 14 horses—		
70,132 pounds hay at $7 per ton	$	245 46
57,478 pounds oats at $1.18 per cwt	$	678 24
1,923 pounds bran at $1.40 per cwt	$	26 92
2 barrels salt at $6 per barrel	$	12 00
4 bushels flax at $2 per bushel	$	8 00
Total cost of feed for 14 horses for 12 months	$	970 62
Average cost of feed per horse for 12 months	$	69 33
Labour (stable attendance) 2,284 hours at 25 cents per hour	$	571 00
Horse labour 256 hours at 8 cents per hour	$	20 48
Interest (8 per cent on $2,100, value of horses)	$	168 00
Shelter, $15 per horse	$	210 00
Shoeing	$	6 00
Veterinary fees	$	20 00
Combs, brushes, etc	$	5 50
Harness repairs	$	51 19
Total cost	$	2,022 79
Cost per horse	$	144 48
Total cost of 18,731 hours of horse labour	$	2,022 79
Average cost per hour horse labour	cts.	10·8

DAIRY CATTLE

The dairy cattle on hand December 31, 1930, totalled fifty-one head of pure-bred Holstein-Friesian cattle. The males include two herd sires and eight bull calves under 1 year and the females include seventeen mature cows, five two-year-olds, eleven yearling heifers, and eight heifer calves.

SALE AND DISPOSAL OF STOCK

The cow Rosthern Pietje Rebecca 111762, born May 13, 1923, was shipped to Buffalo Park, Wainwright, Alberta, June 17, 1930, for cross-breeding work. The above cow as a two-year-old in R.O.P. test produced 10,383 pounds of milk testing 3·85 per cent butterfat in 365 days; as a four-year-old in R.O.P. test produced 12,583 pounds of milk testing 3·57 per cent butterfat in 360 days and as a six-year-old in R.O.P. test produced 11,912 pounds of milk average per cent butterfat 3·68 in 293 days. The above cow was a very good representative of the breed in type and conformation weighing approximately 1,450 pounds, and she showed the desirable characteristics which one wishes to find in a good dairy cow. Rosthern Mechthilde Lass and Rosthern Abbekerk Sylvia were sold for beef, as their period of usefulness was completed. Rosthern Pietje Dollie suffered from chronic metritis, making it necessary to dispose of her. The junior herd sire in 1929-30 was sold to a breeder of pure-bred Holstein-Friesian

cattle at Guernsey, Sask., and nine six-months-old bull calves were sold to farmers in the vicinity of Prince Albert, Birch Hills, and Yorkton. The majority of these bull calves were sold to farmers who had good grade Holstein herds, but a few went into pure-bred herds. Farmers and breeders who have purchased bulls from this Station are well pleased with the progeny. We are continuing the practice of retaining all the bull calves until they are six months old before making delivery. We have found this practice more satisfactory than attempting to sell bull calves at one or two months of age.

THE HERD SIRES

Braeburn Sir Francy 67868, born December 27, 1925, was purchased from a breeder of pure-bred Holstein cattle at Shaunavon, Sask. The above bull has sired a number of good typey heifers in two herds in the vicinity of Shaunavon. The above bull was sired by Strathmore K. McKinley an XX bull in Advanced Registry and a bull which has sired a number of two-year-olds which have qualified in R.O.P. The dam of Braeburn Sir Francy was Ruby Francy Abbekerk 103041 who had a yearly R.O.P. record as a five-year-old of 18,442·0 pounds of milk with a 4·59 per cent butterfat test. The above bull is of very good type, and has quite sufficient quality and smoothness, along with dairy temperament. During the coming year this bull will be entered in Advanced Registry. We are breeding the above bull to the daughters of Agassiz King Pietje Canary and Colony Wimple Sir Bessie.

Rosthern Sir Willie Wimple, junior herd sire.

Colony Wimple Sir Bessie 73928 was entered in Advanced Registry during the year 1930, and graded XX. This bull 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. Colony Wimple Sir Bessie has sired seventeen calves during the year, (ten bull and seven heifer calves). The calves were very uniform in type. He sired twin calves, male and female weighing respectively at birth 56 and 57 pounds. At two months they each weighed 170 pounds. The average weight of fifteen calves sired by Colony Wimple Sir Bessie was 85·2 pounds, the bull calves averaging 89 pounds and the heifer calves 79·5 pounds.

The junior herd sire is Rosthern Sir Willie Wimple sired by Colony Wimple Sir Bessie and out of the cow Rosthern Inferno Esther 154860, who produced 12,614 pounds milk in 305 days testing 3·62 per cent butterfat as a two-year-old on R.O.P., and her granddam produced in the mature class 20,000 pounds of milk with a 4·23 per cent butterfat test in 365 days.

Braeburn Segis McKinley 65885 sired by Strathmore K. McKinley 58304 and out of the cow Flossy Segis Ormsby —104695— was bred to a few cows in the herd during the summer of 1930. Flossy Segis Ormsby was a Gold Medal cow in Advanced Registry and as a five-year-old on R.O.P. in 365 days produced 26,991 pounds of milk, 1,066 pounds of butterfat testing 3·95 per cent, and as a four-year-old in the 305-day division produced 21,846·0 pounds of milk, 791 pounds of butterfat testing 3·62 per cent butterfat.

The Holstein-Friesian herd successfully passed its tenth accreditation test in November, 1930.

CONTAGIOUS ABORTION

(Project A. 660)

Blood samples were taken by a qualified veterinarian in May, 1930, from each individual animal in the herd. These samples were forwarded by him to the animal pathologist at Lethbridge for examination. On examination the herd gave negative reactions to the test, which confirmed the results of the previous year.

ADVANCED REGISTRY

There has been only one bull subjected to inspection under the Advanced Registry rules of the Canadian Holstein-Friesian Association during the year 1930, and he graded XX. In the herd at present are three "Gold Medal" cows, two "Excellent," and ten "Good." The intention is to have the remainder of the herd graded in the year 1931.

DEHORNING CALVES

The calves were dehorned when from ten days to three weeks old, depending chiefly upon the prominence of the small button, or horn. The caustic potash used in dehorning can be procured from a drug store. It should be kept in a closed container, so that it will not become exposed to the atmosphere, and precautions should be taken in handling the caustic potash that it does not come in contact with the flesh, as it will burn severely. It is advisable to wrap it in a piece of paper or cloth, leaving just the point of the pencil of caustic potash exposed. It is a good practice to clip the hair from around the buttons with shears or scissors, then rub carbolized salve or vaseline around the buttons and down the sides of the face of the animal. This is for the purpose of keeping the caustic potash from burning any other portion of the head which it may come in contact with through the blood, which may be carrying caustic potash. The next operation is to throw the calf and tie securely, then take a sharp knife and cut the top off one of the buttons. Immediately rub the point of the pencil of caustic potash into the centre of the button. Rub vigorously until there is quite a hollow in the centre of the button, then turn the head over and treat the other button or horn in a similar manner. This method of dehorning calves has been practised for a number of years at this Station with exceptionally good results. It is important to perform the operation thoroughly in order that there will be no chance of the horn growing, making it necessary to dehorn at a later date.

UDDER BALM AND TEAT DILATORS

Dr. Naylor's Udder Balm has been given a trial during the past two years in comparison to carbolized salve, as to its healing and antiseptic properties. The udder balm applied to cuts or sores appeared to have a great penetrating power, and it retained its natural condition until washed off previous to milking, whereas the carbolized salve appeared to dry immediately. In comparison the udder balm appeared to be far superior to carbolized salve for healing cuts or drying up sores on the udder, and it had a greater tendency to soften caked conditions on the udder.

Dr. Naylor's teat dilators are preferred to the wax teat dilators. In the first place, Dr. Naylor's teat dilators are easy to insert and they are easy to retain in the teat, whereas the wax teat dilators need to be straightened and quite often it is necessary to cut a piece off the end of them, and besides, the wax dilators become thin and drop out. Dr. Naylor's teat dilators are more sanitary in that they are removed directly from the balm and inserted in the teat, and there is less chance for irritation by using Dr. Naylor's teat dilators as compared with the wax teat dilators.

WHITES OF EGGS FOR YOUNG CALVES

Calves which are attacked with white scours or other derangements of the digestive system need regular and punctual attention. Whites of eggs have assisted greatly in removing this cause. As soon as calves showing symptoms of the above trouble are noticed, they are isolated from the remainder of the herd, and treatment administered immediately. The quantity of milk fed is reduced to one-half of the normal feed, and one hour previous to feeding milk the whites of three eggs are given. In all the whites of six eggs are given in one day. This is continued for two or three days or even longer, depending upon the nature of the infection. As soon as the calf appears quite normal, the number of whites of eggs given per day is gradually decreased and at the same time the quantity of milk fed is gradually increased until the calf is back to its normal quantity of milk. During the past two years we have received more beneficial results by using the whites of eggs than anything else which we have tried, providing they are given on an empty stomach at least one hour previous to feeding time. The whites of eggs are given alone, using a small drenching bottle for the purpose.

COD LIVER OIL TO PREGNANT COWS

To determine whether cod liver oil has any influence on the development of the foetus or the condition of the generative organs, the herd of breeding cows were divided uniformly into two groups. Group 1 to receive a tablespoonful of cod liver oil twice per week, commencing six weeks after the cow has been bred and continuing until one month previous to calving, while group No. 2 receives the same standard ration less the cod liver oil. This experiment has been outlined in co-operation with the Animal Pathologist, Lethbridge, for the purpose of trying to determine the seat of trouble, as to cows calving immature calves partially putrefied, and retained after-births. At a future date we hope to have some information on the effects of the cod liver oil.

SUMMER FEEDING

The dairy cows and heifers are pastured on brome, rye grass, sweet clover, and slough pastures. The cows prefer the brome grass pasture in June and July to the rye or slough grass. In the months of August and September when the brome grass pasture has been browsed closely, the cattle take to the rye grass and slough grass pastures. As for sweet clover pasture, the cattle take

well to it providing they have access to no other pasture. An increase in production is noticed when the cattle become accustomed to sweet clover. Sweet clover pasture has not been a dependable crop, and for that reason the acreage of sweet clover pasture has not been increased. Brome grass pasture has been found to be the most persistent and dependable grass and is relished more than the other grasses grown at the Station. An annual pasture such as green oats has given good results, and particularly so in a very dry year.

PERFORMANCE OF THE DAUGHTERS OF INFERNO WOODCREST AS TWO-YEAR-OLDS ON THE 305 DAY R.O.P' TEST

Name	Age	Number of days in lactation period	Total milk for period	Average per cent fat in milk	Butterfat produced in period
			lb.	%	lb.
Rosthern Inferno June	2 years, 160 days	305	11,375	3·91	444·76
Rosthern Inferno Aletha	2 years, 81 days	305	9,437	3·95	372·76
Rosthern Inferno Collie	2 years, 21 days	305	9,728	3·39	329·78
Rosthern Inferno Rosie	2 years, 14 days	305	9,407	3·56	334·89
Rosthern Inferno Esther	2 years, 186 days	305	12,614	3·62	456·63
Rosthern Inferno Edna	1 year, 320 days	305	10,400	3·82	397·28
Rosthern Inferno Polly	2 years, 167 days	305	11,038	3·56	392·95
Rosthern Inferno Louise	2 years, 329 days	305	8,854	3·38	299·27
Rosthern Inferno Effie	2 years, 4 days	305	11,265	3·64	410·05
Total for 9 head			94,118		3,438·37
Average for 9 head		305	10,457·6	3·65	382·04

Inferno Woodcrest, R.O.P. No. 485 which was granted in recognition of the fact that he has sired four or more qualified progeny, each being from a different dam.

RECORD OF THE PERFORMANCE OF THE COW "R.E.S. JOHANNA SYLVIA" GOLD MEDAL COW IN ADVANCE REGISTRY

Age	Number of days in milk	Total pounds of milk for period	Average per cent fat in milk	Pounds of fat for period
		lb.	%	lb.
2 years	365	15,219	3·41	518·97
3 years	305	12,336	3·87	477·40
5 years	365	11,439	4·30	491·88
6 years	365	17,314	4·1	709·87
7 years	362	15,070	4·0	602·80
8 years	359	13,008	3·8	494·30
9 years	305	11,617	3·59	417·05
11 years	280	10,864	3·4	369·38
Total	2,706	106,867		4,081·65
Average	338	13,358	3·82	510·21

The above table indicates continuity of production, evident good breeding qualities and consistency of performance, over an eight-year period. The above cow is now in her ninth lactation period, producing from May 14 to December 31, 1930, 8,411 pounds of milk.

MILK PRODUCTION OF PURE-BRED COWS

In the following tables is given a statement of the milk and fat production and feed consumption records for all cows and heifers which have finished a normal lactation period during the year 1930. The feed charges given in this table are for the feed eaten during the actual period of milking, no allowance being made for the dry period previous to calving.

The profit column shows a comparison only between the cost of feed and value of milk produced. The labour cost of caring for cattle, the manufacture of butter, the interest on the investment, depreciation, etc., are not included, nor is the value of calf at birth.

Butter is computed at 33 cents per pound and skim-milk at 20 cents per 100 pounds.

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

Meal (oats, barley, bran, oil cake)	$ 32 80	per ton
Ensilage	3 00	"
Hay	6 00	"
Roots	1 50	"
Pasture per cow per month	2 00	"

The meal mixture is charged at cost price and roughage at cost of production.

INDIVIDUAL MILK RECORDS DURING THE YEAR 1930

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 33 cents per pound	Value of skim-milk at 20 cents per cwt	Total value of product
				lb.	lb.	%	lb.	lb.	$	$	$
Rosthern Inferno Edna	1 year, 320 days	Mar. 2, 1929	305	10,400	34·10	3·82	397·28	467 39	154 24	20·01	174 25
Rosthern Inferno Polly	2 years, 167 days	Mar. 10, 1929	365	12,005	32·89	3·56	427·38	502·80	165 92	23 16	189 08
Rosthern Inferno Esther	2 years, 186 days	Mar. 22, 1929	305	12,614	41·36	3·62	456·63	537·21	177 28	24 31	201 59
Rosthern Inferno Collie	3 years, 53 days	Apr. 6, 1929	263	9,540	36·27	3·42	326·27	383·85	126 67	18 43	145 10
Rosthern Pietje Rebecca	6 years	May 20, 1929	293	11,912	40·66	3·68	438·36	515·72	170 19	22 95	193 14
R. E. S. Johanna Sylvia	10 years	June 7, 1929	280	10,864	38·80	3·41	370·46	435·84	143 83	20 99	164 82
Rosthern Inferno Louise	2 years, 329 days	June 18, 1929	365	10,238	28·05	3·38	346·04	407·11	134 35	19 78	154 13
Rosthern Pietje Emma	6 years	July 1, 1929	365	12,428	34·05	3·46	430·01	505·89	166 94	24 00	190 94
Rosthern Inferno Miriam	4 years, 12 days	July 4, 1929	300	7,888	26·29	4·21	332·08	390·68	128 92	15 11	144 03
Rosthern Inferno Rosie	2 years, 349 days	July 17, 1929	365	9,161	25·10	3·52	322·47	379·38	125 20	17 68	142 88
Rosthern Pietje Nancy	4 years, 324 days	July 26, 1929	305	11,380	37·31	3·65	415·37	488·67	161 26	21 93	183 19
Rosthern Inferno Aletha	3 years, 109 days	July 31, 1929	305	11,373	37·29	4·00	454·92	535·20	176 62	21 84	198 46
Rosthern Pietje Marcelle	5 years	July 31, 1929	305	10,669	34·98	3·63	387·28	455·62	150 35	20 56	170 91
R. E. S. Pontiac Madrigal	9 years	Aug. 18, 1929	365	11,272	30·88	3·65	411·43	484·04	159 73	21 72	181 45
Rosthern Inferno June	3 years, 185 days	Dec. 31, 1929	305	12,267	40·22	3·91	479·64	564·28	186 21	23 57	209 78
Total for herd (15 cows)			4,791	164,011			5,995·62	7,053·68	2,327 71	316 04	2,643 75
Average for herd (15 cows)			319·4	10,934·1	34·23	3·66	399·71	470·25	155 18	21 07	176 25

Individual Milk Records During the Year 1930

Name of animal	Age at commencement of lactation period	Date of dropping calf	Amount of meal eaten at $32.50 per ton	Amount of roots eaten at $1.50 per ton	Amount of ensilage eaten at $3 per ton	Amount of hay eaten at $6 per ton	Amount of cabbage eaten at $5 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.	lb.		$	cts.	cts.	cts.	$
Rosthern Inferno Edna	1 year, 320 days	Mar. 2, 1929	4,242	3,202	1,725	2,844	.....	4½	92 09	89	19·7	13·3	82 16
Rosthern Inferno Polly	2 years, 167 days	Mar. 10, 1929	4,523	4,472	1,948	3,984	.....	4½	101 40	84	20·2	12·8	87 68
Rosthern Inferno Esther	2 years, 186 days	Mar. 22, 1929	4,875	3,272	1,245	2,799	.....	4½	101 67	81	18·9	14·1	99 92
Rosthern Inferno Collie	3 years, 53 days	Apr. 6, 1929	3,368	2,212	725	1,832	.....	5	73 64	77	19·2	13·8	71 46
Rosthern Pietje Rebecca	6 years	May 20, 1929	4,696	3,260	315	2,686	.....	4½	96 99	81	18·8	14·2	96 15
R. E. S. Johanna Sylvia	10 years	June 7, 1929	4,478	3,150	215	2,591	.....	4½	92 89	86	21·3	11·7	71 93
Rosthern Inferno Louise	2 years, 329 days	June 13, 1929	4,084	3,140	2,816	3,588	.....	4½	93 32	91	22·9	10·1	60 81
Rosthern Pietje Emma	6 years	July 1, 1929	4,841	3,140	2,817	3,588	.....	4½	105 74	85	20·9	12·1	85 20
Rosthern Inferno Miriam	4 years, 12 days	July 4, 1929	3,265	3,140	2,018	3,296	.....	5	78 83	1 00	20·2	12·8	65 20
Rosthern Inferno Rosie	2 years, 349 days	July 17, 1929	4,431	3,130	2,823	3,588	.....	4½	99 01	1 08	26·1	6·9	43 87
Rosthern Pietje Nancy	4 years, 324 days	July 26, 1929	4,839	3,140	2,808	3,588	.....	4½	105 69	93	21·6	11·4	77 50
Rosthern Inferno Aletha	3 years, 109 days	July 31, 1929	4,702	3,130	2,823	3,597	.....	4½	103 48	91	19·3	13·7	94 98
Rosthern Pietje Marcelle	5 years	July 31, 1929	4,576	3,150	2,813	3,588	.....	4½	101 39	95	22·3	10·7	69 52
R. E. S. Pontiac Madrigal	9 years	Aug. 18, 1929	4,799	3,150	2,738	3,491	.....	4½	84 64	75	17·5	15·5	96 81
Rosthern Inferno June	3 years, 185 days	Dec. 31, 1929	4,467	2,485	3,018	2,610	630	4½	98 04	80	17·4	15·6	111 74
Total for herd (15 cows)			66,186	47,173	30,847	47,720	.....	68·5	1,428 82	.....	.....	.....	1,214 93
Average for herd (15 cows)			4.412	3,145	2,056	3,181	.....	4·6	95 25	87	20·3	12·7	81 00

The average production of two two-year-olds completing their records in the 305-day division was 11,507 pounds of milk testing 3·71 per cent butterfat. The average production of three two-year-olds on the 365-day division was 10,468 pounds of milk testing 3·49 per cent butterfat. The average production of three three-year-olds on the 305-day division was 11,060 pounds of milk testing 3·80 per cent butterfat. The average production of the two four-year-olds on the 305-day division was 9,634 pounds of milk testing 3·88 per cent butterfat. The average production of the five mature cows was 11,429 pounds of milk testing 3·57 per cent butterfat in 322 days.

The average feed cost to produce 100 pounds of milk was 87 cents, and the average cost to produce 1 pound of butter, skim-milk neglected, was 20·3 cents.

COST OF RAISING DAIRY CALVES

To determine the value of skim-milk, skim-milk and raw linseed oil, skim-milk and flaxseed jelly, Vi-milk (powdered skim-milk), against whole milk and skim-milk, as to cost of rearing and gains made by calves, the calves being fed whole milk from birth until one month old, then on test from one month until they were four months old. Calves No. 1, 2, 3 received whole milk from one month to three months and skim-milk from three to four months old. Calves No. 4 and 5 received skim-milk alone from one month to four months, and No. 6 and 7 Vi-milk (powdered skim-milk) from one month to four months, and calves No. 8 and 9 received skim-milk and flaxseed jelly from one month until four months old. Calves No. 10 and 11 received skim-milk and raw linseed oil from one month until four months old.

GAINS AND FEED CONSUMPTION OF CALVES

Calf	Name	Weight at one month	Weight at four months	Total gain 1 to 4 months	Average daily gain 1 to 4 months	Whole milk	Skim-milk	Vi-milk (powdered skim-milk) and water	Flax seed jelly	Raw linseed oil	Total cost of feed	Cost of feed for 1 pound gain
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	pts.	$	cts.
1	Sylvia	120	325	205	2·25	1,078	616	.....	.....	.....	17 40	8·49
2	Pontiac	136	334	198	2·18	1,014	630	.....	.....	.....	16 47	8·32
3	Billy	138	342	204	2·24	1,071	630	.....	.....	.....	17 43	8·54
4	Anna	148	330	182	1·98	.....	1,932	.....	.....	.....	3 86	2·12
5	Lassie	114	280	166	1·80	.....	1,932	.....	.....	.....	3 86	2·33
6	Snowball	158	360	202	2·20	.....	.....	1,932	.....	.....	12 06	5·97
7	Laddie	112	310	198	2·15	.....	.....	1,924	.....	.....	12 00	6·06
8	Edith	144	330	186	2·02	.....	1,927	.....	16	.....	4 25	2·28
9	Marie	122	295	173	1·88	.....	1,909	.....	16	.....	4 22	2·44
10	Sarah	150	340	190	2·09	.....	1,908	.....	.....	11½	6 59	3·47
11	Penelope	118	300	182	2·00	.....	1,910	.....	.....	10⅝	6 54	3·59
Total	.....	1,460	3,546	2,086	.....	.....	.....	.....	.....	.....	104 68	
Average	.....	133	322·4	189·6	2·08	.....	.....	.....	.....	.....	9 52	5·02

DEDUCTIONS.—Calves No. 1, 2, 3, fed whole milk from first to third month and skim-milk third to fourth month, made very comparable daily gains, showing only a small difference of 0·07 pound per day. The average daily gain during the total period ranged from 2·18 to 2·25 pounds. The cost of feed for 100 pounds gain was $8.49, $8.32, and $8.54, showing a marginal difference of only 22 cents per hundredweight. The whole milk calves made a higher average daily gain and showed more bloom, and were not so paunchy as the skim-milk fed calves, and particularly so the first two months. The two calves on skim-milk made an average daily gain of 1·98 and 1·80 pounds and the cost of feed for 100 pounds gain was $2.12 and $2.33, which is approximately one-third of the cost of feed for 1 pound gain in the whole milk fed lot. The calves fed Vi-milk (powdered skim-milk) were very comparable in gains made to the whole milk lot and the feed cost for 1 pound gain was approximately one-

third less. The calves on the flaxseed jelly and skim-milk, raw linseed oil and skim-milk, and skim-milk alone made approximately the same average daily gains per calf. The raw linseed oil showed just a little superiority, but considering the cost of feed for 1 pound gain, the flaxseed jelly lot made the most profitable and economical gains. The marked difference between the skim-milk, skim-milk and raw linseed oil, skim-milk and flaxseed jelly was that the latter lots show more bloom in that the skin was silky and loose, whereas the calves receiving straight skim-milk with no fat substitute appeared dry and very tight. The whole milk and Vi-milk are too high in price to feed to the calves unless a person is selling whole milk on the city market, and if so, the farmer can buy powdered skim-milk as a substitute for whole milk. The Vi-milk is diluted as follows: 1 pound of Vi-milk and 9 pounds of water. The raw linseed oil comes rather expensive—$2 per gallon—but it requires very little to supply the fat. The skim-milk and flaxseed jelly make a very good substitute for whole milk.

To 2 pounds of flaxseed add 10 pounds of boiling water and boil for one hour. Flaxseed jelly is a heavy gelatinous gruel fed at the rate of one-quarter cup of flaxseed jelly to every 7 pounds of skim-milk. This was gradually increased to one-half cup to 7 pounds of skim-milk.

Raw linseed oil is fed at the rate of two dessert spoonsful to 7 pounds of skim-milk at the commencement of the test and gradually increased to three desert spoonsful to 7 pounds of skim-milk.

GAINS AND FEED CONSUMPTION OF CALVES

Calf	Date of birth	Weight at birth	Weight at six months	Total gain	Sex	Average daily gain for period	Amount of whole milk fed	Amount of skim-milk fed	Amount of powdered skim-milk fed	Amount of meal fed	Amount of hay fed	Amount of ensilage fed	Amount of roots fed	Total cost of feed	Cost of feed for one lb. gain
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	$	cts.
1	July 1, 1929	102	420	318	Male	1·73	1,062	2,370	.....	356	740	.....	100	28 81	9·1
2	July 4, 1929	102	480	378	Male	2·05	990	2,297	.....	343	754	.....	115	27 42	7·3
3	July 10, 1929	93	460	367	Female	1·99	852	2,567	.....	349	807	.....	150	26 16	7·1
4	July 17, 1929	102	495	393	Female	2·14	1,476	1,848	.....	314	716	.....	185	33 28	8·5
5	July 26, 1929	97	450	353	Female	1·92	1,457	1,932	.....	319	742	.....	257	33 57	9·5
6	July 31, 1929	94	434	340	Female	1·85	1,403	1,932	.....	367	807	.....	305	33 58	9·9
7	Aug. 18, 1929	72	482	410	Male	2·23	1,389	1,932	.....	368	792	.....	465	33 47	8·2
8	Dec. 31, 1929	94	542	448	Male	2·48	1,409	1,904	.....	338	172	239	28	31 39	7·0
9	Mar. 2, 1930	89	506	417	Male	2·27	1,493	1,918	.....	385	575	82	.....	34 40	8·2
10	Mar. 6, 1930	95	554	459	Male	2·49	1,514	.....	1,924	399	616	82	.....	43 25	9·4
11	Mar. 22, 1930	85	480	395	Female	2·15	1,443	1,932	.....	368	690	29	.....	33 66	8·5
12	Mar. 25, 1930	81	514	433	Male	2·35	1,502	.....	1,930	377	713	29	.....	42 95	9·9
13	May 10, 1930	116	504	388	Male	2·11	443	3,213	.....	420	967	.....	.....	22 87	5·9
14	May 14, 1930	90	512	422	Male	2·29	714	2,745	.....	398	930	.....	.....	25 52	6·0
15	May 20, 1930	91	456	365	Female	1·98	900	.....	2,581	363	871	.....	.....	38 19	10·5
16	July 5, 1930	86	490	404	Male	2·20	1,476	1,931	.....	345	513	.....	.....	33 20	8·2
17	July 11, 1930	81	510	429	Male	2·33	456	3,213	.....	362	570	.....	.....	20 92	4·9
	Total	1,570	8,289	6,719	.....	.....	19,979	31,734	6,435	6,171	11,975	461	1,605	542 64	
	Average	92·4	487·6	395·2	.....	2·15	.....	.....	.....	363	704	.....	.....	31 92	8·4

DEDUCTIONS.—Calves Nos. 13, 14 and 17, fed whole milk for one month and skim-milk for five months, made the most economical gains with the lowest feed cost per pound gain. The cost of feed for 1 pound gain for the above three calves was 5·9, 6, and 4·9 cents respectively. Though these calves did exceptionally well, there appeared to be something deficient in the ration in that after the first month when changed to skim-milk, the calves lost all their bloom, the skin was dry and tight in comparison to the calves fed whole milk or Vi-milk. The calves fed Vi-milk (powdered skim-milk) made fairly good gains, but the price of the Vi-milk would not warrant the farmer utilizing this product unless he had no other substitute.

The cost of feed for 1 pound gain in the case of calves fed Vi-milk was 9·4, 9·9, and 10·5 cents respectively. The average total gain for seventeen calves for six months was 395·2 pounds, or an average daily gain of 2·15 pounds per animal per day over the six-months' period. The average total cost of feed to raise one calf was $31.92.

Average cost of feed to raise one calf, whole milk one month, skim milk five months was	$ 23 10
Average cost of feed to raise one calf, whole milk two months, skim milk four months was	27 46
Average cost of feed to raise one calf, whole milk three months, skim-milk, three months was	33 31
Average cost of feed to raise one calf, whole milk three months, powdered skim-milk, three months was	43 10
Average cost of feed to raise one calf, whole milk two months, powdered skim-milk, four months was	38 19

SHEEP

The sheep on hand December 31, 1930, totalled one hundred and four, consisting of one imported Shropshire ram, fourteen pure-bred Shropshire ewes, and six pure-bred Shropshire ewe lambs; one pure-bred three-shear Suffolk ram, a pure-bred Suffolk ram lamb, four pure-bred Suffolk ewes, and one pure-bred Suffolk ewe lamb; thirty graded-up Leicester ewes, twenty-five cross-bred Suffolk-Leicester ewes, and nineteen cross-bred Suffolk-Leicester ewe lambs, and two market lambs. During the year 1930 one pure-bred Suffolk ram lamb was sold for breeding purposes and seventeen fat lambs were marketed.

SHROPSHIRE FLOCK

The foundation of a flock of pure-bred Shropshire sheep was made during the year 1930. The Shropshire breed of sheep appears to be in greater demand on the average farm where a flock of from fifteen to thirty-five ewes are kept, and from the numerous inquiries pertaining to the purchase of rams, there appears to be a growing demand for the Shropshire breed.

The foundation of Shropshire sheep was received from the Central Experimental Farm, Ottawa, Ont., at which farm pure-bred Shropshire sheep have been bred for a number of years. Eighty-five per cent of the foundation flock were sired by imported rams; Bibby 100, Buttar 327, Buttar 330 and Tanner 63 and the remaining fifteen per cent were sired by the Canadian bred ram Kelsey 428. The shipment of Shropshire sheep arrived from Ottawa October 23, 1930, and included in the shipment was the pure-bred imported Shropshire ram, Tanner 27, fourteen pure-bred Shropshire ewes and six pure-bred Shropshire ewe lambs. The Shropshire ewes were bred to the ram Tanner 27, which will mean a higher concentration of imported blood in the 1931 lamb crop. The ram, Tanner 27, was first prize ram lamb at the English Royal Show in 1928.

The Shropshire ewes as a whole, are very uniform in type, low-set, blocky, strong tops, with fairly good spring of rib, and well-covered. Their fleeces are very representative of the breed as to crimp, length of staple, etc. The object in

view is to develop an outstanding flock of Shropshire sheep and to supply reliable breeding stock to farmers, and to study the suitability of this domestic breed of sheep on the farms of Northern Saskatchewan, and to study the influence that the Shropshire ram has upon the ordinary grade ewes found on the average farm, as to the developing of a superior type of market lambs having the required finish when weighing from 80 to 90 pounds.

IODINE FOR PREGNANT EWES

As a possible preventive of weak lambs at birth, and lambs showing symptoms of goitre, potassium iodide has been given to the ewes during the pregnancy period. Iodine has been given in different ways. Iodized block salt has been supplied to ewes where they had free access to it at all times, with good results, and it is the common practice which the farmers are following. Potassium iodide crystals have given good results, by dissolving one ounce of potassium iodide crystals in a gallon of warm water, and giving one dessert spoonful of this solution in the meal per ewe per day during the pregnant period. The third way of supplying iodine is by dissolving four ounces of potassium iodide in water, and sprinkling this on a hundred pounds of common salt which has been thoroughly dried previous to adding the potassium iodide solution. Farmers in the vicinity of the station who were troubled with weak lambs at birth and lambs with goitre after using potassium iodide found that they were not troubled with goitre nor as high a percentage of weak lambs at birth. No trouble whatsoever was experienced with goitre at birth during 1928, 1929 and 1930 lambing seasons at the Station. During these seasons potassium iodide was fed for at least eight weeks previous to lambing. In 1927 there was no potassium iodide fed and goitre was prevalent in the flock.

CONTROL OF SHEEP TICK OR KED

External—The flock was dipped in Cooper's Dip on June 24, and again on October 3. As to the date or time of dipping this will depend chiefly upon the season. It is advisable to dip on a warm day and as early in the morning as possible allowing time for the sheep to dry off before evening. It required 14 pounds of Cooper's Dip to dip the flock of 103 ewes and lambs in June. It was quite noticeable, at the time the ewes were shorn (May 14 to May 20) that the thin ewes were badly attacked with keds, and the lambs which were nourished by these ewes appeared very unthrifty and badly attacked with keds. The Cooper's Dip gave excellent results.

MAINTENANCE OF FLOCK

The sheep were housed on October 15, 1929, and went to pasture on May 31, 1930. From October 15 to January 30, the ewes were fed slough grass hay, oat straw and Swede turnips. After February first, the ewes were fed sweet clover hay, oat straw, Swede turnips, sweet clover ensilage and one half to three quarters of a pound of meal which was composed of two-thirds oats and one-third bran by weight. The ewes commenced to lamb about the first of April and continued until the latter part of May at which time, the succulent feed was corn ensilage, fed at the rate of 4 to 5 pounds per ewe per day along with 1 to 1½ pounds of meal and all the sweet clover hay they required.

PERFORMANCE OF DIFFERENT BREEDS OF SHEEP

Breed	Number of ewes bred	Number of ewes lambed normally	Number of lambs born	Number of lambs raised	Per cent lamb crop	Per cent lamb crop raised
Suffolk	3	3	6	5	200	166·6
Leicester ewe, Suffolk ram	19	18	29	22	152·6	115·8
Suffolk Leicester ewe and Suffolk ram	16	16	21	15	131·3	93·8
Total	38	37	56	42	147·4	110·5

In summarizing the results of 1930 lambing report, the first cross Suffolk-Leicester ewes gave a higher per cent lamb crop, and a higher percentage of the lamb crop was raised than Suffolk-Leicester ewe and Suffolk ram cross. This corroborates the fact that the first cross lambs are thriftier and hardier than the second cross lambs, and the lambs of the first cross are more uniform in type, low set and blockier and with a greater spring of rib and stronger tops than the lambs from the Suffolk-Leicester ewe and Suffolk ram. The first cross lambs were mottled-faced, whereas the second cross lambs were black faced, much like the Suffolk.

The following table gives the comparative weights of pure-bred and cross-bred wether lambs at the time they were born at the 111th day after birth:—

COMPARATIVE GAIN IN WEIGHTS OF WETHER LAMBS 54 DAY PERIOD

Breed	Suffolk	75 per cent Suffolk 25 per cent Leicester	50 per cent Suffolk 50 per cent Leicester
Number of lambs.....No.	4	7	11
Average weight of lambs at birth..... lb.	11·0	10·7	9·8
Average weight of lambs at 111 days..... lb.	79·8	71·8	77·3
Average weight of lambs at 165 days..... lb.	103·0	95·9	102·2
Average gain in 54 days..... lb.	23·2	24·1	24·9
Average gain per day..... lb.	·430	·446	·461
Rape pasture.....			
Oat chop..... lb.	101·0	177·0	278·0
Oil cake meal..... lb.	33·0	57·0	90·0
Total cost of feed..... $	2 12	3 79	5 97
Total gain in weight..... lb.	92·0	169·0	274·0
Cost to produce 100 pounds gain..... $	2 30	2 24	2 18

DEDUCTIONS.—The wether lambs of Suffolk, and Leicester-Suffolk breeding made fairly comparable gains in weight during the finishing period. The first cross Suffolk-Leicester wether lambs made the most rapid gains and the most profitable gains followed by the three-quarter Suffolk and one-quarter Leicester. The first cross lambs appeared to be more rugged, better feeders, and a little more compact in type, with a greater spring of rib than either the pure-bred Suffolks or three-quarter Suffolks and one-quarter Leicester. The three-quarter Suffolks and one-quarter Leicester lambs are very comparable to the pure-bred Suffolk lambs in type, quality of wool, and particularly in the length of fibre.

In the three-quarter Suffolk and one-quarter Leicester the mottled face that we find in the half Suffolk and half Leicester lambs has disappeared, except in the odd one which may have a few white spots or stripes on the face.

SWEET CLOVER VS. SWEDES FOR PREGNANT EWES

To determine their influence on the lamb crop, number of weak or dead lambs at birth, and weight of lambs at birth:—

The flock of ewes were divided as uniformly as possible into two lots of nineteen ewes each, the one lot to receive sweet clover ensilage as a succulent roughage, while the other lot was to receive swede turnips as succulent roughage. An equal quantity by weight was fed to each lot for the period of fifty-one days just previous to the commencement of the lambing period. The test commenced February 8 and continued until March 31.

SWEET CLOVER VS. SWEDES FOR PREGNANT EWES

Items		Lot 1, sweet clover ensilage	Lot 2, Swede turnips
Number of ewes	No.	19	19
Days on test	days	51	51
Ensilage consumed	lb.	2,940	
Swedes	lb.	.....	2,940
Bran	lb.	323	323
Oat chop	lb.	646	646
Number of lambs born	No.	30	27
Number of lambs dead at birth	No.	2	1
Number of lambs died	No.	5	8
Number of lambs raised	No.	23	18
Number of sets of twins	No.	11	8
Number of singles	No.	8	11
Percenatge lamb crop	%	157	142
Percentage lamb crop reared	%	121	95
Total weight of lambs at birth	lb.	301·7	285·5
Average weight of lambs at birth	lb.	10·06	10·43

DEDUCTIONS.—It is clearly indicated that the well-cured sweet clover ensilage free from mould had no ill effects on the percentage lamb crop, in that the percentage of lambs born from the ewes fed sweet clover ensilage previous to lambing was not inferior to that of the Swede turnip group. As to the weights of the lambs at birth, the variation is so small between the two lots that it would seem that sweet clover had no harmful influence on the weight of the lambs. Besides, the percentage of twins from the ewes fed sweet clover ensilage was higher which may partially account for the slightly lower average weight of lambs at birth. It was very noticeable in the feeding of the sweet clover ensilage and Swedes that the ewes fed the sweet clover ensilage relished their feed more than the ewes fed the Swedes.

WOOL

The average wool clip per head for 1930 was as follows:—

	Pounds
Leicesters	9·77
Suffolk	6·23
Suffolk-Leicester	8·90
¾ Suffolk, ¼ Leicester	7·75
¾ Leicester, ¼ Suffolk	8·85
Leicester-Suffolk	9·25

WEIGHT OF FLEECES, 1930

	Pounds
Average weight of mature Leicester fleeces (15 fleeces)	9·11
Average weight two shear Leicester fleeces (4 fleeces)	11·15
Average weight of one shear Leicester fleece (10 fleeces)	10·21
Average weight of mature Suffolk fleeces (2 fleeces)	6·70
Weight of two shear Suffolk fleeces (1 fleece)	6·7
Weight of one shear Suffolk fleece (1 fleece)	4·8
Weight of three-shear Suffolk rams-fleece (1 fleece)	7·6
Average weight of three-shear Suffolk-Leicester fleeces (3 fleeces)	8·1
Weight of three-shear Leicester-Suffolk fleeces (2 fleeces)	9·25
Average weight of two-shear Suffolk-Leicester fleeces (6 fleeces)	10·23
Average weight of one-shear Suffolk-Leicester fleeces (12 fleeces)	8·38
Average weight of one-shear ¾ Suffolk ¼ Leicester fleeces (2 fleeces)	7·75
Average weight of one-shear ¼ Suffolk ¾ Leicester fleeces (2 fleeces)	8·85
Average weight of wool clip per head for the flock of 61 sheep (61 fleeces)	9·08

SWINE

The swine on hand December 31, 1930, totalled ninety head of pure-bred Yorkshires, consisting of one aged boar, one yearling boar, one boar pig, twenty brood sows, twenty pure-bred Yorkshire gilts, and forty-seven feeders and suckling pigs.

During the year the Yorkshire boar, Semans Joe —138953— was purchased. Thirteen pure-bred Yorkshire boar pigs and twenty-one pure-bred Yorkshire gilts were sold for breeding purposes in Northern Saskatchewan.

A Comparison of the Prolificacy of Old Sows, and Gilts of the Yorkshire Breed as Shown by the 1930 Litters

Items	Old sows, second litter or more	Gilts, first litter
Number of litters farrowed in 1930	15	4
Total number of pigs farrowed	178	43
Number of pigs per litter (average)	11·87	10·75
Number of pigs dead at birth	25	6
Number of pigs dead at birth per litter (average)	1·67	1·5
Number of pigs died before weaning per litter (average)	1·47	1·5
Number of pigs weaned per litter (average)	8·73	7·75
Percentage of pigs raised of those farrowed alive	73·6	83·8

FEED COST OF RAISING PIGS FROM BIRTH TO WEANING AGE

Thirteen mature sows (two and three years old) were fed during the spring of 1930 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 the age of sixty days.

The meal ration fed during the suckling period consisted of 100 pounds of oat chop, 100 pounds of shorts, 100 pounds of middlings, 25 pounds of bran, 14 pounds of tankage, and 14 pounds of linseed oil meal. This meal mixture was fed with water.

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

Feed Cost of Raising a Pig from Birth to Weaning Age, 1930—Mature Sows

Number of sows		13
Number of pigs farrowed		153
Average number of pigs farrowed per litter		11·77
Total number of pigs weaned		113
Average number of pigs weaned per litter		8·7
Meal consumed during suckling period	lb.	10,913
Meal consumed during suckling period per sow	"	839
Total cost of feed during suckling period	$	145 14
Total cost of feed during suckling period, per litter	$	11 16
Cost of feed per pig at 60 days old	$	1 28

The value of the meal mixture fed during the suckling period was $26.60 per ton.

The above table shows that the total cost to raise a pig from a mature sow from birth to weaning age was $1.28 when an average of 8·7 pigs per litter were weaned.

TANKAGE VS. POWDERED SKIM-MILK

A comparison was made between tankage and powdered skim-milk as supplements to the grain ration for growing and fattening hogs. The test was carried on with six hogs in each pen. These lots were as nearly identical as possible

as to breeding, age, and general thrift and were kept under exactly similar conditions. The two lots received the same quantity of feed per day throughout the experiment.

All the hogs were weighed individually at the commencement of and at thirty-day intervals throughout the test. The duration of the test was ninety days. The average weight of the hogs at the commencement of test was 65 and 65·2 pounds and at the completion was 193·7 and 189·5 pounds respectively.

The results of this experiment are tabulated below:—

TANKAGE VS. POWDERED SKIM-MILK FOR GROWING AND FINISHING MARKET HOGS

Items		Lot 1, tankage	Lot 2, powdered skim-milk
Number of pigs in each lot		6	6
Total initial weight	lb.	390	391
Average initial weight	"	65	65·2
Total weight at end of first 30 days	"	628	623
Average weight at end of first 30 days	"	104·7	103·8
Total weight at end of first 60 days	"	913	915
Average weight at end of first 60 days	"	152·2	152·5
Total weight at end of first 90 days	"	1,162	1,137
Average weight at end of first 90 days	"	193·7	189·5
Total gain per lot (90) days	"	772	746
Average gain per pig (90 days)	"	128·7	124·3
Average daily gain per pig	"	1·430	1·381
Total quantity of meal consumed	"	3,081	3,081
Total quantity of tankage	"	165	.....
Total quantity of powdered skim-milk	"	.....	165
Total cost of meal mixture	$	33 32	39 35
Total cost of tankage at $2.50 per cwt. (included in cost of meal mixture)		4 13	.....
Total cost of powdered skim-milk at $6.25 per cwt. (included in cost of meal mixture)		.....	10 31
Meal required per 100 pounds gain	lb.	399·1	413·0
Powdered skim-milk per 100 pounds gain	"	.....	22
Tankage required per 100 pounds gain	"	21·0	.....
Cost of feed per head per day	ets.	6	7
Cost of all feed per 100 pounds gain	$	4 32	5 27

DEDUCTIONS.—It will be noted that the total gain per lot was in favour of lot 1 (tankage), which showed a gain of 26 pounds over lot 2 (powdered skim-milk).

The tankage required for 100 pounds gain was 21 pounds, while lot 2 required 22 pounds of powdered skim-milk for 100 pounds gain.

The cost of feed for 100 pounds gain showed a difference of 95 cents in favour of lot 1 (tankage).

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

(1) That both lots made fair gains.

(2) That tankage has a small advantage over powdered skim-milk as to amount of feed required for 100 pounds gain.

(3) That the variation in cost price of tankage and powdered skim-milk, which was $3.75, accounts for the much higher cost of feed per 100 pounds gain in the powdered skim-milk lot.

(4) That the tankage and powdered skim-milk produced no marked difference in type of the hogs in either lot.

HULLESS OAT CHOP VS. COMMON OAT CHOP

The farmers are inquiring concerning the value of hulless oats over common oats for the young growing hog from weaning on. An experiment to obtain this information was carried out this year.

Sixteen pigs were used in this experiment. They were divided into two lots of eight pigs each, as nearly identical with respect to weight, general thrift, etc., as posible. The two lots received exactly the same quantity of meal. The only difference was that lot 1 received hulless oats plus 8 per cent tankage, and lot 2, common oats plus 8 per cent tankage. The two lots were kept under exactly the same conditions during the test. 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

Items		Lot 1, hulless oats	Lot 2, common oats
Number of pigs in each lot		8	8
Total initial weight	lb.	385	385
Average initial weight	"	48·1	48·1
Total weight at end of first 31 days	"	620·0	526·0
Average weight at end of first 31 days	"	77·5	65·75
Total weight at end of first 62 days	"	845·0	670·0
Average weight at end of first 62 days	"	105·6	83·75
Total gain per lot (62 days)	"	460·0	285·0
Average gain per pig (62 days)	"	57·5	35·6
Average daily gain per pig	"	0·927	0·574
Total quantity of meal consumed	"	1,640	1,640
Total quantity of hulless oats	"	1,510	.....
Total quantity of common oats	"	.....	1,510
Total quantity of tankage	"	130	130
Total cost of meal mixture	$	25 90	21 37
Total cost of hulless oats (included in cost of meal mixture)	$	22 65	.....
Total cost of common oats (included in cost of meal mixture)	$	.....	18 12
Total cost of tankage	$	3 25	3 25
Meal required for 100 pounds gain	lb.	357·0	575·0
Hulless oats required for 100 pounds gain	lb.	328·3	.....
Common oats required for 100 pounds gain	lb.	.....	530·0
Tankage required for 100 pounds gain	lb.	28	46
Cost of feed per head per day	cts.	4·18	3·45
Cost of all feed per 100 pounds gain	$	5 53	7 50

DEDUCTIONS.—The lot fed hulless oats made far more rapid gains during the sixty-two-day test, showing an average gain of 57·5 pounds per pig, or an average daily gain per pig of 0·927 pound, while the lot on common oats showed an average gain of 35·6 pounds per pig and an average daily gain per pig of 0·574 pound. The hulless oat lot showed an average gain of 21·9 pounds per pig over the common oat lot during the sixty-two-day period, or an average daily gain per pig of 0·353 pound above the lot fed common oats.

It required 218 pounds more of common oats and 18 pounds more tankage for every 100 pounds gain in the case of the common oat lot.

The variation in the cost of feed per head per day was 73 cents in favour of the common oat lot, while the cost of feed per 100 pounds gain showed a difference of $1.87 in favour of the hulless oat lot.

Valuing both the hulless oats and common oat chop at $1.20 per hundredweight, there was a variation in the cost of $2.85 per 100 pounds gain in favour of the hulless oat chop, in which case this lot would show a profit of $13.11 over the other, whereas when hulless oat chop was valued at $1.50 per 100 pounds and common oat chop at $1.20 per 100 pounds the hulless oat lot showed a profit of $8.60 above the common oat lot.

The value of the common oats was figured at their value on the open market or $1.20 per 100 pounds, and the hulless oats were figured as worth one-quarter more per hundredweight.

The pigs fed the hulless oat chop relished their feed much more than those fed the common oats throughout the feeding trial. The first month on feed, the hulless oat lot showed an average gain per pig of 11·75 pounds above the common oats lot and 21·9 pounds gain per pig the second month over the com-

mon oat lot. In each case, they received the same quantity of feed per lot during the feeding test.

Where no other concentrate than oats is fed after weaning, undoubtedly hulless oats have a far greater place in the meal ration than common oats, and if common oats are fed, it would be advisable to sift out the hulls.

COST OF PORK PRODUCTION

OBJECT OF EXPERIMENT.—To ascertain the cost of raising Yorkshire bacon hogs to 200 pounds in weight and over.

PLAN OF EXPERIMENT.—Fifty pigs were used in this experiment. They were farrowed during the months of April and May. In the following table will be found the results for the first thirty days after weaning, the second thirty days, the third thirty days, fourth thirty days, and the last eight days:—

COST OF PORK PRODUCTION—RESULTS OF EXPERIMENT

Lot	Number of pigs	Days on test	Meal ration		Other feeds
1	5	128	First sixty days:—		
				lb.	
			Middlings	200	Skim-milk.
			Ground oats (sifted)	100	
			Shorts	100	
			Bran	25	
			Linseed oil meal	14	
			Tankage, 45 per cent protein	14	
			Bonemeal	2¼	
			Charcoal	2¼	
			Salt	2¼	
			Sixty to ninety days:—		
			Middlings	100	Skim-milk.
			Oat chop	150	
			Shorts	50	
			Bran	25	
			Barley chop	100	
			Linseed oil meal	14	
			Tankage, 45 per cent protein	14	
			Bonemeal	2¼	
			Charcoal	2¼	
			Salt	2¼	
			Ninety days to finish:—		
			Middlings	50	
			Oat chop	100	
			Shorts	100	
			Barley chop	200	
			Linseed oil meal	14	
			Tankage, 45 per cent protein	14	
			Bone meal	2¼	
			Charcoal	2¼	
			Salt	2¼	
2	5	128	Same at Lot 1.		
3	5	128	Same as Lot 1.		
4	5	128	Same as Lot 1.		
5	5	128	Same as Lot 1.		
6	5	128	Same as Lot 1.		
7	5	128	Same as Lot 1.		
8	5	128	Same as Lot 1.		
9	5	128	Same as Lot 1.		
10	5	128	Same as Lot 1.		
			Valuation of Feeds		
			Meal mixture (first 60 days)		$1 43 per cwt.
			Meal mixture (60 to 90 days)		1 13 "
			Meal mixture (90 days to finish)		1 04 "
			Skim-milk		0 20 "

FEED COST OF PORK PRODUCTION

Items	First 30 days from weaning	31 to 60 days	61 to 90 days	91 to 120 days	121 to 128 days	Total period
Number of pigs in experiment	50	50	50	50	50	50
Initial weight, gross..... lb.	1,867	3,425	5,450	7,725	9,975	1,867
Initial weight, average.. lb.	37·34	68·5	109	154·5	199·5	37·34
Final weight, gross..... lb.	3,425	5,450	7,725	9,975	10,681	10,681
Final weight, average. . lb.	68·5	109	154·5	199·5	213·62	213·62
Number of days fed..days	30	30	30	30	8	128
Total gain for period..... lb.	1,558	2,025	2,275	2,250	706	8,814
Average gain per hog.... lb.	31·16	40·5	45·5	45	14·12	176·28
Average daily gain per hog..... lb.	1·04	1·35	1·52	1·50	1·77	1·38
Meal consumed..... lb.	2,627	4,822	7,680	9,841	3,230	28,200
Skim-milk consumed... lb.	7,592	9,743	4,253	.....	.....	21,588
Meal eaten per pound gain..... lb.	1·69	2·38	3·38	4·37	4·58	3·20
Skim-milk eaten per pound gain..... lb.	4·87	4·81	1·87	.....	.....	2·45
Total cost of feed..... $	52 75	88 44	95 29	102 35	33 59	372 42
Cost of feed per head... $	1 06	1 77	1 90	2 05	0 67	7 45
Cost of feed per head per day..... cts.	3·53	5·90	6·33	6·83	8·38	5·82
Cost of feed per pound gain..... cts.	3·39	4·37	4·19	4·55	4·76	4·23

STATEMENT OF RETURNS

Cost of feed for 50 pigs to weaning at $1.43 per head	$ 71 50
Total cost of feed for 128 days	372 42
Cost of pigs when finished	443 92
Value of 10,681 pounds of pork at $8.20 per cwt	875 84
Profit over cost of feed for 50 pigs	431 92
Average profit per pig	8 64

DEDUCTIONS.—It will be noted from the above table that the cost of feed per head per day was 3·53 cents for the first thirty days; for the second thirty days 5·90 cents; the third 6·33 cents and fourth 6·83 cents and the last eight days of the finishing period 8·38 cents. The cost of feed per pound gain during the different periods shows that the cheapest gains are made during the first months on feed, with pork selling at $8.20 per hundred for bacons, there was a profit of $8.64 per pig, but this does not allow for the cost of the feed fed to the brood sow during the pregnancy period.

ADVANCED REGISTRY POLICY FOR SWINE

The aim and object of the Advanced Registry Policy for pure-bred swine, which is being sponsored by the Dominion Department of Agriculture and under the supervision of the Live Stock Branch, is a basis whereby standards of qualification can be established covering points as individuality, prolificacy, uniformity in litters, slaughter test, and the production of ideal bacon hogs. The data collected are to be systematized 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 progeny 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.

In the following tables are tabulated a portion of the information which was carefully compiled at this station of ten Yorkshire sows entered on this test from the time the sows farrowed until the pigs reached 200 pounds and over in weight, at which time they were shipped to Burns & Company, Regina, Saskatchewan, for slaughter test.

The following table indicates the performance of the four pigs from each litter from a live grading basis at the stockyards:—

PERFORMANCE OF PIGS FROM DIFFERENT LITTERS

Sow	Weight of pigs	Average weight of pigs	Grading	Age (birth to slaughter)	Average age (birth to slaughter)
	lb.	lb.		days	days
GU19	218		Select	176	
	212		Select	183	
	219		Select	183	
	218		Select	197	
		217·0			184·75
GV19	213		Select	187	
	220		Select	187	
	230		Select	187	
	219		Select	187	
		220·5			187·0
GN19	215		Bacon	188	
	213		Select	195	
	222		Select	191	
	215		Select	198	
		216·0			193·0
GT19	212		Select	184	
	210		Select	184	
	219		Select	191	
	213		Select	191	
		213·5			187·5
GI19	225		Select	179	
	213		Select	182	
	212		Select	186	
	213		Select	189	
		216·0			184·0
HA19	216		Select	189	
	215		Bacon	189	
	214		Bacon	189	
	217		Select	189	
		215·5			189·0
GX19	225		Select	181	
	218		Bacon	195	
	229		Select	195	
	223		Select	195	
		224·0			191·5
GQ19	220		Select	173	
	215		Select	173	
	215		Select	180	
	213		Select	180	
		216·0			176·5
GL19	236		Select	179	
	219		Bacon	193	
	213		Bacon	200	
	209		Select	200	
		219·0			193·0
GW10	220		Butcher	172	
	216		Select	186	
	213		Bacon	190	
	213		Select	190	
		215·5			184·5

DAILY GAINS, FEED COST AND NET RETURNS OF FEEDER HOGS IN ADVANCED REGISTRY POLICY

Items		Group GU19	Group GV19	Group GN19	Group GT19	Group GI19	Group GX19	Group HA19	Group GQ19	Group GL19	Group GW10
Average daily gain	lb.	1·42	1·37	1·34	1·39	1·43	1·37	1·34	1·43	1·32	1·38
Meal per pound gain	lb.	3·11	3·20	3·19	3·14	3·15	3·24	3·35	2·90	3·36	3·35
Feed cost per 100 pounds gain	$	4 18	4 22	4 18	4 05	4 15	4 26	4 40	3 95	4 37	4 51
Net returns—birth to finish	$	61 10	55 64	53 64	58 18	56 73	58 40	55 97	58 10	53 65	54 40
Average net return per pig	$	12 22	11 13	10 73	11 64	11 35	11 70	11 20	11 62	10 73	10 88

WEIGHTS AND FEED RECORDS OF PIGS IN ADVANCED REGISTRY POLICY FOR SWINE

Name of sow	Tattoo	Registration Number	Sire of litter	Litter data						
				Number born	Number weaned	Weight of litter		Farrowing to weaning		Cost to raise one pig from birth to weaning
						At birth	At weaning	Amount of feed	Total cost of feed	
						lb.	lb.	lb.	$	$
Rosthern Alexandra Beauty	GU19	135383	King W.H.F. 242	11	10	37·8	367	867	11 68	1 17
Rosthern Alexandra Beauty 2	GV19	135384	King W.H.F. 242	13	10	45·0	330	928	12 51	1 25
Ottawa Augustine 331	GN19	134282	King W.H.F. 242	11	9	31·9	307	902	12 09	1 34
Rosthern Ivanhoe Duchess	GT19	135404	Rosthern King John	10	10	23·8	314	873	11 73	1 17
Lady Bell	GI19	129358	Rosthern King John	11	9	41·3	292	928	12 59	1 40
Rosthern Queen R.	GX19	135398	Rosthern King John	13	10	40·5	310	936	12 71	1 27
Rosthern Queen R. 4	HA19	135401	Rosthern King John	14	11	43·1	365	931	12 63	1 15
Rosthern Alexandra Lady 3	GQ19	135387	King W.H.F. 242	11	8	32·9	323	893	12 12	1 52
Ottawa Alexandra 305	GL19	134284	Rosthern King John	16	8	44·5	262	894	12 07	1 51
Lacombe Willow Duchess	GW10	135964	Rosthern King John	12	12	33·0	404	892	12 17	1 01

WEIGHTS AND FEED RECORDS OF PIGS IN ADVANCED REGISTRY POLICY FOR SWINE

Name of sow	Tattoo	Registration Number	Sire of litter	Weights of 5 feeder pigs						
				Weaning	90th day	Finish	Total gain	Days of feeding trial	Average daily gain	Average number days birth to finish
				lb.	lb.	lb.	lb.		lb.	
Rosthern Alexandra Beauty	GU19	135383	King W.H.F. 242	203	791	1,105	902	636	1·418	187·2
Rosthern Alexandra Beauty 2	GV19	135384	King W.H.F. 242	170	758	1,040	870	635	1·370	187·0
Ottawa Augustine 331	GN19	134282	King W.H.F. 242	168	739	1,065	897	670	1·339	194·0
Rosthern Ivanhoe Duchess	GT19	135404	Rosthern King John	167	733	1,056	889	641	1·387	188·2
Lady Bell	GI19	129358	Rosthern King John	183	797	1,075	892	625	1·427	185·0
Rosthern Queen R.	GX19	135398	Rosthern King John	188	789	1,093	905	661	1·369	192·2
Rosthern Queen R. 4	HA19	135401	Rosthern King John	198	777	1,065	867	645	1·344	189·0
Rosthern Alexandra Lady 3	GQ19	135387	King W.H.F. 242	206	809	1,041	835	586	1·425	177·2
Ottawa Alexandra 305	GL19	134284	Rosthern King John	189	732	1,079	890	672	1·324	194·4
Lacombe Willow Duchess	GW10	135964	Rosthern King John	195	800	1,062	867	628	1·381	185·6

WEIGHTS AND FEED RECORDS OF PIGS IN ADVANCED REGISTRY POLICY FOR SWINE

Name of sow	Tattoo	Registration Number	Sire of litter	Feed consumption and cost 5 feeder pigs—weaning to finish						Returns from 5 pigs	
				Meal	Meal eaten per pound gain	Milk	Milk eaten per pound gain	Total cost	Feed cost per 100 pounds gain	Cash returns	Net returns birth to finish
				lb.	lb.	lb.	lb.	$	$	$	$
Rosthern Alexandra Beauty	GU19	135383	King W.H.F. 242	2,805	3·110	2,351	2·609	37 50	4·157	104 45	61 10
Rosthern Alexandra Beauty 2	GV19	135384	King W.H.F. 242	2,781	3·197	2,133	2·452	36.71	4·220	98 60	55 64
Ottawa Augustine 331	GN19	134282	King W.H.F. 242	2,853	3·186	2,241	2·498	37 51	4·182	97 85	53 64
Rosthern Ivanhoe Duchess	GT19	135404	Rosthern King John	2,789	3·137	1,855	2·087	36 01	4·051	100 04	58 18
Lady Bell	GI19	129358	Rosthern King John	2,808	3·148	2,041	2·288	37 02	4·150	100 75	56 73
Rosthern Queen R	GX19	135398	Rosthern King John	2,934	3·242	2,257	2·494	38 53	4·257	103 37	58 49
Rosthern Queen R 4	HA19	135401	Rosthern King John	2,908	3·354	2,144	2·473	38 13	4·398	99 85	55 97
Rosthern Alexandra Lady 3	GQ19	135387	King W.H.F. 242	2,424	2·903	2,147	2·571	32 99	3·951	98 69	58 10
Ottawa Alexandra 305	GL19	134284	Rosthern King John	2,991	3·361	2,141	2·406	38 91	4·372	100 11	53 65
Lacombe Willow Duchess	GW10	135964	Rosthern King John	2,907	3·353	2,278	2·627	39 13	4·513	98 58	54 40

FIELD HUSBANDRY

The snow did not all go until early in April, but, due to there being little frost in the ground and being very dry, the snow water was absorbed almost immediately and work on the land commenced as soon as the snow was all gone. The soil went into the winter very dry and did not freeze as it does normally. The snow covering was heavy, and, as the moisture from it was practically all absorbed by the dry soil, conditions for germination this spring were very good. Seeding commenced very early, being quite general on the fifteenth of April. Growth was very good until late in May and early in June when lack of rain gave all crops a setback. From about the middle of June to the middle of July there was sufficient moisture and growth was rapid. From the latter part of July until early September the weather was very dry and maturity of all crops was hastened, though the damage from premature ripening was not so great as in 1929. In most cases the sample of threshed grain was good though the yield was in many cases reduced. The samples of oats and barley were affected more by the heat than was the wheat, no doubt due to being later sown and later ripening.

The yields of wheat, oats, and barley were below the average, but the grades were fair and would have shown a profit but for the abnormally low prices. Corn, sunflowers, and roots yielded very low, due mainly to lack of moisture, though the turnips were also damaged by the cabbage butterfly larva. The western rye grass hay yields were about average, due to the rains in late June and early July. The sweet clover was, however, considerably below average, possibly because it grows much taller and coarser and requires more moisture than western rye grass for a normal crop. The stands were good, indicating that it had wintered well. Several fields failed in a good catch of rye grass in 1929, due to the very dry fall, the plants going into the winter in a very weak condition.

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 1930 are as follows:—

RETURN VALUES

Wheat	$ 0 60 per bushel
Oats	0 20 " "
Barley	0 25 " "
Western rye grass hay	6 00 " ton
Oat or barley starw	2 00 " "
Sunflower and corn ensilage	3 00 " "
Turnips	1 50 " "

COST VALUES

Rent	3 00 per acre
Barnyard manure	1 00 " ton
Seed wheat	1 25 " bushel
Seed oats	0 80 " "
Seed barley	1 00 " "
Seed turnips	0 90 " pound
Seed sunflowers	0 11 " "
Seed sweet clover	0 12 " "
Seed western rye grass	0 07 " "
Seed corn	0 08 " "
Machinery	1 35 " acre
Horse labour (single horse)	0 08 " hour
Manual labour	0 25 " "
Tractor operator	0 40 " "
Use of tractor	1 00 " "
Rent of ensiling machinery	0 18 " ton
Twine	0 16 " pound
Threshing wheat	0 10 " bushel
Threshing oats	0 08 " "
Threshing barley	0 08 " "

COST OF PRODUCING CROPS

The costs of 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. An eight-year average is inserted for the totals but since the itemized charges are nearly constant or vary in accordance with the yields an average for them has 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 33	0 30	0 35	0 26	0 38
Manual labour		0 93	1 33	0 95	1 23	1 60
Horse labour		0 51	1 09	0 51	1 06	1 28
Threshing		2 64	2 31	2 71	1 94	2 80
Cost of summer-fallow		5 25	2 64	.....	.....	.....
Total cost per acre	1930	16 29	14 40	12 95	12 72	12 29
	8-year average	17 66	15 29	14 46	13 93	.....
		bush.	bush.	bush.	bush.	bush.
Yield per acre	1930	26·4	23·1	27·1	19·4	28·0
	8-year average	25·7	20·7	24·4	18·3	.....
		$	$	$	$	$
Value per acre	1930	15 83	13 83	16 23	11 64	16 80
	8-year average	26 44	21 01	24 53	18 33	.....
Profit or loss per acre	1930	−0 46	−0 57	3 28	−1 08	4 51
	8-year average	8 78	5 72	10 07	4 40	.....
Cost per bushel	1930	0 62	0 62	0 48	0 65	0 44
	8-year average	0 69	0 74	0 59	0 76	.....

It cost most to produce a bushel of wheat following rye grass hay both this year and in an average of eight years. Wheat was produced the cheapest following sweet clover. The cost was the same on stubble and fallow land this year but more after wheat on an average.

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		1 60	2 00	2 00
Machinery		1 35	1 35	1 35
Twine		0 31	0 32	0 29
Manual labour		1 41	0 90	1 33
Horse labour		1 18	0 51	1 12
Threshing		3 56	2 93	3 94
Cost of summer-fallow		.....	2 67	.....
Total cost per acre	1930	13 29	15 68	15 43
	8-year average	15 77	17 82	15 77
		bush.	bush.	bush.
Yield per acre	1930	44·5	36·6	49·2
	8-year average	52·8	35·9	33·1
		$	$	$
Value per acre	1930	10 38	10 79	13 16
	8-year average	22 59	18 84	17 38
Profit or loss per acre	1930	−2 91	−4 89	−2 27
	8-year average	6 82	1 02	1 61
Cost per bushel	1930	0 30	0 43	0 31
	8-year average	0 30	0 49	0 48

Both barley and oats were produced at a loss this year, mainly due to the low market value. Where the cost of summer-fallow is charged to the barley crop the cost per bushel is greatly increased. The straw was very heavy and the yield of grain low in comparison with barley following hoed crop.

COST PER ACRE OF PRODUCING CORN, SUNFLOWERS AND TURNIPS

Items		Corn	Sunflowers	Turnips
		$	$	$
Rent and taxes		3 00	3 00	3 00
Manure		2 00	2 00	2 00
Seed		2 30	2 64	1 80
Machinery		1 85	2 33	1 35
Twine		0 37	0 48	.....
Manual labour		5 79	8 51	11 68
Horse and tractor labour		3 18	4 98	3 23
Cost of summer-fallow		1 78	.....	5 33
Total cost per acre	1930	20 27	23 94	28 39
	8-year average	28 02	28 42	35 52
		tons	tons	tons
Yield per acre	1930	2·76	5·42	10·62
	8-year average	6·96	7·24	15·29
		$	$	$
Value per acre	1930	8 27	16 26	.....
	8-year average	20 88	21 89	.....
Loss per acre	1930	−12 00	−7 68	.....
	8-year average	−7 14	−6 53	.....
Cost per ton	1930	7 34	4 42	2 67
	8-year average	4 03	3 92	2 32

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 in which case the cost as shown here could show a profit.

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

In order that the results may be compared more readily a nine-year average of the profit per acre for each rotation, excepting where otherwise noted, is given in the following table. The profit or loss per acre for 1930 is also given in the adjoining column.

The profit or loss per acre for each rotation was as follows:—

ROTATION RESULTS

Rotation	1930	Average
	$	$
Rotation "J"—Fallow, wheat, wheat, oats seeded down, hay, hay	−1 89	3 57
Rotation "F118"—Corn, wheat, oats, barley seeded down, sweet clover and rye grass hay	−2 80	3 10
Rotation "Y"—Wheat, hoed crop, wheat, oats seeded down, hay, hay	−2 81	2 43
Rotation "P"—Fallow, wheat, wheat, fallow, hoed crop, barley seeded down, hay, hay	−3 13	1 99
Rotation "C"—Eight-year average: fallow, wheat and wheat	−0 60	6 33
Rotation "D"—Four-year average: fallow, wheat, wheat, and oats	0 78	8 38
Rotation "F. 244"—Two-year average: fallow, wheat seeded down, sweet clover hay, wheat and oats	−0 41	1 88

Following is a summary chart showing in some detail the manner in which the profit or loss from the various rotations is compiled. The chart below is for rotation "F. 118."

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

Rotation year	Crop	Yield per acre		Value of crop, 1930	Cost of production, 1930	Profit or loss per acre	
		1930	Average 9 years			1930	Average 9 years
				$	$	$	$
1	Corn..... tons	3·53	7·06	10 59	20 45	−9 86	−2 95
2	Wheat..... bush.	26·2	26·0	15 72	13 06	2 66	11 17
3	Oats..... bush.	52·0	52·3	11 90	15 33	−3 43	6 36
4	Barley seeded down.... bush.	49·2	32·8	13 16	15 43	−2 27	1 47
5	Hay (sweet clover and rye grass)..... tons	1·67	0·79	10 02	11 12	−1 10	−0 54
	Totals for rotation.....	.....	.....	61 39	75 39	−14 00	15 51
	Average per acre.....	.....	.....	12 28	15 08	−2 80	3 10

Rotation "D" is the only rotation which has shown a profit this year and also shows a high profit in a four-year average. As it has only been under way for four years it is difficult to compare it with others on which we have nine years' results. It is similar to Rotation "C" in that it is a straight grain rotation allowing no space for hay, pasture or other forage crops. This rotation is suitable for conditions where it is not practicable to raise stock. Such rotations as "D" and "C," however, have a tendency to encourage some annual weeds which a hay or pasture crop are effective in controlling.

Of the longer rotations which have been under way nine years or more at this Station, Rotation "J" has given the lowest loss for 1930 and the highest profit in a nine-year average. This rotation is very suitable for mixed farming and has proven effective in reducing wild oats. It is followed successfully by many farmers in the West and where hay can be raised satisfactorily is very suitable.

A five-year rotation, "F 118," has also given good returns in a nine-year average, though the loss was rather high this year. This rotation included all the common crops and while the percentage of cash crop is low the possibilities as a mixed farming rotation are good.

Rotation " Y " is similar to " J " but, due to the position of the cash crop, has shown a much lower profit. The wheat yield following two years hay is normally rather low but surprisingly clear of annual weeds. Perennial weeds with running root stalks are difficult to control in such a rotation where there is no fallow.

Rotation " P " shows more loss this year and a smaller profit in the average than any of the other rotations. Two summer-fallows and turnips are largely responsible for the small profit as they increase the cost so greatly. The rotation is too long for most conditions in the West but does keep the land quite clear of weeds.

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.

A two-year average of barley following corn has been 36·2 bushels per acre and after turnips 27·6 bushels per acre.

The foregoing results indicate quite conclusively that sunflowers are the most exhaustive crop, turnips next and corn the least exhaustive. The difference in yield is no doubt caused more by depletion of moisture than of food elements.

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 others are only started. Only those which have shown conclusive results will be reported on at this time.

BREAKING TAME SOD.—Ploughing about three inches deep after hay is cut and back-setting slightly deeper the middle of September has proven most effective in killing brome sod. Western rye grass sod can be killed with one ploughing at any time.

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 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 obtained from later seedings but the crop was correspondingly later in ripening.

MANURE FOR HAY.—An application of twelve tons of rotted manure in fall on new seeding in the nurse crop stubble has given a profitable increase in the hay crop. One dollar per ton was charged for applying the manure.

GREEN MANURE.—Clover hay removed and the sod ploughed has given about equal results in following crop with bare fallow. The clover sod was treated as a partial fallow. Summer-fallow manure gave the greatest returns but when the cost of manure is deducted the net return is less than from the clover sod.

MANURE FOR WHEAT.—Twelve tons fresh manure applied in winter on first year wheat stubble and ploughed in spring has given the highest returns but does not show 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.

MANURE FOR SUNFLOWERS.—Twelve tons rotted manure applied before ploughing fallow has given the highest yield but not sufficient over no manure to pay the cost of applying. Eighteen tons fresh manure applied in winter has also given good yields.

METHODS OF PLANTING SUNFLOWERS.—Sunflowers planted in rows 30 inches apart and left as sown have given the best results at this Station. In planting the drill should be adjusted to drop the seed about three inches apart.

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 sowing with wheat after fallow.

SUMMER-FALLOW SUBSTITUTES.—A five-year average of results places corn next to bare summer-fallow in point of yield. Sunflower land was next best followed by oats in rows. Green feed sown June 15 was the poorest summer-fallow substitute.

THINNING SUNFLOWERS.—Higher yields and better quality of forage is obtained if the sunflowers are not thinned. If possible they should be sown so that the plants are about three inches apart.

FORAGE CROPS

The early spring of this year caused early growth of all perennial crops but dry weather in June created a delay, resulting in only an average time of harvest for hay. Prolonged dry spells in June and August prevented a normal growth of all annual forage crops and early frosts in late August checked the growth of those which are frost-tender so that they did not benefit from rains in September. Hay yields were about average, while ensilage and root crops were much below average. Due to slightly earlier sowing and the hot dry weather in July and August, corn and other frost-tender forage plants reached a more advanced stage of maturity than usual, though the yields were lower.

ANNUAL HAYS

From experimental results of previous years it has been found that oats harvested before maturity make one of the most certain annual hay crops in this district. The yield is usually higher than from other hay crops and is relished by all classes of live stock. Early, light frosts do little harm, which allows for sowing late in June and the opportunity of killing one or two crops of annual weeds before sowing. Also the oats can be cut for hay before most weeds have matured seed.

The addition of a percentage of peas to the oats increases the protein food value of the forage and makes it much more desirable for many classes of live stock. In Eastern Canada where the precipitation is much higher, this mixture has been grown extensively for many years with good results. In the West, however, where rainfall is more limited a mixture of peas and oats has usually resulted in oats with a very small percentage of peas. With the object in view of finding a combination of peas and oats in which the desired amount of each could be produced, an experiment was commenced in 1927 at this Station. Peas or oats alone will produce very good yields of desirable fodder but with the oats

the protein food is lacking and with the peas harvesting is very difficult, due to their recumbent habit of growth. The most desirable combination is a sufficient quantity of oats to carry the pea vine so as to facilitate harvesting with a grain binder and at the same time have a fair percentage of pea straw and pods. It was found, and is illustrated in the following table, that where equal parts of oats and peas or more oats than peas were sown at the same time the peas were overcome by the oats and the resulting crop was mainly oats. The following table gives the resulting yields from various methods and rates of sowing peas and oats for hay.

In this experiment Banner oats and Arthur peas were used. When harvested the oats were turning colour and the pods on the pea vines were well filled.

YIELDS OF DIFFERENT MIXTURES OF PEAS AND OATS FOR HAY

Mixtures by weight	Remarks	Yield per acre	
		1930	4-year average
		ton lb.	ton lb.
Peas alone		3 1,010	3 704
Peas 7, oats 3	About 25 per cent pea vine	2 1,160	3 677
Peas 5, oats 5	" 30 " "	2 1,635	2 588
Peas 3, oats 7	" 12 " "	3 12	2 1,571
Alternate rows	" 50 " "	3 110	3 375
Oats one week later	" 60 " "	3 834	3 874
Oats sown when peas emerging	" 80 " "	3 350	3 883
Oats alone		3 987	3 1,648

In the above table oats alone have given the highest yield of hay. Where a mixture was used, however, the plot where the peas were sown before the oats has given the highest yield and the greatest percentage of pea vine. We would not recommend seeding peas more than one week ahead of the oats however, as where a longer time elapsed between sowings the peas were so heavy as to lodge considerably, thus hampering harvesting operations.

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 object in each case was to determine the most desirable and profitable way of growing each crop. The following tables and remarks give a synopsis of the results from several years' trials.

WESTERN RYE GRASS

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

RESULTS FROM DIFFERENT METHODS OF SOWING WESTERN RYE GRASS

Method of sowing	First year crop				Second year crop			
	Nurse crop		Sown alone		Nurse crop		Sown alone	
	Hay	Seed	Hay	Seed	Hay	Seed	Hay	Seed
	lb.	lb.	ton lb.	lb.	ton lb.	lb.	ton lb.	lb.
Broadcast	1,684	300	1 1,176	443	0 1,970	351	1 353	461
6-inch rows	1,737	317	1 1,959	539	1 296	361	1 472	466
24-inch rows	1,208	221	1 1,201	700	1 768	492	1 1,190	532
30-inch rows	1,404	291	1 808	623	1 465	559	1 517	437
36-inch rows	1,081	213	1 691	478	1 380	485	1 621	464
Average yield of treatments	1,422	269	1 1,167	557	1 376	450	1 631	472

Average yield 1st year crop.....1 ton 295 pounds hay. 413 pounds seed
Average yield 2nd year crop.....1 ton 504 pounds hay. 461 pounds seed
Average yield after nurse crop.....1,899 pounds hay. 359 pounds seed
Average yield sown alone.....1 ton 899 pounds hay. 515 pounds seed

Summary results from sowing broadcast vs. rows are as follows:—

Method of sowing	For hay			For seed		
	Nurse crop	Alone	Average	Nurse crop	Alone	Average
	lb	ton lb.	ton lb	lb.	lb.	lb.
Broadcast	1,827	1 765	1 296	325	452	389
6-inch rows	2,017	1 1,216	1 617	339	503	421
24-inch rows	1,988	1 1,196	1 592	357	616	487
30-inch rows	1,933	1 663	1 298	425	530	478
36-inch rows	1,731	1 656	1 194	349	471	385

From the above tables it is evident that higher average yields are obtained from the second-year crop of both hay and seed.

It is also shown that a higher yield can be expected where the grass is sown alone rather than where a nurse crop is used. The value of the nurse crop should be added to the nurse crop seeding, however, which would no doubt offset the lack of yield in this case. Also where grass is sown alone weeds are quite troublesome the first year and require to be mowed.

Sowing in six-inch drills gives a higher yield than sowing by any of the other methods. The average yield of hay decreases as the spacing between the rows is increased. For seed the twenty-four inch spacing has given the highest yield.

BROME GRASS

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

Results from Different Methods of Sowing Brome Grass

Method of sowing	First year crop				Second year crop			
	Nurse crop		Sown alone		Nurse crop		Sown alone	
	Hay	Seed	Hay	Seed	Hay	Seed	Hay	Seed
	ton lb.		ton b.	lb.	ton lb.	lb.	ton lb.	lb.
Broadcast	0 1,560	Failure	1 338	145	0 1,877	197	1 288	191
6-inch rows	0 1,605	"	1 1,199	235	0 1,963	189	1 718	191
24-inch rows	0 1,070	"	1 708	370	1 293	274	1 783	284
30-inch rows	0 821	"	1 306	379	0 1,905	322	1 455	333
36-inch rows	0 572	"	1 05	375	1 129	240	1 1,186	273
Average yield of treatments	0 1,126	.....	1 511	301	1 33	244	1 686	256

Average yield 1st year crop.....1,819 pounds hay. 151 pounds seed
Average yield 2nd year crop.....1 ton, 360 pounds hay. 250 pounds seed
Average yield after nurse crop.....1,580 pounds hay, 122 pounds seed
Average yield sown alone.....1 ton, 599 pounds hay. 279 pounds seed

The summary results from sowing broadcast vs. rows was:—

Method of sowing	For hay			For seed		
	Nurse crop	Alone	Average	Nurse crop	Alone	Average
	lb.	ton lb.	ton lb.	lb.	lb.	lb.
Broadcast	1,719	1 313	1 016	99	168	134
6-inch rows	1,784	1 959	1 372	95	213	154
24-inch rows	1,682	1 746	1 214	137	327	232
30-inch rows	1,363	1 332	0 1,873	161	356	259
36-inch rows	1,351	1 596	0 1,974	120	324	222

As with rye grass the yields are considerably higher the second year, both for hay and seed. Where sown without a nurse crop the yields of hay are nearly twice as large as when sown with a nurse crop and the seed yields are over twice as great. As with rye grass, however, the value of the nurse crop should be considered and also the work of keeping down weeds the first year if no nurse crop is used.

Six-inch drill sowings have given the highest yields of hay with twenty-four inch spacings second. The wide spaced rows have, however, given the highest yields of seed. The yields of seed are low in all cases.

ALFALFA

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

RESULTS FROM DIFFERENT METHODS OF SOWING ALFALFA

Method of sowing	First year crop				Second year crop			
	Nurse crop		Sown alone		Nurse crop		Sown alone	
	Hay	Seed	Hay	Seed	Hay	Seed	Hay	Seed
	ton lb.	lb.	ton lb.	lb.	ton lb.	lb.	ton lb.	lb.
Broadcast	1 919	50	1 1,062	43	0 1,129	20	0 1,007	26
6-inch rows	1 1,172	14	1 1,717	67	0 1,334	27	0 1,320	30
24-inch rows	1 651	51	1 1,981	33	1 82	39	1 235	30
30-inch rows	1 270	47	1 1,883	27	0 1,810	38	0 1,946	23
36-inch rows	0 1,892	33	1 545	33	0 1,866	53	1 109	43
Average yield of treatments	1 581	39	1 1,558	41	0 1,644	35	0 1,723	30

Average yield first year crop—1 ton 1,070 pounds hay, 40 pounds seed.
Average yield second year crop—1,684 pounds hay, 33 pounds seed.
Average yield after nurse crop—1 ton 113 pounds hay, 37 pounds seed.
Average yield sown alone—1 ton 641 pounds hay, 35 pounds seed.

The results from sewing broadcast vs. in rows were as follows:—

Methods of sowing	For hay						For seed		
	Nurse crop		Alone		Average		Nurse crop	Alone	Average
	tons	lb.	tons	lb.	tons	lb.	lb.	lb.	lb.
Broadcast	1	24	1	335	1	180	35	35	35
6-inch rows	1	253	1	519	1	386	21	49	35
24-inch rows	1	367	1	1,108	1	738	45	32	39
30-inch rows	1	40	1	915	1	478	43	25	34
36-inch rows	0	1,879	1	327	1	103	43	38	41

The yields from alfalfa were much higher from the first crop than from the second. The difference, however, would not have been so great but for the fact that the average first crop takes in the yields in 1927 which were exceptionally high due to an abundance of moisture. The second crop average does not include 1927.

The difference between seeding with and without a nurse crop is very slight in this case and not significant. The slight increase of hay from seeding alone would most certainly be more than offset by the value of the nurse crop. The difference between sowing in rows or broadcast is also very slight though somewhat better when sown in medium wide rows.

SWEET CLOVER

Sweet clover being a biennial no second year yields are given. It is sown one year and dies the following autumn after one crop. The following table gives a five-year average of cured hay and seed yields for sweet clover:—

RESULTS FROM DIFFERENT METHODS OF SOWING 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 is used and no marked increase in yield is indicated from sowing in rows rather than broadcast or in six-inch drills.

VARIETY TEST OF GRASSES AND CLOVERS

A variety test of sweet clover, alfalfa, and grasses was started in 1929. Each variety was sown in replicated one-hundredth-acre plots and also in rod row plots.

SWEET CLOVER

Many of the kinds listed as varieties below are really only strains of certain standard varieties. The germination in 1929 was good and all survived the winter very well so that the stands this year were very comparable. Due to a rather dry season the growth was not heavy and consequently the yields are only average. Yields and percentage stand are given in the following table:—

SWEET CLOVER—RESULTS OF TEST OF VARIETIES

Name of variety or strain	Source of seed	Per cent stand	Yield per acre		
			Green	Air dry	Oven dry
			tons lb.	tons lb.	tons lb.
Wild sweet clover	Russia	90	8 1,548	2 399	1 1,873
W. R. Fansher	W. R. Fansher	75	8 264	1 1,723	1 1,271
Home grown white	Rosthern	90	7 1,836	1 1,672	1 1,232
Home grown Zouave	Rosthern	95	6 91	1 1,421	1 1,011
Common yellow	Rosthern	85	7 124	1 1,401	1 993
Registered Arctic	Sask. Reg. Seed Growers	80	7 1,515	1 1,252	1 864
Alpha No. 1	Univ. of Sask.	85	6 1,212	1 890	1 544

Though Alpha gave the lowest yield it gave the best quality of forage. All were good quality this year, however, the growth being rather short and the stalks fine.

ALFALFA

As with sweet clover, many lots of alfalfa listed as varieties are really strains of standard varieties from different sources and no apparent difference was noticed in habit of growth. The following table illustrates the results as obtained from one cut, lack of moisture preventing sufficient growth for a second cutting.

ALFALFA—RESULTS OF TEST OF VARIETIES.

Name of variety or strain	Source of seed	Per cent stand	Yield per acre					
			Green		Air dry		Oven dry	
			tons	lb.	tons	lb.	tons	lb.
Grimm	Brooks Alta	90	6	947	1	1,878	1	1,414
Grimm	Rosthern	80	5	1,663	1	1,032	1	722
Ontario Variegated	Peel County	75	5	968	1	921	1	571
Cossack	Disco	80	5	1,128	1	864	1	522
Grimm	A. B. Lyman	90	4	1,630	1	853	1	511
Baltic	Disco	80	4	1,577	1	730	1	404
Medicago Falcata	Paramount	55	5	1,503	1	705	1	381

Though these results are for one year only, Grimm strains are showing considerable superiority, particularly in winter hardiness. Yields were very good considering the season.

GRASSES

In the following table we are showing a comparison of only one strain of rye grass, crested wheat grass, and timothy. Ten strains of rye grass were grown. All the grass wintered well, though usually timothy is not absolutely hardy at this Station.

Following are the hay and seed yields for 1930:—

Name of variety	Source of seed	Yield per acre						
		Green		Air dry		Oven dry		Seed
		tons	lb.	tons	lb.	tons	lb.	lb.
Crested wheat grass	Univ. of Sask	3	1,009	1	1,383	1	977	880
Western rye grass Ott. 115	Ottawa	3	206	1	982	1	626	1,160
Timothy	Early Seed Co.	3	741	1	444	1	152	.....

While crested wheat grass gave the highest yield of hay it did not seed as well as western rye grass. No seed yields of timothy were taken.

ENSILAGE CROPS

SUNFLOWERS

Six strains of sunflowers were grown at the Station this year. Two varieties, Mammoth Russian and Giant Russian, germinated very poorly and no yield results were obtained. All were planted on May 16 and harvested on September 6. At the latter date slight frost damage occurred. Mammoth Russian from McDonald's gave the highest yield and, due to the dry season, was not coarse. It was late, however, showing only about one per cent of bloom when harvested. Manchurian Ottawa 76 and Mennonite reached a more advanced stage of maturity but yielded much lower than Mammoth Russian.

CORN

Twenty-two corn varieties or strains were grown under similar conditions this year. Stands were fairly good but cool weather early in June and periods of drought in June and August checked the growth considerably. Warm dry weather in July and August, while retarding growth and reducing yields, hastened maturity, and many reached a more advanced stage of maturity than usual. The later varieties were very immature, however, when harvested and cannot be recommended for this district. Such varieties as Northwestern Red Dent and Improved Squaw are most suitable for ensilage or fodder purposes in this area.

ROOTS

The yields from all root varieties were very poor due to dry weather which continued quite late in the fall. Most root crops normally make their maximum growth during late summer and early fall, and if this period is dry the yield is invariably low. Roots require an abundance of moisture for good growth. All the roots were sown on May 13 and harvested early in September. They were sown in 30-inch rows and later thinned to one foot between plants, with the exception of carrots, which were thinned to six inches.

SWEDES

Nine varieties or strains of swedes were under test and while the stands were good the yields were much below average, due to the roots being small. The tops were severely damaged by the larva of the cabbage butterfly in July and August, which checked the development of the roots. This is the first time on record at this Station that swedes have been severely damaged by this insect. The field of swedes on rotation "P" was also badly damaged from the same cause. Bangholm and Northwestern from McKenzie's and Hazards Improved from Steele Briggs gave the highest yields this year, though the difference between all varieties was very slight.

FALL TURNIPS

Twelve varieties or strains were under test. Unlike the swedes, fall turnips were not damaged by the cabbage butterfly larva and yielded much better. They also developed much earlier in the season and benefited more from rains in July. The quality was very good. Green Top Aberdeen, Purple Top Mammoth, and Hardy Green Round, all from Suttons, gave the highest yields, but, as with swedes, the variation between varieties was not great.

MANGELS

The percentage stand in mangels was very poor, due to poor germination and cutworm damage in the spring. They appeared to withstand the dry weather better than swedes, but this may have been due to being thin, which allowed more moisture per root. Six varieties which represent the various types were tested. Barres Oval from the General Swedish Seed Company and Giant Rose Sugar from McKenzie's gave the highest yields. The intermediate or oval types appear most suitable for this soil and climate and are quite easy to harvest.

CARROTS

Three types of carrots were tested: namely, a very short type, the Oxheart; a short type, Improved Short White; and an intermediate type, Danish Champion. The yields from all three were very low and much the same. The last two are to be recommended where a carrot for stock feed is required. Both are very smooth, having few side roots, and normally yield very well.

CEREALS

Seeding of cereal varieties was commenced on April 16, which is very early for this district. Germination was fairly rapid, but several severe late frosts damaged the young seedlings of wheat and oats and killed a considerable quantity of the barley. Due to this setback the grain was only about one week in advance of the crop at the same time last year. Dry weather late in May and early in June caused the straw to be medium to short in length and also reduced the head size. This retarding of growth of straw and head served as an advantage when later in July and early August another dry spell was experienced. The plants, being small, required less moisture and produced a good sample of grain with little rainfall. This year the kernels were well filled in most cases and wheat would grade one or two Northern. In 1929 with similar rainfall the kernels were shrunken and graded three or four. Grain ripened somewhat prematurely, due to the prolonged drought, but only the very late varieties suffered greatly. Due to the premature ripening the normal spread in time of maturity between varieties was lessened. Rust was present on most varieties but, due to weather conditions, did no damage.

WHEAT.

Little change can be recommended in wheat varieties from last year. The mid-early varieties are again at the top in yield at this Station. Red Bobs and Red Fife yielded the same on summer-fallow land this year, but Bobs is much the higher in a five-year average. Both yielded rather low on stubble. Marquis gave a good average yield on fallow and has given the highest average yield on stubble. Ceres yielded rather low on summer-fallow but has shown up remarkably well on stubble. Where rust was severe this year it produced a fairly well-filled kernel when the other varieties were little better than feed. Garnet yielded higher than Reward excepting on stubble land this year. In the average, however, Garnet is considerably higher. As in 1929, we recommend Marquis 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, and Garnet or Reward can replace it where frost is common. Reward has also shown some resistance to rust, producing almost as well as Ceres under such conditions.

Following is a table of yields and days required for maturity of six of the most important varieties:—

WHEAT VARIETIES

Variety	On fallow 1/100 acre						On stubble 1/45 acre					
	1930			5-year average			1930			4-year average		
	Yield		Grade	Yield		Days to maturity	Yield		Grade	Yield		Days to maturity
	bush.	lb.		bush.	lb.		bush.	lb.		bush.	lb.	
Early Triumph	31	20	3°	25	30	117	23	15	2°	27	22	115
Marquis Ott. 15	29	45	1°	25	25	119	23	15	2°	29	04	117
Ceres	26	35	2°	25	04	115	28	08	2°	28	37	115
Garnet Ott. 652	29	13	2°	24	52	112	18	22	3°	27	08	111
Reward	26	35	1°	23	37	113	21	22	2°	25	04	113
Red Fife	31	20	2°	23	22	123	23	22	2°	26	35	120

OATS

Banner and Victory have proven the most satisfactory of all varieties tested at this Station for general purposes. Where an early variety is desired Gopher or Legacy serve very well, but will yield slightly less than the first two mentioned. Gopher is about seven days earlier than Victory and Legacy is about two days later than Gopher. Laurel, a high yielding hulless variety, is being used quite extensively for pig and poultry feeding. It is also early maturing, ripening about the same time as Gopher.

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 1/45 acre				
	1930 yield		3-year average			1930 Yield		7-year average		
			Yield		Days to maturity			Yield		Days to maturity
	bush.	lb.	bush.	lb.		bush.	lb.	bush.	lb.	
Banner Ott. ·49	73	18	69	21	103	69	14	60	23	102
Victory	68	28	69	00	102	76	16	55	23	103
Gopher	54	14	60	19	95	67	02	—	—	.....
Laurel	57	26	55	25	96	48	08	44	24	97

BARLEY

The results in the following table were derived from the rod-row test, as they were considered more reliable than from the larger plots. The large plots of barley were damaged severly by late spring frosts, while the rod-row tests escaped injury. A six-year average of results places Trebi and Hannchen at the top 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. O.A.C. 21 stands fairly well in the average and is generally favoured for malting purposes. Himalayan, an early hulless variety, has yielded well this year and in the average. It is the most productive early variety we have tested and should prove useful in combating wild oats. Star is a short, compact six-row type which appears to do best under humid conditions as found in the northern part of this district.

BARLEY VARIETIES

Variety	Type	1930, yield per acre		6-year average		
				Days to maturity	Yield	
		bush.	lb.		bush.	lb.
Trebi	6-row	68	26	96	65	30
Hannchen	2-row	58	26	101	64	18
O. A. C. 21	6-row	54	28	98	59	03
Star	6-row	53	26	93	56	32
Bearer Ott. ·475	6-row	45	30	99	53	36
Himalayan Ott. ·59	6-row (Hulless.)	48	46	92	52	24

PEAS

Peas did very well this season and yields were well above average. The samples of threshed grain were also good. Mackay has given the highest average yield for five years. It is a late-maturing, long-strawed type and well suited for forage purposes. Dashaway has also yielded well and is a medium early, small-seeded type. Chancellor is much the same in appearance. Prussian Blue is a medium-sized, blue-seeded sort which also yields very well. Lemaire is a very early short-strawed type which would only be suitable in conditions where a very early sort is desired.

Following is a table showing the yields and days to mature of the various varieties for 1930 and a five-year average:—

PEA VARIETIES

Variety	1930 results		5-year average		Remarks on grain
	Yield per acre	Days to mature	Yield per acre	Days to mature	
	bush. lb.		bush. lb.		
Mackay Ott. 25	49 30	114	38 06	103	Creamy large.
Dashaway	46 15	111	35 01	99	White small.
Arthur Ott. 18	53 40	112	34 58	107	White large.
Prussian Blue	43 45	113	34 17	107	Blue medium.
Chancellor Ott. 26	47 30	112	34 15	102	White small.
Lemaire	49 10	101	33 59	87	White medium.

BEANS

Due to hot dry weather in August the bean varieties ripened up well before frost. The later sorts yielded rather light, due to premature ripening, but the early varieties produced very well. Large White, Norwegian, and Beauty yielded well and produced good samples of beans. Large White is the most suitable for market as a baking bean, being all white, while the Norwegian is brown, and Beauty a small white pea bean with a yellow eye (hilum). The three mentioned varieties ripen well most seasons at this Station.

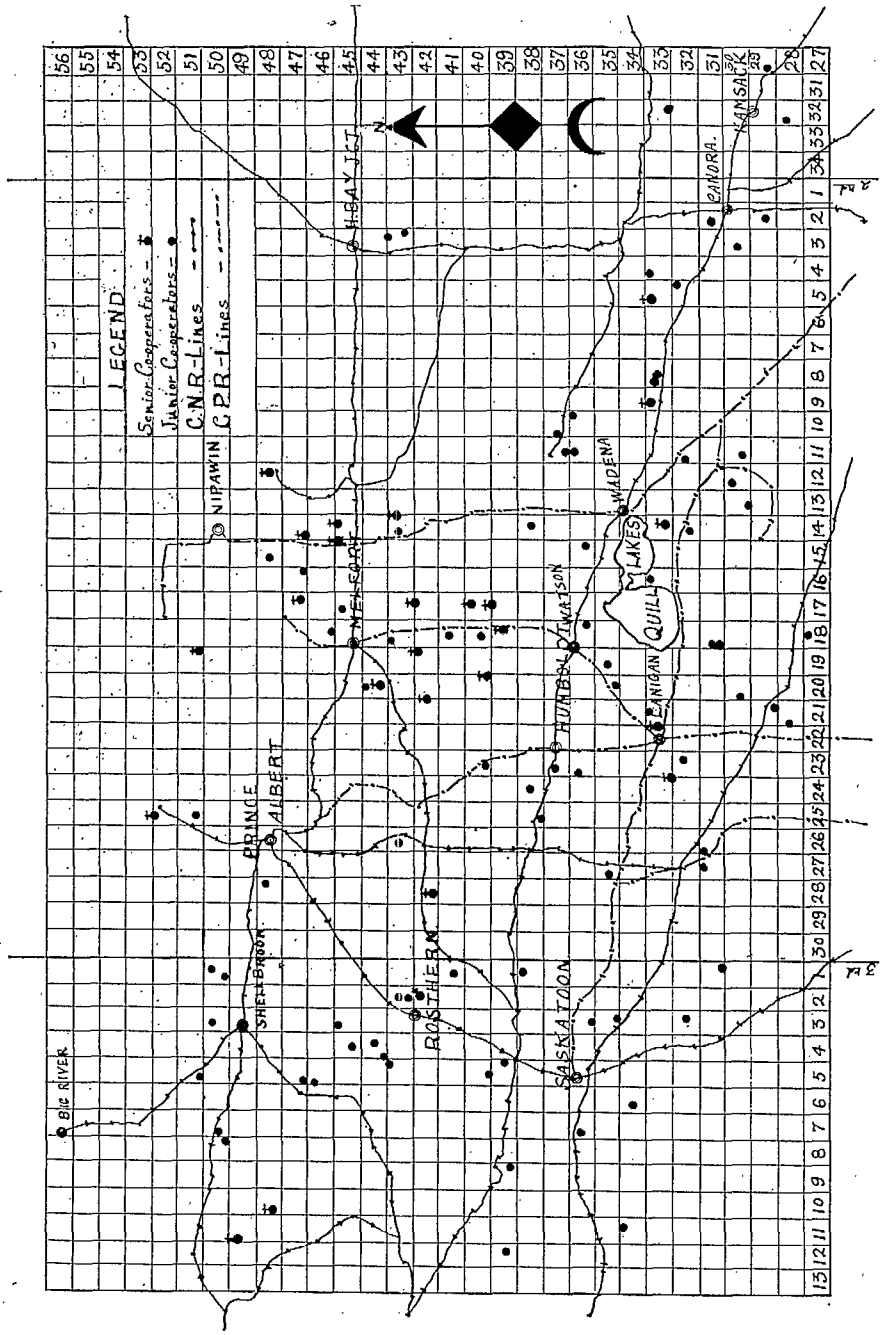
FLAX

In a test of five varieties, Crown flax yielded highest this season. It is a large-seeded sort and normally yields high and produces a good sample at this Station. Novelty, Premost, and Linota also yielded fairly well and the samples of grain were good. Bison was tested this year for the first time and, while the yield was not outstanding, the seeds were very large and the sample good. Linota has been recommended for land infested with flax wilt, but as there is none of this disease here we cannot verify the statement.

CO-OPERATIVE WORK WITH CEREALS

Rod-row tests of cereal varieties have been conducted with various farmers in the district served by this Station for a number of years. Some farmers test wheat, oats, and barley, while others test only one or two classes of grain. Usually about six varieties of each kind of grain are compared, the seed for the rows being prepared and sent out by the Experimental Station. When ripe the farmer cuts the grain from each row and bags it separately. The bags are then labelled and shipped to the Station, where the heads are threshed and the yields from each variety compiled. By this method of testing we hope to get an indication of which varieties are most suited to the various districts and soil types. Thirty-one adult farmers conducted such tests this year.

In addition to this, eighty-three boys and girls in this district tested wheat varieties in co-operation with the Experimental Station and the Saskatchewan Wheat Pool. The seed was prepared and sent out, bags supplied, and heads threshed by the Experimental Station, while the Pool procured the co-operators,



attended to the correspondence, and paid for most of the inspection work. The results derived were very gratifying. Reliable results were obtained from sixty-eight points after discounting those which were damaged by wind, hail, stock,

or birds. As one year's results are never reliable, due to seasonal changes, we do not intend to make any recommendation from this work this year. The accompanying map, however, shows the location of the various co-operators, and it can be seen by this that the district is fairly well represented. For this year the district can be distinctly divided into three areas: namely, an eastern rust area, a southern dry area, and a northern humid area. It may be stated that Ceres was outstanding in yield and grade in the rust area, while Garnet was superior in the north area. Marquis was very good in the dry area.

HORTICULTURE

VEGETABLES

ASPARAGUS

Asparagus was ready for use May 16 and the last cutting was made July 5. From a 30-foot row the yield was 7 pounds 8 ounces, which is practically the same as the average for seven years. This early vegetable should be in every farm garden. It has proved quite hardy with no protection other than that afforded by the dead tops and the natural snowfall. Young plants are easily grown from seed and once set in the permanent bed require very little attention. Although the yields secured have not been large the crop has never failed. It is the earliest vegetable grown here; and may be used for what is, comparatively, a long season and this at a time when fresh vegetables are scarce. In quality it ranks second to none.

BEANS

Thirty-two varieties of dwarf or bush beans were planted May 30. Dry weather delayed germination and the plants did not appear above ground until June 20. Growth was very strong during July but drought in August interfered with the setting and development of the pods and as a result the crop was light. The growing conditions described favoured the early varieties and the highest yields secured were from Princess of Artois, Webber Wax, Challenge Black Wax, Masterpiece, and Refugee or 1000 to 1. Other varieties that gave a fair crop and were high in quality were Bountiful, Early Red Valentine, and Stringless Green Pod.

Kentucky Wonder Wax and Kentucky Wonder Green Pod were the best of the pole or runner beans tested. They produced 20 pounds, and 12 pounds 10 ounces respectively, from a 30-foot row.

BEETS

Variety tests were sown April 30 and the young plants were frozen May 23. The plots were resown, as far as the seed supply would permit, on June 30. This second sowing produced a good crop of marketable beets.

Detroit Dark Red is recommended for the main crop. This variety has yielded well and produced roots that were high in quality. Crosby Egyptian and Early Flat Egyptian have also produced good crops. They are usually listed as being earlier than Detroit Dark Red but this difference in season has not been very marked here.

BRUSSELS SPROUTS

A heavy snowstorm on October 15 followed by severe frosts prevented the recording of data on this experiment. Long Island Improved was the highest yielding variety in 1928 and 1929, and also looked promising in 1930. This has not proved to be a profitable crop but edible sprouts may be produced most seasons if the plants are started in a hotbed.

CELERY

Dry weather with high temperatures in August were unfavourable conditions for the production of good celery. The highest yields were secured from New Golden or Wonderful, Golden Phenomenal, and Paris Golden Yellow. Judging from results here these new varieties should replace White Plume, which has been widely recommended for planting on the prairies. They have not only outyielded the latter variety but have also produced celery of better quality. Easy Blanching and Emperor were the best of the late varieties. They required further blanching after being stored and were in good condition from the middle of November until late in December.

CABBAGE

From seed sown in the hotbed April 7 plants of Golden Acre and Early Krop had formed edible heads by July 20. Early Summer and Extra Early Express were almost as early but produced smaller crops.

Thirty varieties sown in the garden May 5 were completely killed by frost on May 23. Results from previous years would recommend Copenhagen Market for the main crop. Danish Ballhead is the best cabbage for storage but must be sown early or started in a hotbed to develop good heads.

CARROTS

Carrots were sown in the garden April 28 and were not damaged by a frost which destroyed the cabbage, beets, and kohl rabi on May 23. Chantenay is recommended as a main crop variety and Nantes for the home garden, or where high quality takes precedence over yield. Early French Forcing and Early Scarlet Horn were the earliest varieties and were ready for use July 16, while Chantenay and Nantes were ready July 22.

CAULIFLOWER

Early Snowball, Fordhook, Sutton First Crop, and Snowstorm were the best of the early varieties. Dry Weather, a midseason variety, gave a fair crop but Veitch Autumn Giant, which is usually the best of the late sorts, failed to produce edible heads.

SWEET CORN

Pickaninny and Banting were ready to use August 15 from seed sown May 20. Sixty-Day Golden was ready August 18, and Early June on August 19. These were the best of the early varieties tested. Old Squaw was also ready on August 15 and, although lacking the quality of some of the sweeter varieties, was very good when harvested before the ears were over mature. Golden Bantam was ready August 27 and retained its place as the standard for quality among sweet corn.

CUCUMBERS

Each variety was represented by five hills of four plants each with the hills five feet apart each way. Seed of eight varieties was planted in the hotbed May 22 and the young plants were moved to the garden June 10. The following yields were obtained: Davis Perfect 30 pounds 3 ounces, Chicago Pickling 25 pounds 7 ounces, Early Russian 24 pounds 9 ounces, Arlington White Spine 23 pounds 15 ounces, Early Fortune 23 pounds 8 ounces.

Nineteen varieties were planted in the garden May 30. The highest yields were as follows: Double Yield 35 pounds 15 ounces, Davis Perfect 35 pounds 11 ounces, Large White Spine 31 pounds 6 ounces, Early Green Cluster 28 pounds 2 ounces, Japanese Climbing 27 pounds 6 ounces.

Seven pickling varieties were planted in the garden May 30, and the fruits were harvested at the pickling stage. The yields from five hills were: Early Russian 32 pounds 5 ounces, Chicago Pickling 28 pounds 15 ounces, Snow Pickling 25 pounds 10 ounces, Boston Pickling 17 pounds 2 ounces, Cumberland Pickling 13 pounds.

Judging from the results for several seasons, Davis Perfect, White Spine, Early Russian, and Chicago Pickling are reliable varieties.

LEEKS

Monstrous, or Giant Carentan and Musselburg have average yields of 26 pounds and 21 pounds, respectively, from a 30-foot row for a five-year period.

LETTUCE

Three varieties of leaf lettuce, Grand Rapids, Black-Seeded Simpson, and Early Curled Simpson, were tested. Grand Rapids and Early Curled Simpson were more tender and had a finer flavour than Black-Seeded Simpson.

May King was selected as the best of the early heading varieties. New York and Iceberg were outstanding among the latter varieties. Big Boston formed large heads but many of them were decayed when harvested.

MUSKMELONS

The plants are usually frozen here before any fruits have ripened. In 1930 Page Early, Lake Champlain, Emerald Gem, and an Australian variety received from W. D. Willoughby, Parkside, Sask., ripened a few fruits.

WATERMELONS

The varieties Fordhook, Arikara, Cole Early, and Phinney Early all ripened some fruits and yielded in the order listed.

ONIONS

Onions were seeded in the garden April 29 and harvested August 15. There was scarcely any damage from the onion maggot and a fair crop was harvested. Returns from the highest yielding varieties were as follows: Ailsa Craig 28 pounds, Yellow Globe Danvers 20 pounds, Large Red Wethersfield 19 pounds, Ohio Yellow Globe 18 pounds, Prizetaker 18 pounds, Cranston Excelsior 18 pounds.

PARSNIPS

The round varieties provided the most interesting feature of the parsnip test. Two of these, Guernsey and Short Round yielded at the same rate as Hollow Crown and were much easier to harvest. The latter feature should prove an advantage when parsnips are grown on heavy clay soils.

GARDEN PEAS

Sixty-five varieties were planted in the variety test on April 25. The following varieties, with the dates they were ready for use, are given as some of the best, yield and quality both considered, although there are many other excellent varieties: Extra Early Pedigree, July 5; Thomas Laxton, July 9; Gradus, July 11; English Wonder, July 12; Director, July 14; Lincoln, July 15; Reliance, July 15; Bruce, July 17, Stratagem, July 21.

PEPPERS

Eleven varieties were planted in the hotbed March 29 and moved to the garden June 12. Harris Earliest, Hamilton Market, Golden Dawn, and Neapolitan were the only varieties with ripe fruits and also produced the largest yields of green fruits.

PUMPKINS

Fort Berthold and Winter Luxury were the only varieties with ripe fruits when the vines were frozen September 1.

RADISH

Sown April 28, XXX Scarlet Oval was ready to use June 13, Scarlet Turnip White Tip June 14, Non Plus Ultra June 16, and Icicle June 17. Saxa and Twenty Day, which are usually good varieties, were mixed lots, and French Breakfast was a worthless mixture with most of the plants running to seed before edible roots were formed.

SPINACH

Bloomsdale and Viroflay were the earliest varieties. Of the second-early sorts, Giant Leaf produced the largest leaves and remained the longest in season.

SQUASH AND VEGETABLE MARROW

Orange Marrow produced 25 fruits weighing 201 pounds, Long Green 26 fruits weighing 119 pounds, Cocozelle 25 fruits weighing 102 pounds, English vegetable marrow 27 fruits weighing 95 pounds, Delicious 26 fruits weighing 80 pounds, and Long White Bush 29 fruits weighing 79 pounds. The above yields were from five hills of five plants each with the hills eight feet apart. The vines were killed by frost September 1.

TOMATOES

Seed was planted in the hotbed April 5 and the plants were set in the garden June 9. Weather conditions were favourable for rapid growth and the first ripe fruit was harvested August 5. The following yields from thirteen of the highest yielding varieties are the averages for a 5-year period ending 1930:—

TOMATOES—AVERAGE YIELDS 1926-30

Variety	Average yield of ripe fruit from 10 plants		Variety	Average yield of ripe fruit from 10 plants	
	lb.	oz.		lb.	oz.
Herald	18	15	Burbank	16	5
Alacrity	18	7	Earliana	15	11
First and Best	17	7	First of All	15	2
Bonny Best	17	4	Pink No. 1	14	12
Avon Early	17	3	Earliana Grade 2	14	5
Bolgiano	17	0	IXL Extra Early	14	4
Alacrity x Earlibell	16	14			

POTATOES

Extremely dry and hot weather in August with a killing frost September 1, prevented the tubers from sizing well and resulted in the lowest yields on record at this Station. Early Ohio and Irish Cobbler are still the best varieties offered for planting in Northern Saskatchewan.

TREES AND SHRUBS

A list of hardy trees and shrubs that might be used for planting in this district was published in the superintendent's report for 1927. Since that time the following data have been recorded:—

The named varieties of common lilac, *Syringa vulgaris,* were killed back by the winter of 1927-28 and have not yet made a complete recovery. Charles X and Michael Buchner are two of the hardiest of the varieties tested.

Lonicera alberti was also showing injury in the spring of 1928. The plants have since thrown out new growth from the lower parts of the stems.

In the summer of 1930 a few of the Norway spruce, *Picea excelsa,* were found to be dead. These trees were planted in 1912 and previous to this year have shown no evidence of winter injury. The clumps of evergreens on the grounds are becoming quite crowded so that there is competition between the trees. Bearing this in mind it would seem quite possible that the dry weather in the late summer of 1929 may have been a more important factor than the past winter in causing the death of these spruce trees.

Lodgepole pine, *Pinus contorta latifolia,* showed some browning of the leaves in 1930, but none of the injured trees have died.

A single specimen of the Douglas fir, *Pseudotsuga douglasi,* planted in 1909, has been repeatedly frozen back and, although still alive, it is only a few feet in height.

Some specimens of the Canoe birch, *Betula papyrifera,* were killed back in 1930 while many others continued growth from the terminal buds. This difference in hardiness has also been observed in the seedling rows of American elm, *Ulmus Americana,* and Green ash, *Fraxinus lanceolata.* Injured seedlings have been culled from these rows and this practice would seem to have a good deal to commend it as a method of improving nursery stock before the young trees are placed in a permanent location.

SMALL FRUITS

RASPBERRIES

The raspberry crop was almost a complete failure. Dry weather the previous summer was responsible for a poor stand of fruiting canes, and drought and red spider during the fruiting season prevented the fruit that did set from developing.

STRAWBERRIES

As a result of the dry weather in 1929 the stand of plants was poor. The first pickings from early varieties were fairly good, but lack of moisture towards the end of the season caused a rapid falling off in size of fruit and in yields.

Dakota produced the largest crop and is recommended for planting the home berry patch. The fruit from Senator Dunlap was a fine sample but owing to the sparse stand of plants the yield from this variety was small.

BLACK CURRANTS

Many fruits were infested with the Currant Maggot, *Epochra canadensis,* which reduced the yield and made the fruit unfit for use. Varieties giving the highest yields were Lee Prolific, Climax, and Buddenborg with 14 pounds 11 ounces, 11 pounds 2 ounces, and 10 pounds 1 ounce, respectively, from 12 bushes.

Buddenborg produced the finest sample of fruit.

TREE FRUITS

PLUMS

The plum trees wintered well and bore the heaviest crop of fruit harvested for some years. The following hybrid varieties which usually have most of the fruit buds killed in winter, bore fair crops: Cheresoto, Sansoto, Opata, Sapa, Ojibwa, and Waneta.

Cree and Champa, selected sandcherry varieties from South Dakota, also fruited well.

Eleven hundred Cheney seedlings have been fruited but only a few of these are considered worthy of propagation. The fruit from even the best of these selections is lacking in size, and although pleasant to eat from the tree when fully ripe, it develops an astringent or bitter flavour when cooked. The chief value of these seedlings seems to lie in the hardy material they provide for breeding better plums and in supplying seed for hardy stocks.

APPLES

The crabapple trees were damaged by frost on May 23. Prince, Osman, Jewel, and Mecca bore fair crops of fruit. The first large apples ever grown here were harvested from Pine Grove Red and Romankoff. It was very interesting to see these fruits but the varieties mentioned show very little promise of proving hardy.

Apples budded in 1929 produced a good stand of young trees. The average growth of these was about four feet.

The following apple varieties planted at various times between 1910 and 1925 have not proved hardy, and have either killed out entirely or the trees have been discarded after being repeatedly frozen back: Angus, Anis Rose, Anisette, Arcola, Anisim, Anoka, Blushed Calville, Bow, Bogdanoff Glass, Crescent, Charlamoff, Crusoe, Carlyle, Duchess, Dudley, Elsa, Evelyn, Florence, Golden, Granby, Grandmother, Iowa Beauty, Hibernal, Hyslop, Hoadley, James, Jasper, Kelso, Lora, Lowland Raspberry, Lyman Crab, Lubsk Queen, Magnus, Martin, Milwaukee, Moscow Pear Apple, Nestor, Norman, Northern Queen, Ostrakoff, Okabena, Ostrakoff Glass, Patten Greening, Percival, Repka Kislaga, Robin, Rupert, Ruth, Red Anis, Redman, Silvia, Simbirsk, Trail, Transcendent, Volga Anis, Wealthy, Whitney, Walton, Wapella, Yellow Transparent.

ANNUAL FLOWERS

In spite of the hot, dry weather experienced in August many varieties of annual flowers bloomed profusely. Frost on September 1 damaged the more tender sorts but many others carried considerable bloom until October. A partial list of those that have been tried out and can be recommended is to be found in our report of 1928.

Silene colorata (Poir) is a new annual the seed of which has not been found listed in seed catalogues but was obtained from F. Bukowsky of Rosthern. Seed of this annual was planted in the garden May 26 and the plants begun to

bloom the first week of July. It is dwarf, upright in habit of growth, and bears a profusion of pink flowers. It is well suited for use as a border plant.

BULBS FOR INDOOR FLOWERS

All bulbs used for forcing have been potted each year as soon as received, which is usually about October 15.

Polyanthus narcissus have bloomed in five to six weeks from the date potted. Paper White has been given the highest rating.

Native white spruce, 12 years transplanted from the forest.

Roman hyacinths have been potted early in October and have bloomed each year in time for Christmas. The white flowers are fragrant and very pretty.

Early Single tulips usually begin to bloom early in January and varieties of different seasons provide a succession of bloom until the end of March. The following varieties are recommended for growing in pots:—

Early varieties: Duc van Tholl, scarlet; Brilliant Star, brilliant scarlet with dark centre; Proserpine, carmine pink; Mon Tresor, golden yellow.

Midseason and late varieties: Couleur de Cardinal, scarlet, purple shaded; Prince of Austria, bright orange vermillion; Duc de Berlin, red, bordered yellow; Cullinan, pink and white; Flamingo, pink and white; White Hawk; Yellow Prince; Fred Moore, apricot orange.

Early Double tulips are later in blooming than the Early Single varieties. They are usually at their best in late February and March. Peach Blossom has been the most outstanding variety. Deep pink in colour and with very large blossoms it makes a fine pot of bloom. Murillo, blush pink, had smaller flowers than Peach Blossom but forced well. Couronne d'Or, yellow slightly tinged with orange, has also been a reliable variety when grown in pots.

Darwin tulips require more gentle forcing than the Early Single varieties. They were at their best in March and April. By keeping some of the late varieties in a cool room in the cellar their blooming season was extended well into May, when the Early Single varieties were beginning to bloom in the garden. Varieties that have forced well are: Bartigon, scarlet, forces early; Farncombe Sanders, bright scarlet; Clara Butt, apple-blossom pink; Princess Elizabeth, bright pink; Roi d'Island, carmine pink.

Dutch hyacinths are of practically the same season as Early Single tulips. A range of varieties supplied bloom from early in January until the end of March. Specially prepared hyacinths may be had for Christmas forcing. The following varieties are selected from those tested as being well adapted for growing in the home; Arentine Arendsen, early white; Moreno, salmon pink, very early; La Victoire, red, forces easily and early; Gertrude, rosy pink; Gigantea, blush pink; Marconi, pink, late; L'Innocence, white; Enchantress, light blue; King of the Blues, dark blue, late.

Crocus bulbs were planted in fern pans and made ideal pots of bloom for use as centre pieces on the family table. They were at their best in late January and early in February. The following varieties are recommended: Large Yellow, Purpurea Grandiflora, and Mont Blanc.

DAFFODILS

Van Sion has been the most satisfactory of the double sorts for growing in pots and one of the best of all the bulbs forced.

Single daffodils that have forced well are: Victoria, Glory of Sassenheim, King Alfred, Tresserve and Sir Watkin. Victoria is early and forces evenly so that the plants in a pot usually bloom at the same time. The creamy-white perianth and the rich yellow trumpet offer a pleasing contrast, and although the flowers are smaller than those of some varieties the general effect is good.

TULIPS AS BEDDING PLANTS

Early Single tulips have been found the most satisfactory for planting in the garden. They have bloomed year after year without protection of any kind. Their season is from May 20 till the middle of June. Bloom is rather scarce in the garden at this season and the bright, glowing colours of the early tulips have added a distinctive touch to the Station grounds.

If fresh bulbs are purchased each year the cost is rather high but this is quite unnecessary since many varieties have thrived for years even when the beds were planted to annual flowers after the tulip bloom was over. Varieties recommended for bedding are: Cramoisie Brilliant, brilliant red; Couleur de Cardinal, scarlet, purple shaded; Crimson King, bright crimson; Maes, bright scarlet; Joost van Vondel, red and white; Fred Moore, apricot orange; La Reine, white; Mon Tresor, golden yellow; Pottebakker White; Yellow Prince; Le Matelas, bright pink; Pink Beauty.

Early Double, Darwin and Mayflowering tulips have been given a limited trial. They have all bloomed for a few seasons but they have not proved so hardy or as prolific as the Early Single varieties. They bloom later than the latter and so extend the tulip season until the end of June. They are now being given a more thorough test with the beds mulched for winter protection.

SWEET PEAS

Sweet peas bloom freely most seasons and 1930 was no exception. The seed was sown in the garden April 30 and the first blooms were cut from early-flowering varieties July 7. The earliest summer-flowering varieties bloomed from five to seven days later. There are so many good varieties of sweet peas that space will not permit of listing them all. The following varieties have been selected from a list of more than one hundred tested:—

White—Constance Hinton, Edna May Improved, Model, Giant White, Avalanche.
Cream—Matchless, Daffodil.
Picotee—Youth, Annie Ireland.
Light Pink—Bridesmaid, Venus, Elizabeth, Mary Pickford, Valentine, Elegance, Picture, Elfrida Pearson, Magnet.
Deep Pink—Miss California, Doris, Annie Bownass, Miss Philadelphia, Idyl, Ascot.
Rose Pink—Pinkie, Montrose, Hebe, Mrs. A. Searles, Hawlmark Pink.
Rose—Ruffled Rose, Sunset.
Cerise—Charming, Hero.
Scarlet—Hawlmark Scarlet, Huntsman, 2 L.O., Campfire, Pimpernel.
Crimson—Charity, Sybil Henshaw.
Orange—Crusader, Gold Crest, Fordhook Orange.
Mauve—Chieftain, King Mauve, Mauve Beauty.
Lavender—Powerscourt, Colne Valley.
Blue—Sapphire, Blue Bird.
Purple—Olympia, Royal Purple, Floradale Purple.
Maroon—The Sultan, Warrior.

PERENNIAL FLOWERS

The perennial flowers wintered well but the amount of bloom was less than in 1929. This was probably due to the extremely dry weather experienced in that summer. Peonies in particular were not up to their usual high standard. Violas began to bloom April 25 and continued until covered with snow on October 15. They have wintered better than pansies and are more floriferous but the blossoms are smaller. If sown early they make a fine showing the first season. For very early bloom the seed should be sown in late May or June and the young plants transplanted to a nursery row where they may remain till the following spring. Those catalogued as bedding violas have larger flowers than the species, but *V. cornuta* and *V. gracilis* are very interesting and very free-flowering little plants.

A list of perennials selected from those tested here is submitted as follows:—

Achillea ptarmica fl. pl. vars. "The Pearl" and "Perry's White," *A. millefolium rubra* (Yarrow); *Anthemis tinctoria*, var. Kelwayi (Yellow Camomile); *Aquilegia caerulea* (Colorado Columbine), *A. Canadensis* (American Columbine), A. Long-spurred Hybrids; *Campanula carpatica* (Carpathian Bellflower); *Chrysanthemum coccineum* (Perennial Daisy); *Delphinium grandiflorum*, and *D. hybridum* (Perennial Larkspurs); *Dianthus plumarius, D. deltoides superbus; D. speciosus, D. chinensis macrosepalous* (Perennial Pinks); *Dicentra specta-*

bilis (Bleeding Heart); *Gaillardia aristata* (Blanket Flower); *Gypsophila paniculata fl. pl.* (Perrenial Baby's Breath); *Hemerocallis dumortieri* (Early Daylily); *Hesperis matronalis* (Sweet Rocket); *Iris germanica,* and *I. sibirica; Lavatera thuringiaca,* Siberian variety; *Lilium tigrinum* (Tiger Lily), *L. tenuifolium* (Coral Lily); *L. Dahuricum, L. concolor,* var. Dropmore; *Linum sibiricum* (Blue Flax); *Lychnis arkwrightii, L. chalcedonica* (Scarlet Lychnis); *Papaver nudicaule* (Iceland Poppy), *P. orientale* (Oriental Poppy); *Phlox paniculata* and the varieties Baron von Dedem, General von Heutz and Jean Bart, *P. suffruticosa* var. Miss Lingard; *Rudbeckia laciniata fl. pl.* (Golden Glow); *Veronica spicata* (Speedwell); Viola, bedding varieties and *V. cornuta.*

PEONIES

Peonies are rated as the finest of the herbaceous perennials grown here. The season of bloom is from the last week of June to July 20. The following varieties have been grown for six years or more and are listed as the best of the collection:—

White—Duchesse de Nemours and Marie Lemoine.

White, edged or flecked with crimson or carmine and flesh white—Couronne d'Or, Festiva Maxima, Madame de Verneville.

Pale pink and pale pink fading to white or edged with white—Asa Gray, Marguerite Gerard.

Pink—Edulis Superba, Livingston, Madame Auguste Dessert, Monsieur Jules Elie.

Red—Felix Crousse.

POULTRY

The work carried on with poultry during the year 1930 was a continuation of experiments and observation tests in housing, breeding, incubation, feeding, disease control, and selecting for greater average egg production and egg size, supplying information on poultry husbandry to farmers and poultrymen in Northern Saskatchewan by mail and personally, and staging a poultry exhibit at Saskatoon and Prince Albert summer fairs.

The farm flock, consisting entirely of Barred Plymouth Rocks, totalled on December 31, 1930, 605 birds, including 1 cock, 59 cockerels, 107 hens, and 438 pullets.

The average number of laying hens during the twelve months of the year 1930 was 413, and they laid during this time 62,581 eggs, or an average of 152 eggs per hen. The average price received for eggs during the year was 26·2 cents. Six hundred and ten cockerels and 245 hens and pullets were marketed as roasters and fowl. Fifty Barred Plymouth Rock cockerels and 176 yearlings and pullets were sold to farmers and poultrymen for breeding purposes and 24 pullets were shipped to Egg Laying Contests—12 to Brandon Contest and 12 to Indian Head Contest. The highest pullet completing her pullet record was N90, which laid 283 eggs, and the ten high pullets laid an average of 241 eggs weighing 24 ounces per dozen in their pullet year. Twelve hundred and eighty-five eggs were sold for hatching.

No new blood was introduced into the flock during the years 1927, 1928, and 1929. In 1930 three male birds were purchased from the University of Saskatchewan and three settings of eggs were purchased from Mrs. W. J. Thompson, Birch Hills, Sask.

A number of the projects which have been carefully outlined are to be continued for a number of years so that the results obtained over a period of years can be averaged and more conclusive results given to the general public, and particularly to those engaged in the poultry industry.

PROJECTS

The major active projects under way at present are as follows:—

Breeding

Breeding for standard type and production.
Pedigree breeding for egg production: (*a*) Influence of sire on egg production.
Breeding for egg size: (*a*) Inheritance of egg size characteristics.

Incubation

Best date for incubation.
Best type or make of incubator.
Best site for incubators.
Moisture in the incubator.
Incubation costs: (*a*) Total cost per egg unit.

Brooding

Brooding costs: (*a*) Cost of feeding; (*b*) Fuel costs.
Best kind of litter (*b*) for brooder houses.

Baby Chick Feeds

(*a*) Best chick feeds. Exp. (*d*) Home-mixed vs. commercial baby chick starters.
(*b*) Various kinds of milk for chicks.
(*c*) Vitamine feeds for chicks.

Production

(*a*) Pullets vs. hens for egg production.
(*b*) Costs of egg production.
(*c*) Relation of body weight to egg production.
(*d*) Relation between annual production and date first egg laid.
(*e*) Best hatching date for egg production.

Hatching

(*a*) Hatchability from large and small eggs.
(*b*) Feeds for fertility, hatchability and viability.

Fattening

(*a*) Costs and gains in fattening roasters.
(*b*) Broilers vs. fryers vs. roasters.

Egg Preservatives

Exp. (*a*) "Water-glass" vs. cold storage.

Disease

(*a*) Bacillus pullorum infection of fowl.
(*b*) Intestinal parasitism of fowl.

BREEDING

Every bird is trap-nested throughout the year and only the heaviest producing birds of good type are retained for breeders; that is, birds laying over 200 eggs in their pullet year with an egg size of two ounces per egg, except a few individuals in the flock which are retained for specific purposes in breeding.

In order to identify the progeny from outstanding individuals, pedigree breeding is employed. The eggs are carefully marked at hatching time and small numbered metal bands put on the legs of the chicks as soon as they are hatched. Pedigree baskets, holding from three to ten eggs, are used as a means of identifying the chicks at hatching time. The eggs are placed in the baskets on the nineteenth day, all the eggs from one hen being placed in one basket. The incubators are then closed until the chicks have hatched. The small bands are transferred from the legs to the wings when the chicks are three weeks of age. These bands make it possible to identify the breeding of individual pullets and cockerels in the fall. Metal leg bands are put on the legs of the pullets as soon as they are transferred from the range to the laying houses. The pedigreeing of chicks makes it possible to study the individual birds and their ancestry for the purpose of selecting individuals for breeding which conform closely to the standard laid down in the "Standard of Perfection," the guide which we must follow in building up a flock of poultry modelled on the type of the ideal for that specific breed in regard to breed-type, body weight, colour markings, and size and colour of eggs.

REGISTRATION

Of the birds entered in the Indian Head Egg Laying Contest 1929-30 two qualified for registration. One of those qualifying was a daughter of J156, a hen which laid 235 eggs in her pullet year, and the four half-sisters of this bird laid 263, 256, 224, and 236 eggs weighing two ounces or more, respectively, in their pullet year. The leading pullet from this Station at the Indian Head Contest this year is also a daughter of J156.

FEEDING AND MANAGEMENT PROBLEMS

Numerous inquiries have been received to date in regard to rearing, feeding, and management of baby chicks, growing chickens on the range, and the laying pullets. For the advantage of those interested we are outlining in detail the general procedure followed at the Dominion Experimental Station, Rosthern, and which we can recommend to all those in Northern Saskatchewan who are interested in poultry husbandry.

BABY CHICK RATION

5 pounds ground wheat
5 pounds ground oats (oat flour, sifted oats, oatmeal or hulless oats)
5 pounds yellow cornmeal or ground barley
5 pounds middlings or shorts or low grade flour
5 pounds bran
5 pounds meat scrap
3 per cent bonemeal
2 per cent charcoal (chick size)
1 pound alfalfa meal
½ of 1 per cent salt
2 per cent cod liver oil

Scratch Grain for Baby Chicks.—Finely cracked wheat and corn, equal parts.

Baby chicks should be removed from the incubator 24 hours after hatching and placed under the brooder. They should have free access to chick size grit and shell at all times after removal from the incubator. Mash too should be kept before them at all times and water in small container which must be kept clean and sanitary. The baby chick starter should be fed for six weeks.

The litter consists of cut straw or sand.

BROODER STOVES

Fires should be started in the brooder stoves 24 to 48 hours before the chicks are placed in the brooder in order that the temperature may reach, and be maintained at, the desired height. For the first week the temperature at the edge of the hover should remain at approximately 90 degrees Fahrenheit, which means about 100 or 110 degrees in the vicinity of the fire pot. The temperature should remain constant as any sudden deflection in temperature reacts on the health and vigour of the chicks. We find it a good policy to construct a temporary encasement around the brooder stove for the first week or two so as to keep the chicks in the vicinity of the brooder.

The primary essentials of early brooding are constant temperatures, clean, sanitary conditions, feed which is free from mould, and fresh water at their disposal at all times.

FROM SIX WEEKS OF AGE ON

Ration

100 pounds shorts or middlings
100 pounds oat chop (hulless oat chop or sifted oat chop)
100 pounds bran
100 pounds barley chop
50 pounds wheat (ground)
60 to 65 pounds fish meal or beef scrap or equal parts of each
6 pounds bonemeal
10 pounds charcoal
3 pounds common salt
8 pounds cod liver oil

The cod liver oil is included in the ration for the first six weeks of this period.

The scratch should consist chiefly of small immature wheat kernels or small wheat. Grit and shell should be available in separate containers or rather in a hopper having a division separating the two. Fresh, clean water in sanitary containers must be available at all times.

RANGE HOUSES

Three or four days before transferring the birds to the range the range houses should be thoroughly cleaned and sprayed with a disinfectant such as a strong solution of creolin ($\frac{1}{2}$ to 1 cup of creolin to a 12 quart pail of water) and then white washed. Coal oil (kerosene) may be added to the spray with good results, making the disinfectant more potent. Lye is a very good disinfectant for scouring the floors. Black Leaf 40 or a reliable dust or lice powder may be used in instances where lice appear to be prevalent.

RANGE

Soil infection is overcome by rotation of the ranges used. An annual or biennial crop may be grown successfully, such as annual green oats, wheat or barley sown early in the spring and if it reaches the milk stage it should be

mown down to within four or five inches of the ground in order to allow for a second growth. If rape is sown early in the spring it will provide an abundance of green feed. As a biennial crop for green feed alfalfa gives good results when sown with a nurse crop, allowing the chicks access to it the second year.

Roosts should be placed in the colony houses so that the birds will make use of them at an early date. Otherwise they will huddle together and become weak, making conditions ideal for contraction of disease and slow maturity.

The cockerels and pullets should be separated at an early date.

The combination mash and grain hopper should be used in preference to the hand system of feeding.

GROWTH OF COCKERELS AND PULLETS 1930

March hatched Barred Plymouth Rock cockerels weighed, on July 11, 5 to 5½ pounds and the pullets weighed 4 to 5½ pounds on November 1. Three hundred and eighty pullets hatched in March and April weighed an average of 5·48 pounds per bird on November 1, 1930, and they laid during the month of November 4,291 eggs, or average per bird of 11·3 eggs.

RATION FOR PULLETS TO PROLONG BODILY DEVELOPMENT

100 pounds shorts
100 pounds bran
100 pounds barley chop or corn
75 pounds oat chop
20 pounds beef scrap or fishmeal
6 pounds bonemeal
10 pounds charcoal
2 pounds common salt

The thorough mixing and incorporation of the ingredients of the mash cannot be stressed too strongly.

By close observation the poultryman should arrange to readjust the constituents of the growing mash so as to prolong the growth period of the pullets, or as prevention against ovulation. Leghorns should weigh from four to four and one-half pounds before they commence to lay and the Barred Plymouth Rocks five to five and one-half pounds.

SCRATCH FOR PULLETS ON ENTERING THE LAYING HOUSE

200 pounds of wheat.
100 pounds of barley.
100 pounds of oats.

This is fed by hoppers and by hand. Close the hoppers in the afternoon and scatter the scratch in the litter so as to acquaint them with the habit of working. After two weeks the scratch may be fed solely in the litter early in the morning and evening. The morning feed should not be sufficient to satisfy their appetites. The evening feed should be more than enough to satisfy them; three pounds for each fifty birds in the morning and four pounds in the evening.

Green feed has an important place in the ration. Cabbage, mangels, or alfalfa give good results.

The grit and shell hoppers should be given regular attention.

STANDARD LAYING MASH

80 pounds shorts or middlings.
70 pounds bran.
80 pounds oat chop.

80 pounds barley chop.
30 pounds crushed wheat.
40 pounds meat scrap.
10 pounds bonemeal.
8 pounds charcoal.
2 pounds salt (common).

From the first of December to the middle or end of April 2 per cent cod liver oil should be added to this ration.

SCRATCH FOR LAYING HENS

200 pounds whole wheat.
100 pounds barley.
100 pounds oats.

If the hens are in a good thrifty condition and well up in weight by the 1st of May we find it advisable to leave the barley out of the scratch grain from then on during the summer months.

Providing the birds are in normal condition, Epsom salts (1 pound to every 100 birds) given every two weeks during the summer and once a month during the winter are beneficial.

BREEDING FOR EGG PRODUCTION AND SIZE

To develop high-producing strains of Barred Plymouth Rocks laying eggs weighing 24 ounces and more per dozen, males were used in the breeding pens from dams which had laid 200 eggs and more in their pullet year with eggs weighing 24 ounces or more per dozen. The following table shows the results obtained from the daughters of the different males:—

RESULTS FROM DAUGHTERS OF DIFFERENT MALES

Sire	Daughters	Average egg production in pullet year	Average winter record	Average egg weight per dozen	Average age at first egg
	No.			oz.	days
J24	18	218	56	25	205
K25	5	221	54	25	195
K36	9	205	60	25·5	185
K31	7	177	63	25	186
K38	6	175	35	24·5	204
K41	6	209·5	60	26	196
K140	9	204	48	26	191
J74	6	191	37	24	194

The average egg production for sixty-six pullets during their pullet year was 203 eggs, 53 eggs in winter, average egg weight per dozen 25 ounces, and the average age at time first egg was laid was 194 days. The daughters sired by the above males were hatched in the months of March and April. J24 was from a hen which laid 245 25-ounce eggs in her pullet year and his sire's dam laid 234 2-ounce eggs in her pullet year. J24 was the sire of K25 and K31. These two cockerels were full brothers, sons of H41, who laid 227 eggs in her pullet year. K36, K38, and K140 were sired by J26. The dam of J86 laid 245 2-ounce eggs in her pullet year. K36 and K140 were full brothers and their dam's record was 209 2-ounce eggs in her pullet year. The other two males, K41 and J74, were the sons of hens which laid 202 and 200 eggs in their pullet year. Broodiness was prevalent in the daughters of K31 and K38, and as five of the

daughters sired by K31 were daughters of J94, which was broody a number of times during the late spring and early summer months, but laid well during the winter months, her daughters appeared to have this characteristic transmitted to them. The daughters of K38 appeared to have irregular egg cycles as well as being broody a number of times during the summer months.

The daughters of the above males which laid their first eggs late in August, September, and October had a smaller egg size throughout the year than the pullets which laid their first eggs in November and December. There also appeared to be a marked correlation between the body weights of the pullets which commenced to lay early in their pullet year and in the egg weights. Early maturity has undoubtedly an influence on weight of egg and body weight at maturity.

HATCHING RECORD 1930

	Total number eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for one chick hatched	Total fertile eggs for one chick hatched	Total eggs required for one chick when wing banded
Rosthern	3,429	2,987	87·1	1,905	55·56	63·78	1,497*	94·75	1·8	1·6	1·9
Hens	2,988	2,653	88·8	1,686	56·4	63·6	1,497*	94·7	1·8	1·6	1·9
Pullets	441	334	75·7	219	49·7	65·6	*	.....	2·0	1·5	.....
Imperial	2,266	1,973	87·1	1,374	60·6	69·6	1,199*	94·6	1·6	1·4	1·7
Buckeye	922	823	89·3	418	45·3	50·8	298*	95·5	2·2	2·0	2·5
Simco	241	191	79·3	113	46·9	59·2	*	.....	2·1	1·7	.....
February	408	344	84·3	192	47·1	55·8	180	93·75	2·1	1·8	2·3
March	1,957	1,730	88·4	1,065	54·4	61·6	905*	94·4	1·8	1·6	1·9
April	1,064	913	85·8	648	60·9	71·0	412*	96·03	1·6	1·4	1·6

*219 day-old chicks sold in April.
*106 day-old chicks sold in March.

Best Months for Hatching

For five years hatching has been carried on at this Station throughout the months of February, March and April. The following table gives the percentage of eggs fertile and the percentage of fertile eggs hatched each month and the average percentage for each month over a five-year period.

The eggs were all from Barred Plymouth Rocks.

Dates for Hatching

Month	Percentage of eggs fertile						Percentage of fertile eggs hatched					
	1926	1927	1928	1929	1930	Average	1926	1927	1928	1929	1930	Average
February	84·4	82·5	66·2	65·8	84·3	73·5	53·2	58·0	52·1	63·7	55·8	56·5
March	91·5	90·0	73·9	66·8	88·4	79·7	63·4	52·2	47·6	74·9	61·6	60·8
April	90·5	93·0	85·2	61·6	85·8	81·3	51·2	57·0	50·3	79·0	71·0	59·7

The fertility over the five-year period was 6·4 per cent lower in February than in March and in the same period 1·4 per cent lower in March than April. The percentage of fertile eggs hatched was lower in February by 4·3 per cent than in March, while there was only a difference of 1·1 per cent between percentage of fertile eggs hatched in March and April in favour of March hatches, but for the years 1927, 1928, 1929, 1930 the percentage of fertile eggs hatched was higher for the month of April by 2·7 per cent to 9·4 per cent. In conclusion, March and April appear to be the most satisfactory months for hatching and April is to be preferred to March.

HATCHING RESULTS FROM THE DIFFERENT MAKES OF INCUBATORS

Incubator	Total eggs set	Number eggs fertile	Per cent fertile	Number of chicks hatched	Per cent total eggs hatched	Per cent fertile eggs hatched	Total eggs required for one chick hatched	Total fertile eggs required for one chick hatched
Buckeye	11,385	8,973	78·8	5,306	46·6	59·1	2·1	1·7
Imperial	6,398	5,263	75·6	3,572	51·5	67·9	1·9	1·5
Cyphers	8,388	6,518	77·7	3,538	42·2	54·3	2·4	1·8
Tamlin	1,182	981	83·0	537	45·4	63·0	2·2	1·8
Simco	241	191	79·3	113	46·9	59·2	2·1	1·7

The above results are for the years:—

Buckeye	1926	1927	1928	1929	1930
Imperial	.....	.....	1928	1929	1930
Cyphers	1926	1927	1928	1929	.....
Tamlin	1926	1927	1928	.....	.....
Simco	.....	.....	.....	.....	1930

The buckeye, Imperial, Tamlin, and Simco are hot water machines while the Cyphers are hot air machines. The percentage of fertile eggs hatched was lowest for the Cyphers.

HATCHING RESULTS FROM HENS AND PULLETS OVER A FIVE-YEAR PERIOD 1926–1930 INCLUSIVE

Age of bird	Total eggs set	Number of fertile eggs	Number of chicks hatched	Per cent fertile eggs	Per cent fertile eggs hatched	Total eggs required for one chick hatched	Total fertile eggs for one chick
Hens	16,170	12,176	7,414	75·3	60·9	2·2	1·6
Pullets	11,964	9,750	5,652	81·5	58·0	2·1	1·7

Judging from the above results there is very little difference between the eggs from the hens and pullets. The eggs from the pullets showed a 6·2 per cent higher fertility, while the fertile eggs from the hens showed a 2·9 per cent higher hatchability than those from the pullets. The percentage of total eggs hatched was 47·2 for the pullets and 45·8 for the hens, showing a small difference of only 1·4 per cent in favour of the eggs from the pullets.

BEEF SCRAP VS. TANKAGE VS. FISHMEAL

During the months of February, March and April, 1930, an experiment was carried on to determine the value of beef scrap as a protein supplement for egg production as compared with tankage and fishmeal. Three uniform lots of Barred Plymouth Rock pullets were used in this experiment. The mash was the same for all lots except that 20 per cent beef scrap was added to the mash for Lot 1, 20 per cent tankage to that for Lot 2, and 20 per cent fishmeal to that for Lot 3. The following table shows the results:—

BEEF SCRAP VS. TANKAGE VS. FISHMEAL

Lot	Protein supplement	Number of bird	Eggs per bird	Value of eggs per bird	Cost of feed per bird	Profit over cost of feed per bird
				$	cts.	$
1	Beef scrap	30	49·3	1 64	41	1 23
2	Tankage	30	44·5	1 48	41	1 07
3	Fishmeal	30	46·3	1 54	45	1 09

This experiment is under way again from November 1, 1930, to May 1, 1931, and we hope to get more definite and conclusive information before drawing any conclusion as to a comparison of the above sources of protein supplement for higher egg production.

CRATE FATTENING EXPERIMENT WITH COCKERELS FROM THE RANGE

A fattening experiment with 36 cockerels from the range was begun on September 6. They were divided into three lots weighing as follows: Lot 1, 53·5 pounds; Lot 2, 55·25 pounds; and Lot 3, 54·5 pounds. The cockerels were fed in lots of four.

Lot 1 received the following ration in the given proportions: 20 pounds cornmeal, 10 pounds middlings, 10 pounds hulless oats, and 10 pounds meat scrap.

Lot 2 received 20 pounds ground barley, 10 pounds middlings, 10 pounds hulless oats, and 10 pounds meat scrap.

Lot 3 received 20 pounds ground barley, 10 pounds middlings, 10 pounds hulless oats, and 10 pounds meat scrap.

The mash was mixed with water four hours before feeding, two-thirds mash and one-third water.

The following table summarizes the results:—

RESULTS OF CRATE FATTENING EXPERIMENT

—		Lot 1	Lot 2	Lot 3
Number of birds		12	12	12
Number of days on test		14	14	14
Average initial weight	lb.	4·46	4·60	4·54
Average finished weight	"	5·54	5·29	5·42
Average gain	"	1·08	0·69	0·88
Amount of mash consumed	"	50	48	46
Amount of mash consumed per bird	"	4·17	4·00	3·83
Cost of feed consumed	$	1 33	0 91	1 02
Cost of feed consumed per bird	cts.	11	8	9
Average cost per pound gain	"	10	6	8
Selling value of each lot at 20 cents per pound	$	13 30	12 70	13 00
Profit over initial value of 15 cents per lb. and cost of feed	$	3 94	3 50	3 80
Average profit per bird	cts.	33	29	32

Feed prices on which the above values are based:—

Cornmeal	$ 2 75 per 100 pounds
Barley	1 20 per 100 pounds
Wheat	1 67 per 100 pounds
Hulless oats	1 47 per 100 pounds
Middlings	1 80 per 100 pounds
Beef scrap	4 50 per 100 pounds

System of feeding: First feed, one ounce per bird and gradually increased at the rate of four ounces per twelve birds per day until the birds were receiving 24 ounces per 12 birds, after which time the feed was increased at the rate

of 2 ounces per twelve birds per day until the birds were consuming 38 ounces per twelve birds per day. This was the maximum that twelve birds in the lot receiving ground wheat would consume per day, while twelve birds in the lot receiving barley were able to take 40 ounces per day. The lot receiving corn consumed as much as 42 ounces per twelve birds per day but it was found necessary to drop them back in their feed to 40 ounces per twelve birds per day.

The dressing percentage of the birds was approximately the same. The corn lot showed a higher quality of finish than either the wheat or barley lots and they appeared to relish their mash more than the other two lots.

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