DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

LETHBRIDGE, ALTA.

REPORT OF THE SUPERINTENDENT

W. H. FAIRFIELD, M.S.

FOR THE YEAR 1927

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DOMINION EXPERIMENTAL STATION, LETHBRIDGE ALBERTA

REPORT OF THE SUPERINTENDENT, W. H. FAIRFIELD, M.S.

Since this Station is in the centre of an extensive area of dry-land wheat production, and also of extensive irrigation projects, where a more varied system of irrigation farming predominates, it has a dual service to perform. It has to deal with the problems of the dry land farmer, whose main crop is wheat, and also with those of the irrigation farmer who has the opportunity and every inducement, from an economic standpoint to launch into diversified farming.

About half the land comprising the Station is irrigated, and the remainder cannot be irrigated. Two systems of farming are being carried out, one with irrigation and one without. The experiments in field husbandry, cereals, forage crops, and horticulture are, therefore, in a large measure duplicated; in other words, two experimental farms are operated under the one management, their object being not to compare the relative merits of the two systems, but to study their individual problems.

THE SEASON

Abnormal weather conditions prevailed in both the spring and fall of the season of 1927. Heavy and frequent rain storms during April and May caused serious delay in seeding operations. On the irrigated lands in the Lethbridge district only two-thirds of the grain was sown by June 1, and over quite a large area in the extreme southwestern part of the province, there was even less seeded by that date. Ample precipitation during the summer produced heavy crops of every description. Hay and pasture on the dry farms were particularly abundant. Practically no irrigation water was used in the district during the growing season except on alfalfa and sugar beets.

Stormy weather during September and October delayed threshing operations, and the severe winter conditions, which set in early in November, put a complete stop to them. On January 1, 1928, fully 35 per cent of the total crop in the main wheat-growing area south of Calgary was still standing in the stooks. The harvesting of sugar beets was also seriously interfered with, and there were unfortunately many acres left undug owing to the early freeze-up.

METEOROLOGICAL RECORDS AT LETHBRIDGE, 1927

Month	Temperature F.			Hours of bright sunshine	Wind			Evaporation from free water surface summer	Precipitation	
	Highest	Lowest	Mean		Mean hourly velocity	Greatest mileage in one hour			1927	Average 26 years
	°	°	°		miles	miles	direction	inch.	inch.	inch.
January	55	−30	18·3	115·2	13·7	49	SW	.....	0·31	0·63
February	53	−38	18·9	90·8	9·6	42	SW		1·39	0·68
March	60	− 3	31·6	188·4	13·1	58	W	.....	0·37	0·69
April	77	6	37·7	221·4	14·4	50	W	.....	1·48	0·95
May	79	26	45·3	135·6	13·4	48	W	3·36	7·32	2·58
June	82	35	58·4	287·1	9·9	35	W	3·83	1·60	2·77
July	86	37	61·6	308·5	7·0	23	W	4·00	1·93	1·82
August	85	40	60·3	273·3	7·9	36	SW	3·78	1·74	1·77
September	78	29	51·5	182·0	10·7	34	SW	3·16	3·29	1·82
October	80	26	46·6	178·7	13·4	48	SW	2·38	0·58	0·82
November	52	−15	18·1	61·1	11·1	53	W	.....	2·88	0·67
December	43	−34	10·5	87·9	12·0	62	W	.....	0·96	0·63
Total	.....	.....	.....	.....	.....	.....	.....	20·51	23·85	15·83
Average	69·17	6·58	38·23	177·5	11·35	44·83	.....	*3·42	1·99	1·32

*6 months' average.

Last spring frost occurred on May 13 when 31° was registered.

First fall frost occurred on September 8 when 32° was registered. No damage was done at the Station except to tender foliage, but in some parts of Southern Alberta a much lower temperature was registered and late grain was injured.

First frost that could be rated as a killing frost occurred on September 26 when 29° was registered.

Total precipitation for the four growing months of April, May, June, and July..12·23 inches

Twenty-six- year average for the four growing months of April, May, June and July...8·12 inches

Observers' Precipitation Records

Station and observer	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
Barons—Rev. Jos. Lee	0·15	0·75	0·25	0·20	4·62	3·76	1·82	0·87	3·13	0·47	1·80	0·70	18·52
Bow Island—G. R. Calder	0·35	1·10	0·92	1·55	7·05	2·03	1·98	2·35	1·35	0·68	1·80	0·60	21·76
Bindloss—J. Barnes	Nil	0·25	0·40	1·05	6·79	3·02	2·99	1·97	1·40	0·47	0·60	0·90	19·84
Cessford—G. E. Griffith	0·30	0·78	1·27	2·52	3·67	2·45	3·42	0·02	2·04	1·43	2·55	2·70	23·15
Cardston—J. F. Parrish	0·64	1·10	1·45	1·41	10·72	1·56	0·79	1·84	5·98	0·76	2·10	0·65	29·00
Carmangay—H. S. Gibson	0·55	1·15	0·35	0·25	4·47	4·06	3·24	0·74	4·36	0·60	2·50	0·80	23·07
Coaldale—N. F. Priestly	0·20	1·53	0·38	1·40	6·12	1·57	1·62	0·84	2·39	0·69	2·35	0·90	19·99
Empress—Wm. Rowles	0·10	0·60	0·55	0·78	6·63	2·99	4·20	2·23	1·49	0·74	1·00	1·40	22·71
Glenwoodville—Glen Wood	0·70	0·80	0·67	0·82	9·48	1·57	4·31	2·89	5·17	0·95	2·00	1·40	30·76
Grassy Lake—J. E. James	0·42	0·70	0·48	1·45	6·34	2·70	2·76	2·12	2·95	0·66	1·80	1·00	23·38
High River—B. F. Kiser	0·80	Nil	Nil	Nil	3·23	2·22	5·62	2·62	4·14	1·36	1·80	0·60	22·39
Jenner—Clyde Beese	0·25	0·75	0·96	1·97	4·64	3·20	2·62	0·68	1·53	1·05	1·83	1·40	20·88
Kippenville—L. C. Halmrast	0·65	0·70	0·45	1·05	9·26	1·54	3·55	2·88	0·81	0·52	1·35	1·30	24·06
Kipp—C. M. Nicol	0·30	1·35	0·45	1·08	7·15	1·57	1·38	1·34	2·85	0·65	3·30	0·95	22·37
Lethbridge—R. E. Everest	0·25	1·30	0·53	1·43	7·87	1·99	1·09	2·43	3·49	0·70	2·64	0·88	24·60
Lethbridge—Experimental Station	0·31	1·39	0·37	1·48	7·32	1·60	1·93	1·74	3·29	0·58	2·88	0·96	23·85
Macleod—Norman Grier	0·20	0·60	0·40	0·50	6·53	1·90	1·85	0·98	4·27	0·75	2·40	1·20	21·58
Manyberries—J. F. Evenson	0·20	1·40	0·70	1·83	4·92	1·20	4·30	1·90	1·00	2·65	1·40	2·80	24·30
Milk River—J. Wachtler	0·30	0·65	0·40	1·00	8·35	0·86	4·24	2·21	1·19	0·86	1·60	0·32	21·98
Munson—R. R. Fraser	0·10	0·65	0·85	0·60	1·61	2·74	2·89	1·24	2·49	0·67	1·80	0·45	16·09
New Dayton—R. W. Risinger	0·40	1·30	0·40	1·66	8·20	2·79	3·40	1·30	3·29	0·70	2·40	1·10	26·94
Nobleford—E. L. Woodbury	0·20	0·80	0·65	0·81	6·10	2·21	1·99	0·96	3·12	0·67	2·20	1·03	20·74
Orion—Geo. Wagar	0·45	1·25	1·45	1·72	5·57	1·82	3·57	3·43	0·84	0·84	0·85	1·60	23·39
Pincher Creek—J. Palmer	0·50	0·30	0·75	1·07	7·98	2·58	5·02	3·66	4·51	1·44	2·55	1·85	32·21
Pincher Creek—A. Christie	0·50	0·30	0·75	1·07	7·98	2·58	5·02	3·69	6·44	1·40	2·37	1·50	33·60
Raymond—School of Agriculture	0·31	0·85	0·53	2·40	8·65	2·10	2·90	1·56	3·30	0·60	2·30	1·15	26·65
Sunnynook—R. M. Montgomery	Nil	0·45	0·90	1·03	4·03	2·45	3·78	0·50	2·18	0·55	0·73	0·50	17·10
Wainwright—G. C. Boyd	0·05	0·05	0·30	1·00	2·13	2·01	4·99	0·81	2·18	1·90	0·75	0·30	16·47
Whitla—R. H. Babe	0·40	1·00	1·10	1·85	7·54	1·76	3·86	2·39	0·88	1·65	2·00	1·80	26·23
Youngstown—G. S. Coad	Nil	0·80	1·20	2·85	4·20	2·15	3·47	0·64	2·30	1·16	1·20	1·10	21·07

ANIMAL HUSBANDRY*

HORSES

The horses now at the Station number twenty-six head, consisting of nine Percherons, registered or eligible for registration, three registered Clydesdale mares, twelve grade mares and geldings, one light horse, and one pack pony which is used during the summer at the sheep camp on the Forest Reserve.

Satisfactory progress has been made in the establishment of a Percheron stud. The two Percheron brood mares are producing very promising foals.

During the season just past, six mares were bred to Fairhope 6467, a mature horse with creditable winnings, both as an individual, and on his progeny, at the Chicago International and the Canadian Royal.

BEEF CATTLE

Although no work with the breeding of beef cattle has been carried on at this Station, considerable work in experimental feeding of beef cattle has been done. This latter phase of experimental work has received considerable attention during the past fifteen years since it accomplishes a dual marketing service in southern Alberta. It provides a means of utilizing the surplus alfalfa of the irrigated areas as well as providing a home market for the feeder cattle produced on the near-by ranches.

FEEDING EXPERIMENTS

During the winter of 1926-27 fifty-six head of two-year-old steers were put on feeding trials. The steers were purchased both locally and from the Calgary Stocker and Feeder sale, and went into the feed lot at an average cost of $5.25 per cwt., on November 23, 1926. On March 10, they were appraised by Mr. T. G. Bates, cattle buyer for the P. Burns Co., Lethbridge, at prices varying from $5.75 to $6.25 per cwt. On March 14, forty head of these cattle were shipped to Glasgow as a part of the experimental shipment of 102 head which was handled by the Division of Animal Husbandry, Ottawa. Had these cattle been held in Canada for two weeks longer their value would have increased at least $2 per cwt. due to the rapid increase in cattle values which took place in March, 1927. In this case, the experiment would have shown a substantial profit instead of the average loss of $11.53 per head which was taken as a result of the low margin between the buying price and the average appraised selling value of $5.96 per cwt., a spread of 71 cents per cwt.

For some reason, not understood, the steers on feeding trials, while appearing thrifty, made exceptionally low gains with a feed consumption which was exceptionally high. In this respect the trial is too far out of line with similar work in previous years to be of value, and consequently the tables will be omitted, the space being more profitably used in showing the average findings of feeding projects which have been conducted for a number of years.

SOME OBSERVATIONS FROM PREVIOUS TESTS

All steers used in feeding trials, the results of which are given below, were two-year-olds from the Alberta ranges, and the trials were conducted during the winter months in corrals protected by a seven-foot board fence, and with a straw shelter open to the south as the only protection from the weather.

* The work with live stock is under the supervision of Arthur Newman, B.S.A., whose material assistance in the preparation of the report under this heading is gratefully acknowledged. Mr. Newman also has the supervision of the dry-land rotation and cultural work.

FULL VS. HALF RATION OF GRAIN

In 1924 and 1925, two groups of ten steers each were fed, one on a full ration of grain (all they would consume readily) and one on half of what the first group would take. Alfalfa hay was the only roughage fed in each case.

Following are the average results of the two years' trial:—

FEED REQUIREMENTS FOR ONE POUND OF GAIN

—	Full Grain Ration	Half Grain Ration
Grain.....lb.	4.67	2.83
Hay.....lb.	16.63	20.05
T.D.N.....lb.	11.12	12.14
Nutr. Ratio.....	1: 4.45	1: 4.15
Ave. Daily Gain.....lb.	1.66	1.36

A comparison of full versus half grain rations, as given above, would indicate that 1·84 pounds of grain were replaced by 3·42 pounds of hay, and that an increased gain of 0·3 pounds per day was made where the larger amount of grain was fed.

Valuing alfalfa at $10 per ton and grain at $30 per ton, the half grain ration would result in a saving of 1·05 cents in each pound of gain produced. However, it would take a longer period to obtain a finish owing to the lower rate of gain. The ultimate profits derived from the two systems would be dependent upon the price spread, which usually increases towards spring.

Feeding of a half to two-thirds grain ration has the advantage of not requiring such care and skill in feeding since there is not the same tendency to scour as when a full grain ration is used, and observation would lead one to believe that a steadier gain is made on this account. Two-year-old steers being fed liberally on alfalfa hay will eat approximately ten pounds of good quality oat and barley meal.

The feeding tests during the winter of 1926-27 would seem to point to the fact that a two-thirds grain ration, or about 7·5 pounds per day, is the optimum amount of grain to feed to two-year-old steers from the standpoint of finish and economy of gain, although it should be mentioned that this is from one year's work only.

In feeding trials conducted at this Station with 500 steers on ten different experimental projects, and covering a period of fifteen years under practically all conditions of market prevailing since 1912, it has cost an average of 16 cents to produce one pound of gain, while the average selling price for the same period has been 7·76 cents. In spite of the fact that gains have cost double their market value an average profit of $3.43 per steer has been realized over feed costs. This has been made possible by an average spread of 2·12 cents per pound. The profit from steer feeding is derived from the increased value of the initial weight of the steer, and is greatly influenced by prevailing market conditions, also by the quality and finish of the animal.

This point can be well illustrated by the following figures:—

Year	Cost to produce 1 pound gain	Selling price	Spread per cwt.	Profit per steer
	cts.	$	$	$
1916–17.....	17	10·65	4·30	24·24
1918–19.....	24	15·00	3·80	14·75
1921.....	17	7·50	−0·50	−29·00

Corn silage has proven to be the best supplement to alfalfa hay, giving the most rapid gains and producing them at a low feed requirement. Sunflower silage and corn fodder come next in order. Due to the excessive overhead involved where silos and ensiling machinery have to be provided, it is possible that corn fodder would be the most economical supplement to alfalfa hay.

From a practical standpoint, a feeder must size up the feeds he can economically produce and then combine them in the ration so as to derive the greatest returns, keeping in mind palatability and variety as aids to economical gains.

SHIPPING STORE CATTLE TO GREAT BRITAIN

The cattle fed at the Station during the winter were exported to Great Britain in March as a part of the experimental shipment forwarded by the Animal Husbandry Division, Central Experimental Farm, Ottawa. They left Lethbridge on March 14, but because of delay caused by severe storms on the prairies did not reach West St. John, N.B., until the evening of March 25. From there, they were shipped on March 26 via ss. *Carmia* of the Anchor Donaldson Line, consigned to Watson and Butchelor, commission firm of Glasgow.

These cattle comprised two lots of twenty each, one all white faces, and the other mixed beef breeds. Both lots showed breediness and a fair to good finish. The entire shipment was classed as good butchers and short-keep feeders.

Prior to shipment these steers were marked in such a way as to identify the various individuals, and permit of any merits or demerits which a certain animal might have from the standpoint of foreign or home markets, being traced back to the kind or condition of the individual animal.

The cattle were appraised at the feed lot, at Winnipeg and at Montreal, and we are indebted to Mr. Ben Kirk at Winnipeg, and to Mr. Harris at Montreal, for their services in appraising the cattle at these points. Off-car weights were obtained at Winnipeg, Montreal and St. John. Information regarding the percentage shrink and the value of shipment calculated with 2 per cent fill over off-car weights is set out in the following tables. It is, however, interesting to note that the higher percentage of shrink is in the first stages of the journey. When enroute for two or three days, cattle become accustomed to the train, settle down, and barring inclement weather, with feed and water supplied at reasonable intervals, the loss in weight is small.

The regulations governing the export shipment of cattle to Great Britain and the method of enforcement can be found together with a great deal of other information regarding the exporting of cattle to Great Britain in Bulletin 62, "Shipping Store Cattle to Great Britain," by the Division of Animal Husbandry and obtainable from the Publications Branch, Ottawa.

Conditions on board the ship were very favourable. The drainage in the cattle deck was good. Temperatures on the cattle deck throughout the voyage were between a minimum of 32° and a maximum of 60°.

The feed on board ship consisted of a mixture of timothy and clover hay. A grain ration of crushed oats and cracked corn was supplied. While this was a good ration, the corn had the disadvantage of being a new feed to the western cattle. It required some time to accustom them to it. An average of eighteen pounds of hay per day and 4·3 pounds of grain was fed throughout the voyage. The grain ration was one pound per day at first, and was increased as the cattle became accustomed to the feed and to the motion of the ship.

CANADIAN CATTLE AS STORES

In the market or cattle lairage, the cattle are taken over by the commission firm to which they are consigned, and prepared for market by cleaning and sorting into uniform groups of from two to eight head, according to the class of buyer they are most likely to suit. The really fat cattle and heavy cattle are usually sold singly and are very likely to be purchased by representatives of the meat trade. The feeder cattle are sold in "wagon lots" or fractions thereof to suit the feeder who will be shipping out.

Generally, the Canadian cattle appear to be very well liked as stores by the Scottish feeder, their merits being their thriftiness and freedom from disease. Canadian cattle, however, have some outstanding drawbacks, real or otherwise, in so far as their suitability to the British meat trade is concerned. Possibly the one most proclaimed by buyers in the ring is the presence of brands on the Western cattle. This is a double handicap. It lowers the price of the hide and brands the animal as a Canadian steer for life, no matter how fine a Scottish finish he may carry. He is thus prevented from being sold as a "home-grown" steer, a class which commands the highest price.

The second outstanding drawback in so far as their suitability to British demand is their age and weight which is usually coupled with a certain coarseness not found in the "home" or in the Irish-bred bullock. On the market Canadian steers weighing up to 15 cwt. were criticized severely and sold at a much lower rate per pound than did smaller cattle showing more quality. The Scottish feeders say: "Send us two-year-old cattle weighing nine cwts." The meat trade states that it does not want cattle over 13 cwt., as there is no demand for heavy cuts and joints of meat.

The difficulty of handling the wild western cattle with the Old Country system, designed for more gentle stock, is also a slight handicap to the general reputation of Canadian cattle.

Despite these drawbacks the cattle sold for prices comparing very favourably with those obtained for "home-grown" stock.

TYPE OF CATTLE

We have been in the habit of considering the big, heavy steer as the most desirable type to export. No doubt this is due to the flat freight rate when there was no discrimination in ocean freight rate according to weight, and it was good business to ship a heavy steer. Observations in connection with this shipment would conclusively indicate that the type of steer most in demand on the Canadian markets is also most favoured in Scotland, namely a thick-set, breedy, well-finished steer of 1,100 to 1,200 pounds. One steer of this type which was picked as the "top" by appraisers at both Winnipeg and Montreal, was also selected by Mr. John MacLeod, cattle buyer for the Scottish Wholesale Societies, Glasgow, as the best suited to their trade.

MARKETS

Since the time of the shipment under review, all Canada's surplus beef cattle have been going to American markets at prices which discourage shipment to Great Britain. At the present time, the United States buyers can afford to pay the tariff and still purchase Canadian cattle at a price which prevents the profitable continuance of the overseas trade.

The big deterrent to the British trade is the cost of transportation. The total charges from Lethbridge to sale in Glasgow were $46.32 per head and the average gross return at Glasgow was $114.74. The handling charges equalled forty per cent of the total receipts; much too high a charge for the profitable sale of cattle in Britain at present prices despite the fact that ocean freight has been reduced from $20 to $15 for heavy steers and from $18 to $13.50 for lighter steers.

Fortunately, the British and the American market requirements are similar. Both markets demand young cattle of medium weight, good quality, and typical of one of the beef breeds. Practically the same type are desired as feeder cattle to finish at home.

While America is at present taking all of our surplus cattle at more profitable prices than can be secured in Great Britain, it is well to keep in mind that the overseas trade was a welcome relief in the early days of the Fordney-McCumber tariff which at that time amounted to a practical embargo on Canadian cattle entering the United States. Although British returns are low at present due to the industrial unrest, heavy transportation charges, and dumping of Argentine chilled beef on the British markets as an instrument in a meat war between packing house interests, we may again be glad of this outlet for the beef which we must sell abroad.

SHRINKAGE OF CATTLE AT VARIOUS POINTS EN ROUTE

—		Lot 1	Lot 2
Average feed lot weight, Lethbridge	lb.	1,209·5	1,202·5
Average Winnipeg weight	lb.	1,145·5	1,131·0
Average loss per steer to Winnipeg	lb.	64·0	71·5
Average per cent shrink	%	5·3	5·9
Average Montreal weights	lb.	1,100·0	1,110·0
Average shrink per steer to Montreal	lb.	109·5	92·0
Per cent shrink, Lethbridge to Montreal	%	9·1	7·7
Average St. John weight	lb.	1,100·0	1,117·5
Average shrink, Lethbridge to St. John	lb.	109·5	85·0
Per cent shrink, Lethbridge to St. John	%	9·1	7·1
Average weight at Glasgow	lb.	1,108·0	1,114·3
Average shrink, Lethbridge to Glasgow	lb.	101·5	88·0
Per cent shrink, Lethbridge to Glasgow	%	8·4	7·3
Average gain or loss, St. John to Glasgow	lb.	8·0	−3·2

N.B.—Lot No. 1 consisted of 20 Herefords; lot No. 2 was made up of 4 Herefords, 9 Shorthorns and 7 Aberdeen Angus cattle.

The above table gives data on weights of the shipment as recorded at various points. It will be noticed that lot 1 weighed the same at St. John as at Montreal, and lot 2 weighed slightly more at St. John, which is possibly due to a fast run between the two points and a good fill at Montreal. On the ocean, lot 1 gained an average of eight pounds per steer and lot 2 lost an average of 3·2 pounds, due to there being two very wild steers in the group that did not settle down during the entire voyage. The gains made by the Lethbridge steers en route were very low in comparison to the shipments from other places owing to the longer time it took to get them on a full ration of grain.

COST OF SHIPPING STEERS FROM LETHBRIDGE TO GLASGOW VIA ST. JOHN

—	Lot 1	Lot 2
Number of steers	20	20
	$	$
Total charges to St. John	346 13	341 53
Charges, stock-yards at St. John	16 40	16 40
Handling and loading at 50 cents each	10 00	10 00
Ropes, tools, tagging, men, etc	12 60	12 60
Insurance, $140 per head at ½%	17 50	17 50
Ocean feed	104 00	104 00
Excise stamps	0 20	0 20
Ocean freight at $15 per head	300 00	300 00
Total cost to port of debarkation	806 83	802 23
Average cost to port of debarkation	40 34	40 11
Overseas charges:—		
Extra charge per Donaldson Bros	7 97	7 97
Lairage at Merklands	18 00	18 00
Keep	36 42	36 42
Herds	9 72	9 72
Insurance	1 32	1 32
Commission	48 60	48 60
Total charges to date of sale in Glasgow	928 86	924 26
Total charges to date of sale in Glasgow per head	46 44	46 21

PROFIT AND LOSS STATEMENT

—	Lot 1	Lot 2
Number of steers	20	20
	$	$
Cost of steers	1,107 40	1,107 40
Cost of feeding	496 40	496 40
Cost of shipping overseas	804 53	804 53
Cost of sale	122 03	122 03
Total cost to Glasgow	2,530 36	2,530 36
Less surplus fodder	30 66	30 66
Net cost to Glasgow	2,499 70	2,499 70
Total return Glasgow	2,208 50	2,203 64
Total loss per lot	291 20	296 06

REPORT OF SHIPMENT OF LETHBRIDGE STEERS SHOWING PRICE VARIATIONS DUE TO BREED, WEIGHT AND CONDITION

Lot	Number of steers	Average weight feed lot	Appraised value feed lot per cwt.	Average value feed lot 3 per cent shrinkage	Appraised value Winnipeg, per cwt.	Average value Winnipeg, off car weights, +2 per cent fill	Appraised value Montreal, per cwt.	Average value Montreal off car weights, + 2 per cent fill	Average weight off boat, Glasgow, pounds	Average shrinkage to Glasgow, pounds per cent	Average value, Glasgow	Average price per pound, Glasgow	Average price per pound Lethbridge, 3 per cent shrinkage
					STEERS REPORTED BY BREED								
		lb.	$	$	$	$	$	$	lb.	lb. %	$	cts.	cts.
Hereford	24	1,200	5 97	69 30	7 37	83 59	7 75	86 80	1,097	103 8·0	114 61	10·47	9·85
Shorthorn	9	1,217	6 08	71 21	7 27	84 44	7 75	90 11	1,138	78 6·4	115 15	10·35	9·76
Angus	7	1,211	6 03	70 78	7 35	85 12	7 75	88 22	1,125	89 7·3	117 99	10·48	10·04
					CATTLE 40 HEAD—REPORTED BY WEIGHTS								
Price by weights—													
1,000–1,100	5	1,061	.....	61 77	.....	75 50	.....	76 20	965	97 9·1	106 18	10·85	10·03
1,100–1,200	12	1,146	.....	66 65	.....	80 59	.....	84 17	1,053	93 8·2	111 47	10·75	10·01
1,200–1,300	16	1,241	.....	72 78	.....	85 44	.....	90 53	1,143	98 7·9	117 47	10·42	9·83
1,300 up	7	1,331	.....	76 82	.....	92 64	.....	97 44	1,242	89 6·7	120 21	9·88	9·42
Average	40	1,206	5 84	70 03	7 25	83 87	7 80	88 04	1,111	94 7·8	114 74	10·68	9·59

It will be noted in the foregoing table that there was very little variation in the price per pound realized for the different breeds, the Angus cattle giving only a slightly higher return.

The table showing the price variation according to weight indicates a spread of approximately one-half a cent per pound, between steers of 1,000 pounds and over 1,300 pounds, in favour of the lighter steers. This was the case despite the fact that the heavier steers were carrying more flesh. The table substantiates the observation that the younger cattle are more favoured on the British market.

DAIRY CATTLE

Progress in the pure-bred Holstein-Friesian herd has been satisfactory during the year. This herd was started in 1925, beginning with consignments received from the Central Experimental Farm, Ottawa, and the Experimental Station, Lacombe, Alta., comprising at that time a total of seventeen head, seven of which were mature cows.

On December 31, 1927, the pure-bred herd consisted of twenty-seven head, all females with the exception of the herd sire and included the natural increase from the original seventeen head.

THE HERD SIRE

The possibilities for constructive breeding were greatly improved by the new herd sire, Agassiz Faforit Re-Echo, 73153, calved December 29, 1926, a son of Agassiz Champion Re-Echo, 54809, and a grandson on the sire's side of Agassiz Segis May Echo, 41302, with 30,886·0 pounds of milk and 1,681·25 pounds of butter in one year.

His two nearest maternal dams, Agassiz Dekol Faforit, 103527, with 14,175 pounds of milk and 715 of butter at two years, and Agassiz Faforit Posch —39321—with 21,096·0 pounds of milk and 1,171·25 pounds of butter, average over four per cent butter-fat on yearly record. The favourable production of his ancestry together with the reasonably good general type, scale, and dairy temperament of the bull, give us ground for hope of much improvement by his use in the herd.

HEALTH OF DAIRY HERD

The general health of the herd during 1927 left little to be desired, the only trouble of a pathological nature being one slight case of mammitis which responded readily to treatment with "Iodex".

PRODUCTION

The cows were fed throughout the year on home-grown feeds, the winter ration consisting of alfalfa hay, corn silage and a grain mixture consisting of equal parts of oats and barley meal. The roughages were fed ad lib; roughly thirty pounds of silage and twelve to fifteen pounds of hay daily while grain was fed at the rate of one pound of grain to each four pounds of milk produced.

AVERAGE PRODUCTION PER COW

Average milk in year	lb.	9,762·40
Average butter fat	lb.	340·05
Average percentage fat	%	3·48
Average value of fat from each cow at 40 cents per lb	$	136 02
Average value of skim-milk from each cow at 25 cents per cwt	$	21 96
Total revenue per cow from milk produced	$	157 98

The average production from the herd is somewhat lower than during the previous year owing to the fact that six of the cows were going through their first lactation period as two-year-old heifers.

REPRODUCTION AND GENITAL DISEASES

Immediately after the herd was brought to the farm in 1925, each animal was submitted to serum tests for bacillus abortus of bang, the causitive organism of a large percentage of abortions, with the co-operation of Dr. L. M. Heath of the Veterinary Research Station, Lethbridge. At that time all cattle giving evidence of being spreaders of infection were removed from the herd. The test has been applied at intervals since with negative reactions. Whether attributable to this precaution or not, we have so far been fortunate in escaping without a case of abortion. We have, however, this year encountered the allied condition of sterility, due to cystic ovaries, with the resultant uselessness of the animals for dairy purposes. Two cows thus affected were sold to the butcher.

Of the 15 cows of breeding age, 12 produced normal calves within the year, a breeding efficiency of 80 per cent.

CREAM GRADES

The dairy building continued to give satisfaction from the standpoint of convenience and of cream grades.

The practice in caring for the cream is to place it on a small platform in the ice chamber immediately after separating, where it is held from two to seven days and usually grades " Table " at the end of that time.

During the months of July, August, and September daily temperature readings were taken in the ice chamber. The maximum during the three months was 52 degrees F., while the mean maximum for the three months was 42·9 degrees F. and the mean minimum for the same period was 37·5 degrees F. These represent air temperatures, the maximum being the degree to which the air was heated during such times as the door was necessarily opened.

The cream sold at the local creamery during the year graded as follows: " Table "—82·6 per cent, " Special "—4·3 per cent, " No. 1 "—13 per cent. It is interesting to note that three-fourths of the cream which graded " No. 1 " was produced during the winter months when beet molasses was being added to the ration. We have observed an undesirable flavour in the cream which appears coincident to the feeding of the beet molasses—but whether this is attributable to its use or not cannot be definitely stated.

LAMB FEEDING TRIALS

The lamb feeding work during the winter of 1926-27 was a duplication of the work of the previous winter, the object being to obtain further information as to the most economical amount of grain to feed with alfalfa hay. A variation was made with one group in that beet molasses was self-fed as a supplement to alfalfa hay and grain in Group 4, where corn silage had been fed the previous year.

Two hundred lambs were divided into four groups of fifty each, and fed as follows:—

Group 1. Alfalfa hay—one-half grain ration.
Group 2. Alfalfa hay—two-thirds grain ration.
Group 3. Alfalfa hay—full grain ration.
Group 4. Alfalfa hay—one-half grain ration and beet molasses.

The lambs were selected as uniformly as possible as to sizes and breeding. They were all wether lambs from the range flock with Shropshire breeding predominating.

They were lambed in March or early April and were ranged on the Crowsnest forest reserve from June 1 to October 1, after which they were allowed to range on the prairie and stubble until November 1, when the feeding experiment began.

The lambs were weighed into the feeding lots at 8·5 cents per pound, and 100 head of the tops were sold on January 31 at 10·5 cents, leaving a 2-cent spread, the remaining 100 of unfinished lambs being valued at 10 cents in accordance with market prices at the time.

All groups of these lambs made a profit over feed. Group 1, fed on half grain ration, and group 4, fed on half grain ration with molasses, made low returns due to the low number of finished lambs.

DETAILS OF FEEDING TRIALS

—		Lot 1 Alfalfa half grain ration	Lot 2 Alfalfa two-thirds grain ration	Lot 3 Alfalfa full grain ration	Lot 4 half grain ration, molasses
Number of days on trial		92	92	92	92
Number of lambs at beginning		50	50	50	50
Number of lambs at end of trial		50	50	50	50
Total initial weight	lb.	3,628·3	3,645·3	3,645·8	3,623·3
Average initial weight	lb.	72·6	72·9	72·9	72·5
Total final weight	lb.	4,780·0	5,100 0	5,500 0	4,930·0
Average final weight	lb.	95·6	102·0	110·0	98·6
Total gain for period	lb.	1,151·7	1,454·7	1,854·2	1,306·7
Average gain per head	lb.	23·03	29·09	37·08	26·13
Average daily gain	lb.	0·250	0·316	0·403	0·284
Quantity of Feed Consumed					
Alfalfa hay	lb.	12,490	10,410	8,560	10,490
Oats	lb.	1,431·5	1,857·0	2,736·0	1,431·5
Barley	lb.	2,780·5	3,636·0	5,434·0	2,780·5
Molasses	lb.	.....	.....	.....	1,671·0
Salt	lb.	25·0	25·0	25·0	25·0
Value of Feeds					
Alfalfa at $12 per ton	$	74 94	62 46	51 36	62 94
Oats at $36 per ton	$	25 77	33 43	49 25	25 77
Barley at $27 per ton	$	37 54	49 09	73 36	37 54
Molasses at $20 per ton	$	.....	.....	.....	16 71
Salt at $30 per ton	$	0 38	0 38	0 38	0 38
Total value of feed	$	138 63	145 36	174 35	143 34

SUMMARY OF RESULT OF FEEDING TRIAL

—		Lot 1	Lot 2	Lot 3	Lot 4
Number of lambs finished on January 31		12	27	44	17
Total weight of fat lambs	lb.	1,270	2,920	4,940	1,810
Average weight of fat lambs	lb.	105·8	108·1	112·3	106·5
Total value at 10·5 cents	$	133·35	306·60	518·70	190·05
Number of unfinished lambs January 31		38	23	6	33
Total weight of unfinished lambs	lb.	3,520	2,170	510	3,100
Average weight of unfinished lambs	lb.	92·63	94·35	85·00	93·94
Total value at 10 cents	$	352 00	217 00	51 00	310 00
Total value of all lambs January 31	$	485 35	523 60	569 70	500 05
Cost of Return					
Average initial cost of lambs	$	6 16	6 19	6 20	6 15
Cost of feed per head	$	2 77	2 91	3 49	2 86
Average cost of lamb and feed	$	8 93	9 10	9 69	9 01
Cost to produce one pound of gain	$	0 12	0 10	·094	·109
Average value of lamb	$	9 70	10 47	11 39	10 00
Profit per lamb	$	0 77	1 37	1 70	0 99

In connection with the foregoing table, it is interesting to note that the amount of grain, the rapidity of gain, the number of finished lambs and the profits have a direct correlation. The trial seems to indicate that a full grain ration or approximately two pounds per lamb per day is the most economical ration for fattening lambs.

Those of an analytical turn of mind will find the following summaries interesting. The actual feeds used have not been analyzed, Henry and Morrison analysis being used in this computation. These will only be approximations of the actual amounts of the nutrients fed, but will be fair from the standpoint of comparison, all of the group having received the same quality of feed.

FEED REQUIRED TO PRODUCE ONE POUND OF GAIN

—	Lot 1	Lot 2	Lot 3	Lot 4
Alfalfa..... lb.	10·84	7·16	4·62	8·03
Oats..... lb.	1·24	1·28	1·48	1·10
Barley..... lb.	2·41	2·50	2·93	2·13
Molasses.....	.....	.....	.....	1·28
Total feed per pound of gain..... lb.	14·49	10·94	9·03	12·54

NUTRIENTS REQUIRED TO PRODUCE ONE POUND OF GAIN

—	Lot 1	Lot 2	Lot 3	Lot 4
Fat..... lb.	0·1832	0·1527	0·1451	0·1579
Carbohydrates..... lb.	6·4886	5·1254	4·5406	5·8291
Protein..... lb.	1·4870	1·1072	0·8956	1·1848
Total digestible nutrients per pound gain..... lb.	8·1588	6·3853	5·5813	7·1718
Nutritive ratio.....	1 : 4·64	1 : 4·94	1 : 5·43	1 : 5·22
Average daily gain..... lb.	0·250	0·316	0·403	0·284
Cost to produce one pound of gain..... cts.	12·0	10·0	9·4	11·0

PASTURING SHEEP ON FOREST RESERVE

This is an experiment that has been under way for the last eight years, the object of which is to determine the feasibility of alfalfa growers on irrigated land utilizing the nearby forest reserve in the Rocky mountains for summer pasturing of sheep. On the irrigated farms in the district there is always an abundance of winter feed, but it is difficult to obtain cheap summer pasture on the relatively high-priced irrigated land, while on the forest reserve there is always a vast amount of pasture, peculiarly adapted for sheep, that goes to waste each season. Owing to the difficulty and probable impracticability of trailing sheep from the farms in the Lethbridge district to the mountain ranges it was necessary to arrange to ship the sheep by rail to and from the summer range. The obviously heavy expense entailed by so doing was taken into consideration in planning the experiment, but the results of the eight seasons indicate that the plan is both practical and profitable.

During the fall and winter months the band is either run on stubble fields or fed at the Station, the amount of feeding required depending upon the severity of the weather. During the summer months from early June till late in September they are pastured in the Crowsnest forest reserve, being shipped by rail from Lethbridge to Sentinel, near Coleman, and returned by rail again in the fall. The ewes are bred to lamb fairly early; that is to start lambing about the middle of March. In order to accommodate them during the lambing period a shed 140 feet by 64 feet is used. As the grass in the forest reserve, as a rule, is ready for pasturing early in June, it has been the custom to shear the sheep

in May. After shearing they are dipped and shipped to the mountains during the first week in June. The sheep were returned to Lethbridge during either the last week in September or the first week in October. October, 1927, completed the eighth year of the experiment, and the statement that follows gives the details of the expenses and returns during the period from October, 1926, to October, 1927, and shows that a gross profit of $4,109.30 was made during that time.

Expenses October, 1926, to October, 1927:—		
Winter pasture on stubble fields		$ 420 00
Alfalfa hay, 110·5 tons at $10		1,105 00
Low grade Alfalfa hay, 9 tons at $9 and 29 tons at $7		284 00
Silage, 100 tons at $4		400 00
Coarse grain, 46,151 pounds at $1.50 per cwt		692 27
Salt, 2 tons at $26.50		53 00
Summer pasture on forest reserve		77 00
Total freight to and from forest reserve		733 11
Shearing		145 18
Purchase of rams, 13 at $30		390 00
Labour, total for 12 months (estimated)		2,000 00
		$ 6,299 56
Inventory, October, 1926:—		
Number of ewes to be bred, 828 at $13		$10,764 00
Number of ewe lambs on hand, 73 at $8.50		620 50
Number of feeder lambs on hand, 207 at $7		1,449 00
Number of rams on hand, 23 at $30		690 00
		$13,523 50
Sales:—		
45 aged ewes		$ 315 00
Lambs, net receipts		7,155 41
Aged bucks		92 00
Net wool receipts, less dip and supplies		1,683 68
		$ 9,246 09
Inventory, October, 1927:—		
Number of ewes to be bred, 885 at $13		$ 11,505 00
Number of ewe lambs on hand, 127 at $8.50		1,079 50
Number of feeder lambs on hand, 203 at $7.25		1,471 75
Number of rams on hand, 21 at $30		630 00
		$ 14,686 25
Financial summary:—		
Sales for year	$ 9,246 09	
Inventory, October, 1927	14,686 25	
Expenses for year		$ 6,299 54
Inventory, October, 1926		13,523 50
Gross profit for season		4,109 30
	$ 23,932 34	$ 23,932 34

DETAILS OF THE TEST FROM OCTOBER, 1926, TO OCTOBER, 1927

The sheep reached Lethbridge from the forest reserve on October 6, 1926, and were put on stubble fields. The lambs were disposed of, except the 203 feeders and the 127 ewe lambs saved for the maintenance of the breeding flock. The band was carried on stubble fields in the neighbourhood rented for the purpose until March. Hay was fed in stormy weather when it was impossible for the sheep to get to the ground. The price paid for the stubble pasture was at the rate of $4.50 per day per thousand head. Days when it was not possible for the sheep to pasture, and they had to be fed hay, were not counted. Shearing was begun on May 10, and finished May 14. The sheep were all dipped, lambs included, on June 7, and on June 15 were branded.

On June 21, 1927, the sheep were shipped to the forest reserve at Sentinel, Alta., the first siding east of Crowsnest Station. There were included in the

shipment 887 ewes and 1,024 lambs. In loading the cars care was taken to see that an average of 68 ewes and 78 lambs were put in each deck. The sheep reached Lethbridge from the mountains October 5.

For the past eight years the results of each season's experiments have been given in detail in the annual reports, copies of which may be had on application. These included an itemized financial statement of the season's expenses and returns. A summary of these is here presented:—

FINANCIAL SUMMARY COVERING PERIOD FROM OCTOBER, 1919, TO OCTOBER, 1927

For the Year ending October, 1920

Sales for year	$ 4,864 62	
Inventory, October, 1920	7,431 00	
Expenses for year		$ 6,572 08
Inventory, October, 1919		10,050 00
Loss	4,326 46	
	$ 16,622 08	$ 16,622 08

For the Year ending October, 1921

Sales for year	$ 3,635 07	
Inventory, October, 1921	7,898 00	
Expenses for year		$ 4,452 19
Inventory, October, 1920		7,431 00
Loss	350 12	
	$ 11,883 19	$ 11,883 19

For the Year ending October, 1922

Sales for year	$ 4,248 02	
Inventory, October, 1922	9,839 25	
Expenses for year		$ 4,722 88
Inventory, October, 1921		7,898 00
Profit		1,466 39
	$ 14,087 27	$ 14,087 27

For the Year ending October, 1923.

Sales for year	$ 9,980 38	
Inventory, October, 1923	10,357 00	
Expenses for year		$ 5,210 38
Inventory, October, 1922		9,839 25
Profit		5,287 74
	$ 20,337 38	$ 20,337 38

For the Year ending October, 1924

Sales for the year	$ 10,530 40	
Inventory, October, 1924	14,515 00	
Expenses for year		$ 5,881 78
Inventory, October, 1923		10,357 00
Profit		8,806 62
	$ 25,045 40	$ 25,045 40

For the Year ending October, 1925

Sales for year	$ 13,035 92	
Inventory, October, 1925	14,705 00	
Expenses for year		$ 6,222 95
Inventory, October, 1924		14,515 00
Profit		7,002 97
	$ 27,740 92	$ 27,740 92

For the Year ending October, 1926

Sales for year	$ 10,469 35	
Inventory, October, 1926	13,523 50	
Expenses for year		$ 6,274 28
Inventory, October, 1925		14,705 00
Profit		3,013 57
	$ 23,992 85	$ 23,992 85

For the Year ending October, 1927

Sales for year	$ 9,246 09	
Inventory, October, 1927	14,686 25	
Expenses for year		$ 6,299 56
Inventory, October, 1926		13,523 50
Profit		4,109 28
	$ 23,932 34	$ 23,932 34

Eight Years' Results

Total sales	$ 66,010 45	
Increase inventory, October, 1927, over Inventory, 1919	4,636 25	
Total expenses		$ 45,636 11
Total gross profit		25,010 59
	$ 70,646 70	$ 70,646 70

SWINE

The swine herd has made substantial improvement during the year, due chiefly to the development of high class progeny from Ottawa Beau 17 —119713— the herd sire.

Hogs on the station on December 31, 1927, numbered one hundred and fifty-eight. One hundred and one head of market hogs weighing 17,220 pounds were sold during the year, realizing $1,503.90.

Price levels during the year varied from $7.50 to $10.50 per hundredweight for thick smooths.

It is the policy of the station to sell available breeding stock of good quality at moderate prices to farmers in the district, especially where the demand is not being supplied by private breeders. Twelve head of breeding stock were sold during the year.

EXPERIMENTAL WORK WITH SWINE

Experiments were carried on during the year with the object of gaining information regarding the following practices:—

1. Winter feeding of pigs in straw shelter.
2. Self vs. limited hand feeding, effect on economy of gains and on type.
3. The comparative value of tankage, alfalfa meal, skim-milk, cod liver oil and fish meal supplements to the grain ration of oats and barley as aids in the economical production of pork.

During the summer, Experiments 2 and 3 were repeated with hogs on pasture.

STRAW SHELTER

Possibly the outstanding feature in connection with our swine work in so far as it applies immediately to the man just starting in swine is the success we have had in feeding hogs during the winter in cheaply constructed straw shelters. This type of shelter reduces the over-head considerably as compared with the more expensive piggeries, and appears to promote good health in the herd.

EXPERIMENTAL FEEDING TRIALS

All of the pigs used on winter feeding trials in 1927 were farrowed between the 11th and the 15th of the previous October. They were all fed in a uniform manner on oats and shorts with no milk until January 12, when they were put on feeding trial. They were from a uniform group of sows of Yorkshire breeding; one-half of the litters were sired by a Yorkshire boar, and the other half by a Tamworth boar. These pigs were divided into experimental lots as uniformly as to breeding, sex, weight, and type as possible.

The pigs used on summer-feeding trials were born in late April and early May from the same sires and dams as those used in the winter trials, and were grouped into experimental lots after taking the same factors into consideration.

The grain rations were mixed in the following proportions for all of the feeding trials:—

For pigs weighing up to 80 pounds—oats 3 parts, barley 1.
For pigs weighing from 80 to 125 lb.—oats 2 parts, barley 1.
For pigs weighing from 125 to 150 lb.—oats 1 part, barley 1.
For pigs weighing from 150 to market weight—oats 1 part, barley 2.

HAND VS. SELF FEEDING

This trial was run both in summer on pasture and in winter in dry lots, and the results of both trials are given here.

The grain mixture was fed in proportions as outlined above, with tankage added at the rate of 10 per cent up to 150 pounds, and 5 per cent above 150 pounds market weights.

Group 1 was self-fed, group 2 hand-fed a limited ration amounting to 4 per cent of the body-weight calculated weekly.

The following tables give the results showing the amount of grain required to produce a pound of gain as well as the number of days required to reach market weights.

WINTER FEEDING TRIALS, JANUARY TO JUNE

—		Self-fed	Hand-fed, 4 per cent of body weight
Number of hogs		8	8
Total initial weight	lb.	383	383
Average initial weight	"	47·9	47·9
Total final weight	"	1,573	1,627
Average final weight	"	196·6	203·4
Total gain	"	1,190·0	1,244·0
Average gain per head	"	148·8	155·5
Average days from commencement of trial to time of marketing		137·6	168·7
Average daily gain	lb.	1·08	0·92
Feed consumed:—			
Oats	lb.	3,509	3,203
Barley	"	3,365	3,010
Tankage	"	510	459
Grain required to produce one pound of gain	"	5·78	4·99

SUMMER FEEDING TRIALS, JULY TO DECEMBER

(On alfalfa pasture July to September)

—		Self-fed	Hand-fed, 4 per cent of body weight
Number of hogs		9	9
Total initial weight	lb.	391·0	397·0
Average initial weight	"	43·4	44·1
Total final weight	"	1,856.0	1,786·0
Average final weight	"	206·2	198·4
Average gain per head	"	162·8	154·3
Average number of days from commencement of trial to time of marketing		118·0	167·3
Average daily gain	lb.	1·38	0·92
Feed consumed—			
Oats	lb.	3,690·0	4,225·0
Barley	"	2,945·0	2,955·0
Tankage	"	500	515
Grain required to produce one pound of gain	"	4·53	5·17

GRADES, WEIGHTS AND MEASUREMENT OF DRESSED HOGS

Summer Feeding Trials—Self vs. Limited Hand-feeding.

—		Self-fed	Hand-fed 4 per cent of body weight
Number of selects		1	4
Number of thick smooths		8	5
Average dressed weight	lb.	153·3	154·1
Average dressing percentage	%	74·3	77·7
Average length of side	inches	29·8	29·7
Average thickness of fat at shoulder	"	1·94	1·91
Average thickness of fat at loin	"	1·41	1·50

It will be seen from the foregoing tables that self-feeding has given a much higher daily gain than the limited hand-feeding system and the hogs self-fed reached market weight 49 days sooner. The amount of grain to produce a pound of gain is somewhat erratic, for in the winter trials the self-fed groups required more grain for each pound of gain than did the hand-fed group, and this was reversed in the summer feeding trials. This in part was likely due to the fact that when the hogs are on pasture there is not the same tendency for them to stand around the self feeder and waste food when they are not really eating.

These figures give a favourable comparison of winter feeding with summer feeding from the standpoint of economy of gains.

It is interesting to note that the hand-feeding gave the largest number of selects on foot, and on the rail they measured one-tenth of an inch shorter from hip joint to first rib. There was a more even thickness of fat, and a greater dressing percentage than where the hogs were self-fed.

Following is the summarized table of trials conducted during the period from January to June regarding the value of alfalfa meal, skim-milk, cod liver oil, and fish meal, as protein supplements to the grain ration.

WINTER FEEDING TRIAL

—	Group 1 Grain, alfalfa meal, self-fed	Group 2 Grain, skimmed milk	Group 3 Grain, cod liver oil	Group 4 Grain fish meal	Group 5 Grain only
Number of days of trial	147·6	108·0	139·6	139·0	145·0
Number of hogs	6	6	6	6	6
Total initial weight lb.	287	286	300	288	288
Average initial weight lb.	47·8	47·7	50·0	48·0	48·0
Total final weight lb.	1,110 0	1,048·0	1,075·0	1,226·0	1,096·0
Average final weight lb.	185·0	174·7	179·2	204·3	182·7
Average gain for period lb.	137·2	127·0	129·2	156·3	134·7
Average daily gain lb.	0·93	1·18	0·93	1·12	0·93
Feed consumed:—					
Oats lb.	3,190	2,685	3,000	2,802	3,050
Barley lb.	2,845	1,430	2,500	2,177	2,600
Supplement lb.	453	6,640	55	268	.....
Grain required to produce one pound of gain lb.	7·33	5·40	7·10	5·31	6·99
Grain reductions per lb. gain attributable to supplement lb.	−0·34	1·59	−0·11	1·68	.....

SUMMER FEEDING TRIALS, JULY TO DECEMBER (ON PASTURE UNTIL SEPTEMBER 15 WITH COLONY HOUSES FOR SHELTER)

—	Group 1 Grain, pasture, skim-milk	Group 2 Grain, pasture,	Group 3 Grain, pasture, fish meal 5 per cent
Average number of days of trial	133·6	138·2	141·4
Number of hogs	10	9	10
Total initial weight lb.	434	403	434
Average initial weight lb.	43·4	44·8	43·4
Total final weight lb.	1,946	1,776	1,776
Average final weight lb.	194·6	197·3	177·6
Average gain for period lb.	151·2	152·5	134·2
Average daily gain lb.	1·13	1·10	0·95
Feed consumed:—			
Oats lb.	3,522	3,671	3,589
Barley lb.	3,380	3,200	3,237
Supplement lb.	4,830	.....	215
Grain required per pound gain lb.	4·56	5·00	5·09
Reduction in grain required per pound gain attributable to supplement lb.	0·44	.....	−0·09

SUMMER FEEDING TRIALS—GRADES, MEASUREMENTS, AND WEIGHTS OF DRESSED CARCASSES

—	Group 1 Grain, pasture, skim-milk	Group 2 Grain, pasture	Group 3 Grain, pasture, fish meal 5 per cent
Selects	4	1	1
Thick smooth	6	8	9
Average dressed weight lb.	147·3	156	142·9
Average dressing percentages %	75·7	79·1	80·5
Average length of side in.	29·6	29·4	29·5
Average thickness of fat at shoulder in.	1·82	1·66	1·85
Average thickness of fat at loin in.	1·30	1·55	1·36

DEDUCTIONS FROM WINTER AND SUMMER FEEDING TRIALS

Alfalfa meal as the sole supplement does not appear to be a valuable addition to the ration of feeder hogs.

It has been proven by many trials that skim-milk is the best supplement to the grain ration. It gives best returns when fed to pigs in the younger stages of their development.

Cod liver oil has not given significant results. It may have a value with pigs at weaning stage when skim-milk is not available.

Fish meal has given good results on the winter trials, but not in summer-feeding trials, where pasture was available.

Examination of the table showing grades, measurements and dressing percentages will reveal that there is no significant difference between the average length of any of the pigs in the groups, while the dressing percentage appears to increase with the lower daily gain and higher grain requirement per pound gain.

A report of three years' work with cross-breeding and protein supplements will be ready for presentation in the next annual report.

CEREALS*

The seasonal conditions for the growth of all crops were extremely abnormal on account of so much moisture and such cold weather in the spring. There were only a few days in the latter part of April when seeding could be carried on satisfactorily and the seeding of wheat was continued throughout the district as late as June 10, being done at short intervals between storms. The early-seeded grain germinated but produced little or no growth until the warmer weather commenced about the middle of June, so that there was little difference in time of maturity between early- and late-seeded crops.

Fortunately, favourable weather prevailed at the time of ripening. In the greater part of the district, killing frosts did not occur until the first of November, which gave the late-seeded crops a splendid opportunity to ripen without damage from frost. Winter weather set in, however, early in November and continued throughout the balance of the year, making the time much too short for threshing the heavy crop which was produced in all parts of the district with the result that from twenty-five to fifty per cent of the crop in many localities stood in the stook over winter. Attempts made at threshing during the winter months proved unsuccessful as it seldom happened that weather suitable for threshing continued longer than two or three days at a time, and the grain threshed was greatly reduced in quality.

In the foothills district, the adverse weather conditions were more pronounced, as in addition to the excess of moisture in the spring, that area also received killing frosts in September which resulted in the grain marketed from that district being of very low grade.

VARIETY TESTS—DRY LAND

On dry land, the testing of cereal varieties that are comparatively new is conducted in quadruplicate rod-row plots. These plots are arranged and seeded so as to provide ordinary field conditions, and results are determined by averaging the yields of the four plots. The varieties which give best results in this method of testing, as well as those most commonly grown in the district, are also tested in duplicate one-fortieth acre plots. All tests are conducted on land that was in summer-fallow the previous season.

* The work with cereals and forage crops is under the supervision of W. D. Hay; B.S.A., whose material assistance in the preparation of the report under these headings is gratefully acknowledged.

WHEAT

Twelve varieties of spring wheat were tested in one-fortieth acre plots. Seeding was done at the rate of seventy-five pounds per acre with an ordinary press drill. The surface soil had been blown off the field to such an extent that the yields obtained from all varieties were much lower than normal soil would have given in a year with such a plentiful supply of moisture.

WHEAT—TEST OF VARIETIES (DRY LAND)

Grown in duplicate plots of 1-40th acre each

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Average yield per acre for past 3 years	Yield for past 3 years in per cent of Marquis 10 B
			inches		bush.	bush.	
Red Bobs 222	Aug. 27	108	29·5	10	32·0	34·2	135·2
Renfrew	Sept. 1	113	35·5	10	33·8	31·1	122·9
Kota	Aug. 30	111	33·0	7	27·7	31·1	122·9
Red Fife (Ott. 17)	Sept. 2	114	32·5	10	29·6	30·6	121·0
Supreme	Aug. 30	111	28	10	29·2	30·1	119·0
Early Triumph	" 23	104	26·5	10	29·7	26·3	104·0
Kitchener	Sept. 1	113	26	10	17·9	26·0	102·8
Marquis 10 B	Aug. 30	111	24	10	18·9	25·3	100·0
Reward (Ott. 928)	" 23	104	28	10	19·8	22·9	90·5
Garnet (Ott. 652)	" 22	103	26·5	10	18·8	20·2	79·9
Ruby (Ott. 623)	" 22	103	30	10	19·5	18·6	73·5
Marquis (Ott. 15)	" 31	112	27	9	26·7	.....	.....

Unfortunately Marquis Ottawa 15, which is generally used as the standard of comparison for wheat varieties, was damaged during one of the past three years and could therefore not be used for comparative purposes. Marquis 10 B, which has proved a somewhat lower yielding strain here, was used instead.

Red Bobs 222 is a selection made by the University of Alberta from the original Red Bobs. It resembles very closely Early Triumph, which is another selection from Red Bobs made by Dr. Seager Wheeler. Supreme is also another selection from the same source, made by Dr. Seager Wheeler.

These selections have given good satisfaction from the standpoint of yield. They are inclined, however, especially in wet seasons, to produce grain which is lacking in colour, and which is consequently reduced in grade.

Renfrew is a variety which closely resembles Marquis in nearly every respect. The head and the grain are almost identical with those of Marquis and it has been one of the best yielders at the Station for the past three years. It is about four days later in maturing than Marquis and about four inches longer in the straw. The extra length of straw gives it a little advantage in certain of the drier districts where length of straw may often be an important factor.

Kota, on account of weakness in the straw and inferior milling qualities, is not recommended for the district, even though it has been one of the highest yielding varieties during the last three years. In recent years, Garnet has been recommended for districts where an early variety is required. Reward now appears to be an important variety also for such districts. On account of its earliness, yielding capacity, and better milling qualities, it will probably replace Garnet on many farms.

OATS

There were seven varieties of oats tested in one-sixtieth-acre plots. These were seeded May 10 at seventy-five pounds per acre. As in the case of wheat, little or no growth took place until about the middle of June and the yields obtained were smaller than would have resulted if the surface soil had not been affected by drifting.

OATS—TEST OF VARIETIES (DRY LAND)

Grown in duplicate plots of 1-40th acre each

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Average yield per acre for past 6 years	Yield for past 3 years in per cent of Banner
			inch.		bush.	bush.	
Victory	Aug. 24	105	29·0	9	39·2	62·8	104·7
Leader	" 26	108	30·0	10	64·6	61·8	103·0
Banner (Ott. 49)	" 26	108	30·5	10	56·5	60·0	100·0
Danish Island	" 26	108	31·5	10	58·4	58·7	97·8
Gold Rain	" 21	103	29	10	46·9	53·2	88·7
Longfellow (Ott. 478)	" 23	105	35	9	40·5	49·7	82·8
Alaska	" 10	91	29	10	21·8		

Over a period of the last six years, Victory has been the highest yielding variety and for that reason is the one recommended for dry land farms. This year, probably on account of the abnormal moisture supply, it was out-yielded by five other varieties, but more particularly Leader, Danish Island, and Banner. The variation in yield of the oat varieties was much greater this year than it usually is. Laurel, although not included in the tests this year, has given good results as a hulless variety.

BARLEY

Of the fifteen varieties tested, twelve have been grown continuously for the past six years. Seeding was done on May 3 at the rate of seventy-two pounds per acre.

BARLEY—TEST OF VARIETIES (DRY LAND)

Grown in duplicate plots 1-40th acre each.

Variety	Date of ripening	Number of days maturing	Length of straw	Strength of straw on scale of 10 points	Yield per acre	Average yield per acre for past 6 years	Yield for past 6 years in % of O.A.C. 21
			inch		bush.	bush.	
Trebi	Aug. 20	109	21·0	8·5	64·1	49·1	142·3
Bark's	" 29	118	25·0	9·0	62·3	44·9	130·1
Cape	" 17	106	21·5	9·0	42·9	40·6	117·7
Odessa	" 15	104	20	9·0	41·0	37·9	109·9
Bearer (Ottawa 475)	" 20	109	29·5	8·5	48·7	37·8	109·6
Gold (Sweden)	" 24	113	22·5	7·5	63·5	36·7	106·1
Mariout	" 22	111	20·5	8·5	43·3	36·0	104·3
Chinese (Ottawa 60)	" 15	104	28·0	8·5	47·5	34·8	100·9
O.A.C. 21	" 15	104	29·5	8·5	45·0	34·5	100·0
Early Chevalier (Ottawa 51)	" 12	101	29·5	8·0	41·5	34·3	99·4
Invincible	" 21	110	27·5	9·0	47·4	31·7	91·9
Himalayan (Ottawa 59)	" 17	106	22·0	8·0	41·8	31·4	91·0
Junior (Ottawa 471)	" 16	105	17·5	9·5	61·7	.....	.....
Swedish Chevalier	" 24	113	29·0	7·0	60·3	.....	.....
Duckbill (Ottawa 57)	" 24	113	30·0	9·0	41·4	.....	.....

Trebi has been a consistenly high yielder at the Station on dry land and is the variety recommended under these conditions. Bark's ranks second in yield over a period of years. This variety, however, is not strongly recommended under dry land conditions. It attained this standing largely because last season was a wet one and the two previous ones had several good rains in August which benefited it more than other varieties, on account of its later maturity. It is the latest maturing variety under test and often when subjected to late August and early September rains it lodges badly.

A general comparison between the yielding capacity of six-rowed and two-rowed sorts may be got from the fact that the first nine varieties, with the exception of Gold, are six-rowed; while the remainder, with the exception of Himalayan and Junior, two six-rowed hulless varieties, are two-rowed. Himalayan is most worthy of recommendation where a hulless variety is required.

PEAS

Comparative tests were conducted with eight varieties of peas grown in quadruplicate plots, each consisting of five rows one rod in length and seven inches apart. Seeding of all plots was done on May 31 at the rate of 150 pounds per acre.

PEAS—TEST OF VARIETIES (DRY LAND)

Variety	Date of ripening	Number of days maturing	Yield per acre	Average yield per acre 1916–1927 (inclusive)	Yield for 1916–1927 (inclusive) in per cent of Mackay
			bush.	bush.	
English Grey	Oct. 11	133	14·6	17·3	105·5
Solo	" 9	131	10·2	16·8	102·4
Prussian Blue	" 8	130	11·0	16·5	100·6
Mackay (Ottawa 25)	" 8	130	14·3	16·4	100·0
Golden Vine	" 13	135	10·2	15·6	95·1
Chancellor (Ottawa 26)	" 5	127	9·1	15·4	93·9
Cartier (Ottawa 19)	" 12	134	13·6	.....	.....
Arthur (Ottawa 18)	" 10	132	10·1	.....	.....

The effect of the soil drifting on the land where these tests were conducted was apparent and the yields of the varieties were considerably lower than the average yields for the past twelve years. Mackay and Golden Vine are the two varieties recommended, since they are not outyielded by the others to any appreciable extent and produce grain of a better quality for marketing.

WINTER WHEAT

In many parts of the district, more importance is being attached to winter wheat. One main reason for this has been the fact that in a few recent years the problem of soil drifting proved so serious that farmers were obliged to consider means of combatting it. The growing of winter wheat has been found, in many cases, an effective as well as economical means of control. In some seasons, the question of winter killing makes the winter wheat crop an unsafe one, and prevents it from holding an important place in the cropping system, while in those seasons where the loss is only slight, the returns may exceed those received from spring wheat.

On Rotation "T", winter wheat seeded on summer-fallow has averaged 27·4 bushels per acre in the sixteen-year period, 1912-27. On Rotation "B", a two-year alternation of wheat and fallow, spring wheat has averaged 26·6 bushels per acre for the same period. The price paid for winter wheat is usually about ten cents per bushel lower than that paid for spring wheat of similar grades.

This disadvantage of winter wheat may be offset by its tendency to distribute over a longer period the demands for labour and machinery at seeding and harvesting times, thus encouraging lowered expenses. When a cultural method comes into general practice that is more effective in the prevention of winter-killing, the winter wheat crop will really command serious attention.

The conclusions arrived at from the experimental work conducted at the Station with winter wheat are that seeding should be done on summer-fallowed land about the first of September and at the rate of one bushel per acre.

For the past three seasons, the Station has been conducting, in co-operation with the United States Department of Agriculture, variety tests of winter wheat for winter hardiness. The results averaged for the three years show that seven of the varieties tested have been found more winter hardy than Kharkov, the variety most commonly grown, and at the twenty-six experiment stations in the United States and Canada where these tests were conducted it was found in summarizing results for the years from 1920 to 1925 inclusive, that nine varieties were less subject to winter killing than Kharkov. Four of these were considerably better in this respect. It is therefore probable that a variety superior to Kharkov can be obtained.

ROD-ROW TESTING OF CEREAL VARIETIES

All varieties of wheat, oats and barley under test at the Station were included in the rod-row system of testing. This method has been used at the Station for the last four years for testing both the newer varieties and the old or more commonly grown ones, and serves as a means of determining the ones best adapted to the conditions and worthy of further testing in the larger sized plots. Rod-row plots consist of three rows, one rod long and seven inches apart with just the row space of seven inches between plots. Test plots of each variety are replicated three times, making four plots in all, and results obtained from such plots are considered as accurate as those obtained from the larger sized plots in duplicate. Varieties are seeded at the usual rate of seeding used at the Station, and seeding is done by hand, so that they are grown practically under field conditions. The following shows the standing of the varieties tested in rod-row plots, as determined by averaging results over a period of four years for plots grown on dry land, and three years for plots grown on irrigated land.

DRY LAND

Wheat.—Early Triumph, Supreme, Marquis Sask. 7, Kitchener, Marquis Ottawa 15, Huron Ottawa 3, Marquis 10B, Marquis McD. 114, Golden, Marquis McKay, Crown Ottawa 353, Ruby Ottawa 623, Acme, Duchess Ottawa 933, Reward Ottawa 928, Garnet Ottawa 652, Master Ottawa 520, Prelude Ottawa 135, Kubanka Ottawa 37.

Oats.—Columbian Ottawa 78, Leader, Irish Victor P., Leader B., Gerlach (Sask.), O.A.C. 72, Legacy Ottawa 678, Danish Island, Gold Rain, Prolific Ottawa 77, Leader A, Alaska, Laurel Ottawa 477.

Barley.—Swedish Chevalier, Hannchen Sask. 229, Himalayan Ottawa 59, Gold, Early Chevalier Ottawa 51, Chinese Ottawa 60, Charlottetown No. 80, O.A.C. 21 (Sask. Sel.), Junior Ottawa 471, O.A.C. 21, Bearer Ottawa 475, Duckbill Ottawa 57.

IRRIGATED LAND

Wheat.—Supreme, Early Triumph, Kitchener, Kubanka Ottawa 37, Marquis Ottawa 15, Marquis Sask. 7, Huron Ottawa 3, Marquis 10B, Renfrew, Aurore,

Marquis McD. 114, Red Quality A., Golden, Marquis McKay, Reward Ottawa 928, Acme, Kota, 929B., Ceres, Chelsea Ottawa 10, Red Bobs 222, Early Red Fife, Producer Ottawa 197, 928-L6, Parker's Selection, Garnet Ottawa 652, 928, QQ2, 928 P., 928-WID, Duchess, Ottawa 933, 939D., Quality, Master Ottawa 520, Crown Ottawa 353, 932 A, Ruby Ottawa 623, Prelude Ottawa 135.

Oats.—Columbian Ottawa 78, Danish Island, Leader, Gold Rain, Banner Ottawa 49, Victory, Leader B, Gerlach Sask., Legacy Ottawa 678, Kherson, Irish Victor P., Prolific Ottawa 77, O.A.C. 72, Longfellow Ottawa 478, Leader A., Alaska, Liberty.

Barley.—Chinese Ottawa 60, Bearer Ottawa 475, Star, O.A.C. 21, Charlottetown 80, Swedish Chevalier, Hannchen Sask. 229, 910 H., Gold (Swedish), Himalayan Ottawa 59, Junior Ottawa 471, Early Chevalier Ottawa 51, Duckbill Ottawa 57, Pearl.

CORN—TEST OF VARIETIES—IRRIGATED LAND

Variety	Source	Height of plants at harvesting	Maturity at harvest	Yield per acre green weight	Yield per acre dry matter	Average yield per acre of dry matter for past 4 years
		ft. in.		tons	tons	tons
Burr Leaming	Geo. S. Carter	7 9	Late silking	41·79	5·23	4·90
Longfellow	J. O. Duke	6 5	Silking	38·49	4·25	4·82
Bailey	J. O. Duke	7 8	Silked	28·74	3·57	4·10
Compton's Early	J. O. Duke	8 0	Silked	41·38	4·13	4·07
Golden Glow	J. O. Duke	7 4½	Silked	30·22	3·58	3·87
Leaming	J. O. Duke	7 5	Silked	28·54	3·48	3·82
North Western Dent	South Dakota	6 6	Ears formed	33·51	4·28	
North Western Dent	Dakota Improved Seed Co.	6 5	Ears formed	31·09	4·07	
Improved Squaw	Locally grown	4 8	Dough	23·16	3·93	
North Western Dent	Crookston	6 0	Dough	22·61	3·91	
Assiniboine Yellow	Ottawa	5 1	Early dough	25·71	3·76	
Falconer	Ottawa	5 5	Milk	26·39	3·62	
Quebec 28	Dr. Todd	5 3	Milk	22·71	3·45	
Minnesota 23	Northland Seed Co.	5 5	Early Dent	15·26	3·44	
North Western Dent	Brandon	5 8	Late dough	21·34	3·31	
Wisconsin 7	J. O. Duke	7 6	Tasseling	36·04	3·15	
North Dakota White Flint.	Ottawa	4 8	Late milk	22·72	2·98	
Gehu	Locally grown	4 7	Dough	20·12	2·97	
Howe's Alta Flint	Ottawa	3 8	Ripe	10·18	2·71	

Unfortunately the strains of North Western Dent, which is the variety most commonly grown for ensilage purposes, have not been tested during each of the past four years, and the average yields cannot therefore be included for the four-year period. These strains, on account of reaching a higher degree of maturity at harvest time, and therefore producing ensilage of better quality than the six varieties first mentioned on the list, are recommended in preference to them. The Minnesota 23 variety, while tested at the station this season for the first time, appears to be one of the best for ensilage purposes in districts where early fall frosts are likely to damage the corn crop. Farmers who have grown it look upon it as a promising one for the district. Of the varieties grown for grain or hogging-off purposes, Improved Squaw, Gehu and Howes' Alta Flint have given best results. Where earliness is a limiting factor, the Howes' Flint is recommended in preference to the first two varieties mentioned.

FORAGE CROPS

The cold weather of the spring months was not conducive to rapid growth. When the warm weather occurred, about the middle of June, grass and clover crops had made only about half as much growth as they usually have made at that time. It was, however, a much more favourable spring for getting grass and clover crops started, as the surface soil remained moist and provided conditions suitable for germination. While the growth in the early part of the season was small, the extra moisture supply and warmer weather which occurred later produced, on dry land, yields much greater than those obtained under average conditions, and on irrigated lands yields which compared favourably with those obtained in previous years. Practically no irrigating was necessary.

On range lands, feed was much more plentiful than usual, providing better conditions for range stock during the winter months.

CORN

The season was probably more unfavourable for corn than for any other class of forage crop. Experience in the past has shown that the growth and maturity of corn grown both at the station and in the surrounding country could have been greatly improved by earlier planting. In recent years, therefore, earlier seeding has been recommended. While this season's weather conditions were decidedly in favour of late seeding, and in many cases, the early-seeded corn rotted in the ground, it must be remembered that such abnormal spring weather has seldom if ever occurred in the past, and that in districts receiving as low an annual precipitation as this, one must expect them only rarely in future. It should also be remembered that in such wet seasons the high returns from the wheat crop completely overshadow any small loss that may result from a poor corn crop, while in dry seasons when grain and hay yields are low, conditions are generally favourable for corn, and the winter feed supply is greatly improved by this crop.

The practice of growing corn for hogging-off purposes is becoming more common each year, and is looked upon by many farmers as the most economical method of harvesting the crop.

All varieties of corn tested at the Station were seeded on dry land for comparative purposes, but the stand obtained in practically all cases was so thin that yields could not be obtained.

CORN—TEST OF VARIETIES—IRRIGATED LAND

There were nineteen varieties of corn included in the comparative tests. These were all seeded with an ordinary two-row corn planter in quadruplicate 1/200 acre plots. The data recorded from the tests were obtained by averaging results from the four plots. Seeding of all varieties was done on May 12, at approximately fifteen pounds per acre. A good stand was obtained in all cases and the plants were then thinned to approximately ten inches apart in the row, which has been found at the station to be the best distance of thinning. As the value of corn for fodder purposes is based largely upon its per cent of dry matter, this was determined by drying samples from the different varieties in an oven until all the moisture was driven off. From the weight of the remaining material the yield per acre of dry matter was then computed. These dry matter determinations were made by Mr. S. Barnes, the Field Husbandman stationed at Swift Current, Saskatchewan.

As there was ample precipitation for corn throughout the season, no irrigating was required.

FIELD HUSBANDRY

CROP ROTATIONS

Eight rotations are established on the non-irrigated and two on the irrigated part of the Station. These have been under way for from two to sixteen years and careful cost and return data have been kept each year. In addition to the rotations, one dry-land field has been planted to wheat every year since 1911.

The following tables give the cost and return values used in working up the rotation tables for 1927:—

COST VALUES FOR THE SEASON OF 1927

Rent and taxes, dry land	per acre	$ 2 50
Rent and taxes, irrigated land	per acre	8 00
Manure	per ton	1 00
Seed wheat	per bush.	1 50
Seed oats	"	0 80
Seed barley	"	1 00
Seed peas	"	3 00
Seed rye	"	1 12
Seed corn	per lb.	0 09
Alfalfa seed	"	0 30
Rye grass seed	"	0 11
Sweet clover seed	"	0 12
Brome grass seed	"	0 11
Sugar beet seed	"	0 12
Twine	"	0 13
Machinery	per acre	1 35
Manual labour	per hour	0 30
Horse labour, per horse	"	0 08
Threshing wheat and peas	per bush.	0 14
Threshing barley	"	0 14
Threshing oats	"	0 10
Ensiling	per ton	1 30

RETURN VALUES FOR THE SEASON 1927

Wheat	per bush.	$ 1 15
Oats	"	0 52
Barley	"	0 68
Rye	"	0 75
Peas	"	2 50
Alfalfa hay and pea and oat hay	per ton	10 00
Alfalfa seed	per lb.	0 25
Corn ensilage	per ton	3 50
Wheat or pea straw		Nil
Oat or barley straw	"	2 00
Sugar beets	"	8 25

DRY LAND CROP ROTATIONS

The most popular, and by many believed to be the most profitable cropping practice followed up to the present by the majority of dry land farmers in the southern part of Alberta, has been one which provides the maximum acreage of wheat while still allowing some attention to be given to the control of moisture, weeds and soil drifting. Just how long the present methods may be followed profitably owing to possible depletion of soil fertility is a debatable question. However, in anticipation of a future demand for information on various cropping systems some of which would entail a variety of crops, and be suitable to a more varied farming program, several crop rotations have been planned and conducted at the Station.

Five crop rotations were laid down in 1911, as well as one plot known as rotation "A" on which wheat has been grown continuously for sixteen years. In 1921 rotations "J" and "Z" were started, and in 1926 rotation "F" was planned with a view to gaining information as to the effect of sweet clover and corn on soil texture and its relation to soil drifting.

A review of rotations "A", "B", and "C" will indicate the relation of continued profits to the cropping system. Speaking generally, rotation "A", wheat continuously, was the most profitable of these rotations while the land was new. However, the profits from this plot have gradually diminished due to the lack of means of weed control or moisture conservation, until at the present time, despite the fact that there are no summer-fallowing charges and a chance for a return each year, this plot is the least profitable of the straight wheat rotations.

Rotation "B", wheat and summer-fallow in alternate years, owing to the heavier summer-fallowing charges, has not returned as high an acre profit as has "C" with two crops of wheat after summer-fallow. Rotation "B", nevertheless, has an average acre yield of three bushels over Rotation "C" as the supply of moisture, invariably the result of summer-fallowing, makes it more consistent and more sure of returns in a dry year.

SUMMARY OF YIELDS AND PROFITS PER ACRE DRY-LAND ROTATIONS

ROTATION "A"—WHEAT CONTINUOUSLY

Rotation Year	Crop	Yields		Profit or loss (−)	
		1927	Average for 16 years	1927	Average for 16 years
				$	$
1	Wheat	16·9 bush.	13·27 bush.	7 52	3 92
	Field average per acre			7 52	3 92

ROTATION "B"—TWO YEARS' DURATION

1	Summer-fallow				
2	Wheat	36·03 bush.	26·57 bush.	19 95	10 27
	Field average per acre			9 98	5 13

ROTATION "C"—THREE YEARS' DURATION

1	Wheat	38·44 bush.	31·47 bush.	31 26	10 31
2	Wheat	32·29 bush.	21·14* bush.	22 25	7 89
3	Summer-fallow				
	Field average per acre			17 84	6 07

*Average for 4 years (oats till 1923)

ROTATION "T"—TEN YEARS' DURATION

1	Summer-fallow				
2	Winter wheat	45·20 bush.	27·37 bush.	25 26	6 71
3	Oats	62·37 bush.	43·78 bush.	17 62	6 62
4	Alfalfa seeding			−13 27	−15 82
5	Alfalfa seed	171·88 lb.	11·27 lb.	29 52	17 76
6	Alfalfa seed	33·75 lb.	2·64 lb.	−2 39	2 93
7	Alfalfa seed	30·63 lb.	2·34 lb.	−6 28	−0 81
8	Summer-fallow				
9	Corn	7·71 ton	7·79 ton	6 00	2 64
10	Spring wheat	39·58 bush.	22·93 bush.	30 43	10 64
	Field average per acre			8 69	3 07

ROTATION "S"—NINE YEARS' DURATION

Rotation year	Crop	Yield 1927	Yield Average for 16 years	Profit or Loss (−) 1927	Profit or Loss (−) Average for 16 years
				$	$
1	Summer-fallow				
2	Corn	7·78 ton	7·57 ton	−6 38	−4 04
3	Winter rye	33·0 bush.	24·55 bush.	14 76	13 14
4	*Summer-fallow (Volunteer oats)	48·24 bush.	3·02 bush.	13 41	3 02
5	Wheat	41·33 bush.	26·41 bush.	32 03	6 69
6	Oats	73·64 bush.	40·35 bush.	18 05	4 84
7	Summer-fallow				
8	Peas and oats	2·52 ton	2·04 ton	−3·43	−2 08
9	Wheat	40·12 bush.	35·62 bush.	29 34	1 66
	Field average per acre			10 86	2 58

*From oat crop substituted for winter-killed rye in 1926.

ROTATION "M"—SIX YEARS' DURATION

1	Summer-fallow				
2	Winter wheat	52·93 bush.	25·01 bush.	35 14	4 41
3	Oats	74·12 bush.	39·73 bush.	18 15	4 33
4	Summer-fallow				
5	Peas and oats	3·16 ton	2·18 ton	2 67	0 18
6	Oats	77·65 bush.	45·81 bush.	22 23	5 98
	Field average per acre			13·03	2·48

ROTATION "J"—SIX YEARS' DURATION

		1927	Average for 6 years	1927	Average for 6 years
1	Summer-fallow				
2	Wheat	43·17 bush.	43·17 bush.	32 02	8 73
3	Wheat	37·17 bush.	21·34 bush.	24 76	6 16
4	Oats seeded Western rye 9 lb., alfalfa	65·0 bush.	40·69 bush.	6 18	5 34
5	Hay	1·35 tons	0·61 tons	6 99	−1·74
6	Hay or pasture	2·49 tons	1·25 tons	17 79	1 19
	Field average per acre			14 62	3 28

ROTATION "Z"—FIVE YEARS' DURATION

1	Summer-fallow				
2	Wheat	46·83 bush.	27·76 bush.	23·93	4 58
3	Wheat	42·17 bush.	24·70 bush.	29 34	3 76
4	Sweet clover seeded	Nil	5·09 tons	−16 28	−8 63
5	Hay or pasture	4·12 tons	1·99 tons	23 68	3 13
	Field average per acre			12 13	0 57

ROTATION "F"—THREE YEARS' DURATION

		1927	1927
1	Sweet clover	2·71 ton	15·43
2	Wheat (seeded to sweet clover)	17·00 bush.	7·95
3	Corn (failure)	Nil	−10·05
	Field average per acre		4·44

DRY LAND CULTURAL WORK

SUMMER-FALLOW SUBSTITUTES

In 1917, a group of plots was laid out with a view to determining the value of intertilled crops as summer-fallow substitutes. From 1917 until 1921, wheat was planted in alternate years after the following summer-fallow substitutes:—

Corn, check-rowed, and cultivated both ways.
Potatoes, check-rowed and cultivated both ways.
One plot left fallow as a check.

The following five-year average yields of wheat per acre were obtained:—

After corn	10·99 bush.
After potatoes	14·96 bush.
After summer-fallow	13·64 bush.

In 1922, the potato plot was changed to sunflowers, and from then until 1927, the following six-year average yields of wheat per acre were harvested:—

After corn	19·22 bush.
After sunflowers	15·62 bush.
After summer-fallow	20·83 bush.

CULTURAL ROTATIONS

In the autumn of 1927, eight cultural rotations of three years' duration were laid out on drifted soil.

CROP ROTATIONS ON IRRIGATED LAND

Two rotations are conducted on the irrigated part of the Station, one of ten years' duration and one of fifteen years. Both rotations have alfalfa as a base and receive an application of twelve tons of manure per acre once during the rotation cycle.

Rotation "U" is a straight rotation of six years of alfalfa followed by sugar beets, wheat, oats and barley in the order named. Alfalfa is seeded with barley as a nurse crop. The manure is applied to the alfalfa one year before the crop is broken for sugar beets.

Rotation "X" is arranged somewhat differently. Two-thirds of the land comprised in the rotation are in alfalfa and one-third in crops planted on ploughed land. A field of alfalfa is not broken each year as with Rotation "U", but one-half of the alfalfa area (i.e. one-third of the land in the rotation) is broken every five years and in the same year, all of the fields used for annual crops are seeded to alfalfa. The annual crops are rotated among themselves in the order shown in the summary table. Manure is applied on the barley stubble preceding the corn.

That these systems of cropping and the light applications of manure (twelve tons per acre once in ten or fifteen years) have kept yields at a high level is shown by the good average yield of crops and by the excellent returns this year after thirteen and sixteen years respectively of cropping. Not only have good yields been maintained but the use of alfalfa and cultivated crops has made it possible to keep weeds under control, a problem of no small moment on the irrigated farm. It is evident, however, from the number of weeds in the final year of grain that from three to four years is the maximum that grain crops can be grown consecutively on irrigated land.

SUMMARY OF YIELDS AND PROFITS PER ACRE ON IRRIGATED ROTATIONS

ROTATION "U"—TEN YEARS' DURATION

Rotation year	Crop	Yields		Profit or loss (−)	
		1927	Average for 16 years	1927	Average for 16 years
				$	$
1	Alfalfa	3·54 ton	1·97 ton	16 40	7 67
2	Alfalfa	3·645 ton	3·58 ton	17 69	24 60
3	Alfalfa	3·255 ton	3·82 ton	14 30	27 74
4	Alfalfa	2·105 ton	4·01 ton	4 30	30 18
5	Alfalfa	2·345 ton	4·20 ton	6 63	31 70
6	Alfalfa	3·725 ton	4·44 ton	18 19	33 53
7	Sugar beets	9·092 ton	10·56* ton	18·06	**123 36
8	Wheat	46·00 bush.	47·25 bush.	26 36	28 12
9	Oats	92·65 bush.	91·23 bush.	25 24	17 87
10	Barley	61·67 bush.	52·03 bush.	19 98	11 63
	Field average per acre			16 72	33 64

*5-year average, beets. **Average profit for potatoes for eleven years $171, and for sugar beets for five years $18.57.

ROTATION "X"—FIFTEEN YEARS' DURATION

		1927	Average for 13 years	1927	Average for 13 years
1 to 5	Alfalfa	2·85 ton	2·80* ton	11 23	*14 79
6 to 10	Alfalfa	3·98 ton	3·39* ton	21 04	*25 32
11	Barley	60·42 bush.	43·14 bush.	20 61	12 11
12	Corn	12·16 ton	7·81 ton	4 81	1 65
13	Wheat	47·83 bush.	36·20 bush.	31 78	16 22
14	Oats	88·24 bush.	64·28 bush.	24 25	7 45
15	Peas	52·17 bush.	21·94 bush.	100 65	14 47
	Field average per acre			22 90	16 83

*12-year average.

IRRIGATION EXPERIMENTS*

Experiments dealing with the stage of plant growth when water should be applied to wheat, alfalfa, potatoes and sugar beets were continued this year. This is the sixth year of experimentation with wheat and potatoes, the fifth year with alfalfa and the third year with sugar beets. Timothy, brome grass and mixed pasture grasses were included in the experiment but were discontinued because of under-ground seepage developing where these plots were located.

APPLICATION OF WATER

The stage of plant growth was used, whenever possible, to determine the time when water was to be applied to the crops. Wheat was irrigated one to four times in the season. The stages when water was applied were immediately after the plants came up, when they had three leaves and five leaves, and when they were in the shot-blade, flowering or soft-dough stages.

Alfalfa was irrigated in early May, when the first crop was twelve inches high, ten days before cutting, immediately after cutting or when the second

* Experimental work with irrigation and also with poultry and bees is under the supervision of A. E. Palmer, M.Sc., whose material assistance in the preparation of the report under these headings is gratefully acknowledged.

crop was twelve inches high. Where three cuttings were made, an application of water was given immediately after the second crop was cut. From one to four irrigations were applied to alfalfa.

Potatoes were irrigated when half-grown, when the plants started to bloom, when in full-bloom or ten days after full-bloom and at intervals of ten days or twenty days. The potato plots were irrigated from one to six times.

Sugar beets received water before thinning, immediately after thinning and at intervals of two to eight weeks throughout the season. From one to five irrigations were applied to sugar beets. Three or more sets of plots of each crop were irrigated in the preceding fall and one set received no irrigation.

SOIL MOISTURE STUDIES

Soil moisture determinations were made on all plots of each foot-depth of soil to a depth of six feet in the spring and after harvest, and before and after each irrigation. These determinations showed that a six-inch application of water failed to penetrate into the soil to a depth of six feet in more than half the plots when the soil moisture content was below eleven per cent at the time of irrigation. With a moisture content between eleven and thirteen per cent, sixty to seventy per cent of the observations showed that the water had penetrated to six feet. The water applied to almost all of the plots having a soil moisture content above thirteen per cent wet down six feet or more.

The loss of water from the soil of fall-irrigated land between the time of irrigating in the fall and seeding the following spring was noticeable, but usually not important, except in 1925-1926 when the weather between mid-October and early May was very open, dry and windy. During that period the water loss from a number of plots was about equal to the irrigation application of the previous fall.

DEDUCTIONS AND RECOMMENDATIONS

It seems safe to make the following deductions and recommendations from the two to six years' experiments with the irrigation of wheat, alfalfa, potatoes, sugar beets and sunflowers.

Wheat.—One irrigation produced a good crop of wheat in the years of average rainfall. In the drier seasons, two applications of water were needed.

Irrigating in the fall after harvest for the succeeding year's wheat crop proved to be a good practice. If a fall irrigation was not given, and if the precipitation of May and early June was not abnormally high, it was found essential to irrigate after the crop was up in the spring, but before the plants were checked in growth by lack of moisture.

Contrary to the usual opinion, irrigating wheat as early as the three-leaf stage did not reduce yields on the sandy clay-loam soils where the experiments were conducted.

When wheat needed more than one irrigation, good results were obtained when the second application was made in the flowering stage.

Irrigating wheat in the soft-dough stage did not increase yields, but sometimes caused the grain to lodge.

Alfalfa.—In each year of the experiments, except the "wet" year of 1927, alfalfa required at least two irrigations to produce two good crops. It was found necessary to apply one of these the previous fall or in early May to give a heavy first cutting of hay. A second irrigation was required just before or just after cutting the first crop. If May was dry, an irrigation when the first crop was about twelve inches high increased the yields.

It seemed to make little difference in the yields of the second crop whether the water was applied ten days before or immediately after cutting the first crop.

Potatoes.—Irish Cobbler potatoes, irrigated when the plants were half-grown, gave lower yields than were secured if the first irrigation was postponed until the plants were starting to bloom. In the drier seasons an irrigation in the starting-bloom stage and two subsequent irrigations at intervals of twenty days was the most satisfactory practice.

There was no consistent difference observable in the cooking quality of potatoes receiving different irrigation treatments. When the plants were retarded in growth from lack of water and then irrigated, second growths, resulting in "knotty" tubers, were prevalent. The potatoes receiving five or six irrigations produced tubers with enlarged lenticels, but the cooking quality did not appear to be impaired. The greatest number of irrigations produced more small potatoes than one or two irrigations.

Sugar Beets.—The limited data secured with sugar beets suggest that an irrigation in the previous fall and one during the growing season, from six to eight weeks after thinning would be sufficient for that crop in years of average rainfall. There was no uniform difference in the sugar content of the beets receiving different irrigation treatments, except that where the beets were retarded in their growth from drouth and then irrigated, the sugar content was lower than where the beets were not injured by lack of water at any stage of growth.

Sunflowers.—Sunflowers gave best yields on fall-irrigated land or with a spring irrigation when the plants were about six inches high. In the two years of the test with sunflowers, one irrigation in the season was sufficient. This crop wilted noticeably if the soil became too dry, but revived and produced fair yields when water was applied.

These experiments indicate that, including the available water in the soil at the beginning of the season, wheat requires from 1·50 to 1·75 acre-feet of water, alfalfa 1·75 to 2·25 acre-feet and potatoes about 1·50 acre-feet to produce good crops.

WATER USED ON THE STATION FARM

The excessive rainfall received in May, together with the moisture carried over in the soil from the heavy storms of the previous fall was sufficient for all grain and cultivated crops and for the first cutting of alfalfa hay. It was necessary, therefore, to irrigate only the permanent pastures, the lawns and garden and the second crop of alfalfa hay. A total of but 33·64 acre-feet of water was used on the Station farm and was applied between July 24 and August 17. The 33·64 acre-feet do not include the amount used for the irrigation experiments where the water was applied regardless of the crops' need.

HORTICULTURE

The rainfall recorded from April to September inclusive during the season of 1927, totalling 17·36 inches, was greater than in any other year since the Station was established. It is nevertheless interesting to note that earlier meteorological records kept at the city of Lethbridge show that in 1902 and in 1906 the rainfall for the same period was even greater than in 1927. In 1910, the driest summer ever experienced in Lethbridge, only 1·69 inches of rain were recorded from the first of April to the first of August, which gives some indication as to the extremes in precipitation that may be expected in this district.

On account of the greater rainfall, the weather was slightly cooler than normal, and the more tender vegetables and flowers made a correspondingly

slower growth, but in the main, the season was extremely favourable for garden crops. Seeds of all kinds germinated readily after planting so that good stands were obtained. All kinds of trees and shrubbery wintered well. Fruit trees and bushes were, with the exception of plums, well laden with fruit. The last frost in the spring occurred on May 13, when a temperature of 31 degrees was recorded. The first frost in the fall was on September 8, and the first killing frost on September 26.

DRY LAND

In addition to the irrigated garden, there is a dry land garden for the purpose of demonstrating the possibilities of gardening for the dry land farmer. It consists of a vegetable garden, a small fruit plantation, and an apple orchard.

VEGETABLE GARDEN

The dry land garden did particularly well, and due to the ample rains the yields were similar to those obtained from the same varieties grown in the irrigated garden, as the latter required and received no irrigation. On this account detailed information concerning the varieties grown in the dry land garden will be omitted and the reader referred to a later part dealing with the vegetables in the irrigated garden. Most of the seeds in the dry land garden were sown on April 19.

FRUITS

The fruit trees and bushes on the dry land are protected on the west by a good windbreak. A reasonable distance is left between the windbreak and the first row of trees or bushes and this strip of land is given clean cultivation. It has been learned by experience that this strip of fallow land should be thirty to forty feet wide where high growing trees such as poplars or willows, and about twenty feet where caraganas are used. Too often dry land farmers congest their fruit plantations within their windbreak too much. If satisfactory results are to be obtained absolutely clean cultivation must be maintained. The fruit bushes can utilize, and usually require, all the moisture that falls, so that if grass and weeds are allowed to grow and rob the soil of moisture the fruit plantation must of necessity suffer. There is no danger from soil drifting resulting from the continuous summer-fallow conditions in the plantation provided the windbreak is in a healthy condition.

Currants, gooseberries, and raspberries are planted in rows eight feet apart, which allows for horse cultivation for a number of years after the bushes are set out. An occasional top dressing of manure is very beneficial in maintaining vigour. Three varieties each of black currants, red currants, and white currants are under test. The fruit was medium to fair in size, but of excellent quality. Although the yields were satisfactory they only averaged per bush about half that obtained from the same varieties in the irrigated garden.

The raspberries and strawberries gave very fair crops of fruit both as to quality and yield, thanks to the ample rains.

Many of the young apple trees under test fruited.

IRRIGATED LAND

VEGETABLES

To permit earlier seeding in the spring, and to ensure a better germination, fall ploughing is practised. It has been found that thorough surface cultivation immediately following the ploughing is desirable, for if a lumpy surface is left in the fall it is almost certain that the soil will be in the same condition the following spring.

Asparagus.—The yield from the plantation was abundant. Asparagus, coming as it does so early in the spring when there is such a dearth of green vegetables, is looked upon by many as a luxury. Owing to the ease with which it can be grown, however, no farmer has a valid reason for not availing himself of it.

Beans.—Of the twenty varieties grown the Round Kidney Wax produced the largest crop and proved to be as early as any tested during the season.

Beets.—The nine varieties under test all did well. An even germination was obtained and the yields were satisfactory. Two varieties deserve special mention, Detroit Dark Red and Early Wonder. These are somewhat smaller than the average but appear to be better suited for table use.

In a date of seeding experiment, the best results were obtained in the first and second seedings as compared to later ones. This year the first seeding could not be made before April 25; the second was made on May 5.

Cabbage.—Twenty-one varieties were grown, and satisfactory yields were obtained from all of them. Golden Acre was the earliest to mature closely followed by Copenhagen Market. Kildonan can be recommended for a mid-summer variety, while Danish Ballhead has proved to be an excellent variety for winter storage. Although cabbage may be grown successfully from seed in most seasons, if sown in the open as soon as the land can be worked in the spring, still better and more reliable results can be counted on by using plants started under glass.

Cauliflower.—Of the four varieties, Danish Perfection was the earliest and also the heaviest yielder. Early Snowball was a few days later and did not produce quite as heavy a crop, but it is as a rule a dependable variety and can be recommended.

Carrots.—Nine varieties were grown. The recommended varieties (with yield from a 30-foot row) are: Nantes Half Long—78 pounds, and Chantenay—79 pounds. Date of seeding tests indicate that early seeding of carrots is desirable.

Celery.—Ten varieties were under test. Some of them run to seed badly. Golden Self Blanching proved the earliest. Easy Blanching proved to be of excellent quality and a desirable one for winter storing.

Corn.—The season did not prove favourable for corn. Owing to the wet conditions at seeding time, it was necessary to re-plant most of the varieties. The cool weather during the summer was not conducive to rapid growth, so on the whole the corn crop was not a particular success. Sixteen varieties were grown. Pickaninny and Banting were the most satisfactory of the earlier ones. Of the late ones, Golden Bantam remains the favourite.

Cucumbers.—Three varieties were grown. On account of the cold, wet spring, the small seedlings had a difficult time, but nevertheless did fairly well, although the main crop was not properly ready for picking until the date of the first frost. Long Green Improved appeared to be most suited for general purposes.

Citron.—Two varieties, Red Seeded and Colorado, were sown but neither matured owing to the unfavourable season.

Egg Plant.—Of the four varieties grown only two, Early White Round and Early Dwarf, succeeded in bringing any egg plants to a sufficient stage of maturity for use.

Kale.—Tall Scotch Curled, the only variety grown, made strong, satisfactory growth.

Kohl Rabi.—Three varieties were grown and all gave very satisfactory results.

Lettuce.—The season being particularly favourable for lettuce, the nine sorts under test all did extremely well. The varieties that did best were New York and Wonderful (both head), Grand Rapids (leaf), and Trianon (cos).

Muskmelon.—The six varieties under test failed to mature any melons due to the unfavourable season.

Onions.—Twelve varieties were seeded April 23, and notwithstanding the season, all of them were fairly well matured at time of frost. Of the varieties tested, Extra Early Flat Red Wethersfield can be recommended for an early sort, Danvers Yellow Globe for the main crop, and White Barletta for a pickling onion.

Parsley.—Three varieties, Vaughan XXX, Champion Moss Curled, and Triple Curled, were tested. They all grew well, the leaves being large and well curled.

Parsnip.—Three varieties were grown. The following yields were obtained from a 30-foot row: Hollow Crown—74 pounds, Guernsey XXX—74 pounds, Intermediate—72 pounds.

Peas.—Peas are a vegetable that can always be counted upon to give a satisfactory yield of excellent quality. They should be sown as early in the spring as the land can be worked. Cultural experiments that are under way indicate that a generous quantity of seed should be used. When the seed is placed one inch apart in the row the resulting yield is larger than when the seed is spaced at a greater distance apart. Thirteen varieties were under test. Thomas Laxton and Little Marvel were the first ready for use. For the main crop, Prosperity, Stratagem, and Tall Telephone are recommended. The last named sort was the heaviest yielder of the thirteen under test.

Potatoes.—All of the varieties under test were planted May 14. Two rows, each 100 feet long and 30 inches apart, were planted of each variety, and before harvesting enough was dug off the ends so that an even one-hundredth of an acre was left. The following table gives the yield per acre of marketable potatoes and also the average yield per acre for the past five years. Since the establishment of the Station many varieties of potatoes have been tested but those sorts that have proved inferior have been dropped from time to time.

YIELD PER ACRE OF MARKETABLE POTATOES (IRRIGATED)

Varieties	1923	1924	1925	1926	1927	Average yield for five years	Colour of skin
	bush.	bush.	bush.	bush.	bush.	bush.	
Sutton Abundance.....	428	391	581	733	450	517	Creamy white
Irish Cobbler.....	319	346	650	606	550	494	Creamy white
Reeves Rose.....	289	388	560	530	390	431	Light rose
Royal Russet.....	270	423	578	451	390	422	Russet brown
Wee McGregor.....	342	400	518	361	490	422	Creamy white
Gold Coin.....	326	405	366	423	466	397	Creamy white
Netted Gem.....	232	263	575	400	440	382	Russet brown
Eight Weeks.....	224	392	483	475	278	370	Rose.
Early Ohio.....	175	328	461	455	348	353	Light pink.

Peppers.—The season was not favourable for peppers.

Pumpkins and Squash.—Eight varieties of the former and seven varieties of the latter were tested out, but less than half of the crop matured properly.

Radish.—Of the six varieties tested, the Saxa was the earliest. Scarlet Turnip White Tipped and Icicle were two outstanding varieties.

Rhubarb.—This vegetable as usual made a strong satisfactory growth. The reader is referred to last year's report from the Station regarding observations concerning the cultivation of rhubarb.

Swiss Chard and Spinach both gave satisfactory results.

Salsify.—Mammoth Sandwich Island was the only variety grown, and it did well.

Tomatoes.—Twenty-nine varieties of tomatoes were under test. The seed was sown under glass on March 17. They were pricked into two-inch pots on April 5 and later repotted into four-inch pots and again into six-inch pots. Five plants of each sort were set out in the open June 7. This method of using pots for the raising of the tomato plants, as compared to the usual way of raising them in flats or shallow boxes, appears to be much more satisfactory, in that it is possible to develop a strong root system that is not disturbed when planting in the open, the result being not only a better crop but an earlier one. Of the varieties under test this season, Early Detroit and Selected Earliana were the earliest. Two worthy of special mention, on account of the good crop of smooth well-shaped tomatoes they produced, were Burbank and Carter Sunrise.

Turnips.—Seven varieties were grown. The yields were reduced on account of an infestation of aphis.

SMALL FRUITS

The black, red, and white currants all fruited well. Out of a large number of varieties under test since 1908 the following are recommended and are arranged in order of yield of fruit for the season of 1927:—

Black Currants.—Magnus, Ontario, Topsy, Eagle, Saunders, and Bang Up.

Red Currants.—Raby Castle, Frauendorfer, Red English, New Red Dutch, Moore Seedling, and Prince Albert.

White Currants.—Large White and White Kaiser.

Gooseberries.—The Houghton is the hardiest variety so far tested, although the Carrie and Alma are fairly satisfactory so far as hardiness is concerned. A very satisfactory crop of fruit was obtained.

Raspberries.—Raspberries have never failed to give some fruit, and in most seasons the crop has been abundant, but to be successful in growing them in this district it is necessary to cover the canes completely with moist soil in the fall. The varieties recommended in order of earliness are: Cuthbert, Louden, and Herbert. The last-named variety produces a particularly attractive fruit.

Strawberries.—Of the large number of varieties grown here, none have given as good results as the Senator Dunlap. It is particularly hardy, a vigorous grower, prolific, and produces a fair-sized fruit of good quality.

TREE FRUITS

Apples.—The outstanding event of the season in the horticultural work was the pleasing amount of apples produced from the various sorts of standard

apples under trial. It should be clearly stated that southern Alberta is never expected to become an apple-producing district from a commercial standpoint. What is hoped for, however, is that some sorts of hardy apples, larger than a crab, may be found that will withstand the rigours of our climate and produce a little fruit for the home consumption of the grower. The varieties producing the best crops of apples out of about a score that fruited were: Patten Greening, Hibernal, and Yellow Transparent.

The cross-bred apples, as usual, produced an abundant crop of crabs.

Plums.—The plum crop was a total failure this season.

FLOWERS

A most satisfactory display of bloom was obtained from both the annual and perennial beds. Although there are numerous annuals that may be grown quite satisfactorily under the conditions that exist in the Lethbridge district by planting the seed in the open in the spring—the sweet pea being an outstanding example—still to ensure earlier blooms it is advisable to start many of them under glass and bed out in late May after danger from frost is reasonably well past. Most annual flowers so treated bloom so profusely during the latter part of the summer that this extra work is worth while. Perennials, on the other hand, require much less work after the first season, and every farm home should have some of them to brighten up the yard surrounding the house. It is possible to make a selection of hardy perennials that will supply a continuous bloom from early summer, when the Iris starts, to time of frost when the Golden Glow forms a golden mass. Some of the kinds that do well are: Irises, Aquilegias, Pyrethrum, Shasta Daisy, Campanulas, Lychnis, Pæonies, Delphinium, Oriental Poppy, Iceland Poppy, Pinks, Lupinus, Phlox, and Golden Glow.

Bulbs.—Tulips are always satisfactory, but this season the daffodils did particularly well.

SHRUBS AND TREES

All kinds of shrubs and trees wintered well. The flowering shrubs bloomed profusely and made a bright show of colour.

LAWNS

Dandelions are giving trouble in the lawns, but by giving a top dressing of fine well-rotted manure in the late fall we are succeeding so far in maintaining an attractive green swarth notwithstanding the presence of the undesirable dandelion.

POULTRY

Three kinds of poultry work are under way at the Station: (1) The breeding of a high egg-producing strain of Barred Plymouth Rocks that will be uniform enough for experimental work. (2) Experiments in different phases of poultry husbandry. (3) The Alberta Egg Laying Contest.

BREEDING

Barred Plymouth Rocks have been bred at the Station for a number of years. The first endeavour was to develop a strain of high egg producers. That this has been accomplished is evidenced by the uniformly high production that is obtained from the Station flock and is further substantiated by the performance of a pen of birds from this Station entered in the Vancouver Island Egg Laying Contest conducted at the Experimental Station, Sydney, B.C. This

pen laid 2,374 eggs, which was the highest egg production in the contest, the highest egg production of a pen of a heavy breed in any Contest in Canada during the year, and the second highest average egg production of a Barred Rock pen in any official contest on the continent.

For the past three years special attention has been directed toward breeding for larger egg size and steady improvement is noticeable.

BARLEY VS. CORN FOR LAYING PULLETS

An experiment has been conducted for three years to test the relative value of yellow corn and barley as ingredients in the scratch grain and mash fed to laying pullets. This experiment is of special value as most of the poultrymen of the district are feeding imported yellow corn regardless of the fact that it costs almost twice as much per pound as barley grown locally.

Pens of fifty Barred Rock pullets were used. Part of these pens received yellow cracked corn in the scratch and yellow ground corn in the mash. The others were fed cracked barley in the scratch and ground barley in the mash instead of corn. The barley used was a hulled variety of good quality.

The mash of the basic ration used in both pens consisted of equal parts of bran, shorts, low grade flour, ground oats, and meat meal with a little salt and charcoal. This was fed dry in self-feeding hoppers. At noon each day, the birds were fed as much wet mash as they would eat in five minutes. This was composed of the same ingredients as the dry mash except that ground green bone was substituted for meat meal, and charcoal and salt were eliminated. The scratch feed was composed of two parts of wheat and one part of crushed oats. One part of cracked corn or one part of cracked barley was added to the scratch feed and one part of cornmeal or one part of ground barley was added to the mash.

Alfalfa leaves were kept before the birds and liberal quantities of beets, turnips, and mangels were provided. Cabbage was fed until early in January.

RESULTS OF TEST

During the first year of the test (1924-1925) one pen received barley and one received corn. Only water was given to drink. The results that year were greatly in favour of the corn-fed lot both in egg production and in vitality of the birds. The average pullet year production of the corn-fed birds that lived to complete the year was 201 eggs while the barley-fed birds averaged only 174 eggs. The most noticeable difference in the results from the two feeds was the higher mortality in the barley-fed pen where 46 per cent of the pullets died as compared to a mortality of 18 per cent in the pen receiving corn.

In the second year of the test, two pens were fed the same feed as was used in the previous year's test. In addition to these, two other pens were added to the experiment. One of these received the same ration as the barley-fed pen except that milk as well as water was provided to drink. The other pen was given the same ration as the corn-fed pen except that double the amount of corn was given in both the mash and the scratch feed.

The results in 1925-26 were similar to those of the previous year. About December 15, some of the birds in the barley-fed pen receiving milk appeared unthrifty and on December 21 one pullet died and deaths continued until nine in this pen had succumbed by March 1. The production continued to be good for all healthy birds in the pen. There were no deaths until February in the pen receiving barley and no milk, but many of the birds were unthrifty and production was light especially in January and February.

During January and February many of the pullets in both barley-fed pens developed what appeared to be a form of roup. No indication of this trouble was observed in the corn-fed pens although no precaution was taken to prevent

them from being exposed to infection from the other pens. On careful examination of the trouble in the barley-fed pens, it appeared to be identical with a disease described by Beach of California, as caused by vitamine A deficiency.

By March 1, most of the birds in both barley-fed pens were suffering from the ailment and it was evident that the same high mortality experienced in the previous year would be repeated. It was then decided to try feeding cod liver oil, so after March first the barley-fed birds were given one-fourth of a teaspoonful of crude cod liver oil per bird in the wet mash each day. Within two weeks after starting the feeding of cod liver oil, all the pullets had become thrifty, production soon returned to normal and with the exception of some head swellings that appeared to be permanent, no indication of the former trouble was observable. No further deaths were recorded in the barley-fed pens except that two pullets died in June from ovary trouble.

In the third year of the experiment (1926-1927), one pen was fed corn and three pens were fed barley, in addition to the basic ration. The corn-fed pen and one of the barley-fed pens received the same ration as was fed in the first year of the experiment. The other pens received the same feed as the barley-fed pen except that a good quality of fish meal was substituted for meat meal in the mash of one pen and cod liver oil, 1 c.c. per bird per day was added to the wet mash of the other pen.

As investigators in the United States have found well-cured alfalfa a good supplement where feeds low in vitamine "A", such as barley, were used, care was taken this year at the time of alfalfa harvest to secure alfalfa cut when not more than one-fourth in bloom and well cured without rain injury or undue exposure to the sun. Undoubtedly the quality of alfalfa fed was superior to that fed in the preceding years and was good as could be secured in this district. As in the two preceding years, the pen receiving only barley in addition to the basic ration was less thrifty, had a higher mortality, and laid fewer eggs than the corn-fed pen. The difference between the pens, however, was not so pronounced as in previous years, due, possibly, to the better quality of alfalfa fed. The mortality in this barley-fed pen was 26 per cent higher and the average egg yield 4 per cent less than in the corn-fed pen. The pen receiving barley and cod liver oil had 22 per cent higher mortality and 4 per cent higher egg production, and the pen receiving barley and fish meal had 19 per cent higher mortality and 3 per cent higher egg production than the corn-fed pen.

While the mortality in the barley-fed pen receiving cod liver oil was almost as high as in the pen receiving no cod liver oil, it was noticeable throughout the year that the birds receiving cod liver oil were more thrifty and this was reflected in an 8 per cent increase in production over the pen fed barley but no cod liver oil.

EFFECT OF COD LIVER OIL AND RAW LIVER FED TO BREEDING HENS, ON FERTILITY AND HATCHABILITY OF EGGS AND VIABILITY OF CHICKS

For two years duplicate pens of ten hens and a cockerel have been fed supplements of cod liver oil, raw pigs' liver or a combination of both oil and liver to note the effect of these feeds on hatching and brooding results. The basic ration consisted of equal parts of corn, crushed oats and wheat in the scratch feed and equal parts of bran, shorts, low grade flour, corn meal, beef meal, ground oats and a small portion of charcoal and salt in the dry mash. A wet mash was fed at noon each day. This was of the same composition as the dry mash except that ground green bone was substituted for the meat meal. The cod liver oil and ground liver were mixed with the wet mash. Check pens were fed the regular ration but without either of the supplementary feeds. Alfalfa leaves were fed liberally to all pens.

Since the chicks were pedigreed, the same male was kept in each pen until the end of the regular hatching season. After the regular hatching season, the males were alternated in the various pens each day as a check on the prepotency of the cockerels used.

In the two years of the test, the feeding of cod liver oil or raw pigs' liver did not appear to influence the fertility or viability of the eggs laid by the hens nor the livability of the chicks hatched from these eggs.

FATTENING COCKERELS

As many poultrymen are enquiring about the relative profits of selling unfinished cockerels or fattening them before selling, an experiment was conducted this year to obtain some local information on this problem and to compare different methods of fattening.

Three lots of fifteen cockerels each, hatched in April, were placed in feeding quarters on August 22 and fed for eighteen days. Lots No. 1 and No. 2 were fattened in crates while Lot No. 3 was fattened in a colony house where the birds had a space of eight feet by sixteen feet. Lot No. 1 was fed a mash composed of equal parts of high-grade household yellow corn meal and sifted oat chop, mixed with pasteurized buttermilk. Lots No. 2 and No. 3 received the same feed except that finely ground yellow corn was substituted for the household corn meal.

FEED CONSUMED, COST OF FEED AND GAIN MADE BY EACH COCKEREL IN AN EIGHTEEN DAY FATTENING TEST

Pen number	Varying feed	Feed consumed		Cost of feed	Gain
		Grain	Milk		
		lb.	lb.	$	lb.
1	Household cornmeal	3·73	0·27	0·12	0·75
2	Ground corn, crate-fed	3·87	0·27	0·11	0·88
3	Ground corn, pen-fed	3·81	0·27	0·11	0·92

The cockerels were valued at 20 cents per pound when put on feed and 30 cents per pound when finished. At these prices the profit after deducting cost of feed was from 32 cents to 33 cents per bird.

In this test ground corn gave slightly better gains at a lower cost than household corn meal.

Pen fattening was a little more satisfactory than crate fattening but required more building space.

There was little difference in the quality of the birds in the different lots at the end of the test.

EIGHTH ALBERTA EGG LAYING CONTEST

The average production in the eighth Alberta Egg Laying Contest which closed October 30, 1927, was 189 eggs per bird for the twenty-four pens completing the 364 days' test. There were no extremely high records made by any individual or pen but the production of the contest was the most uniform of any yet conducted at the Station. The leading pen finished only 1·8 points ahead of the second pen and there were but 100·9 points between the pen in the sixth position and the highest pen.

FINAL STANDING OF THE SIX LEADING PENS AND BIRDS

*Leading Pens**

Breed	Owner	Eggs	Points
1. White Wyandottes	J. R. Moore, Vegreville, Alta	2,118	2,336·1
2. S. C. White Leghorns	W. J. O'Neail, Innisfail, Alta	2,061	2,334·3
3. S. C. White Leghorns	E. R. Nicholls, Big Valley, Alta	2,063	2,268·2
4. S. C. White Leghorns	Mrs. J. W. Cookson, Tofield, Alta	1,936	2,263·0
5. S. C. White Leghorns	Alping P. F., Calgary, Alta	1,959	2,258·3
6. Barred Rocks	F. Edwards, Edmonton, Alta	2,200	2,235·2

*Leading Birds**

1. S. C. White Leghorn	Cloverlea Seed and Stock Farm, Edmonton, Alta.	281	345·0
2. White Wyandotte	J. R. Moore, Vegreville, Alta	271	337·6
3. S. C. White Leghorn	E. R. Nicholls, Big Valley, Alta	242	302·6
4. S. C. White Leghorn	W. J. O'Neail, Innisfail, Alta	244	300·3
5. Barred Rock	F. Edwards, 12833 73rd St., Edmonton, Alta	266	296·5
6. S. C. White Leghorn	University of B.C., Vancouver, B.C	259	290·6

* Arranged in order of points; an egg averaging 24 ounces per dozen was credited with one point. One-tenth point was added for each ounce per dozen over 24 ounces, and one-tenth point was deducted for each point under 24 ounces. Eggs weighing over 27 ounces were considered as 27-ounce eggs, while eggs under 20 ounces were not counted.

POULTRY REGISTRATION

Sixty-five birds in the contest qualified for registration in the Canadian National Live Stock Records. To register, birds must be of a recognized breed, without standard disqualifications and must lay at least two hundred eggs in the contest. The eggs must average at least 24 ounces per dozen after the first month's lay.

HENS REGISTERED IN 1927

Address of breeder	Breed	Number of birds registered	Average eggs	Average egg weights
				oz.
B. F. Galbraith, Sangudo, Alta	S.C.W.L	3	218	25·8
W. J. O'Neail, Innisfail, Alta	"	5	221	25·7
Alpine Poultry Farm, Calgary, Alta	"	5	216	26·6
Cloverlea Stock Farm, Edmonton, Alta	"	4	251	24·9
Mrs. J. W. Cookson, Tofield, Alta	"	4	218	27·0
E. R. Nicholls, Big Valley, Alta	"	5	222	26·3
J. McKay Hughes, Vegreville, Alta	"	2	202	24·4
University of B.C., Vancouver, B.C	"	4	233	25·0
Round T Ranch, High River, Alta	R.C.W.L	2	212	24·5
W. J. Gould, Vegreville, Alta	W. W	1	204	24·7
J. R. Moore, Vegreville, Alta	"	5	240	25·3
Progress Poultry Farm, Lethbridge, Alta	"	2	220	24·6
R. S. Kerr, Coronation, Alta	"	1	239	25·1
T. G. Kinvig, Medicine Hat, Alta	P.R	2	216	24·3
Stewart & Williams, Forestburg, Alta	B.R	2	228	25·0
F. Edwards, Edmonton, Alta	"	5	234	25·3
E. Brewitt, Michichi, Alta	"	3	216	27·1
Geo. Wagar, Orion, Alta	"	4	240	24·7
H. G. L. Strange, Fenn, Alta	"	1	212	25·6
S. Coldwell, Stettler, Alta	"	3	226	24·3
Geo. Glasser, Lethbridge, Alta	"	1	253	24·0
Wright & Bond, Irricana, Alta	S.C.R.I.R	1	227	26·2

BEES

FALL AND WINTER CONDITIONS

The fall of 1926 was a very desirable one for feeding and packing bees. Warm, calm weather with plenty of sunshine made it possible to put the bees away in good condition for the long, cold, disagreeable winter, with but few days of flights, which followed.

Ninety-five Jumbo and Standard, ten frame colonies and twelve, five frame colonies, were packed outdoors and fed for the winter by the fifteenth of October. Of this number only four ten frame and two five frame colonies failed to survive the winter. Four more were found queenless later in May.

Early spring conditions were not ideal on account of cold and snow. Pussy willows produced pollen by April 20. The first examination of colonies was completed on April 25. The first dandelion blooms were seen on May 25, the season being about three weeks later than usual. A very light maintenance flow of nectar and production of pollen continued until the twenty-second of June when the first heavy flow of nectar was observed coming in from white clover. The cold, backward weather of April and May retarded the growth of colonies, compelled some feeding of bees, and made a more luxuriant growth of nectar secreting plants with later blooms than usual.

The first increase in weight of a colony on scales was recorded July 7. The honey flow at that time was from white and alsike clover. Sweet clover was secreting nectar on July 10 and alfalfa on July 20. An unusual amount of apple bloom on the Station this year did much to help overcome the dearth of other nectar in early June.

APIARY EXPERIMENTS

The unusually cool and changeable season had considerable influence on the apiary experiments.

SWARM CONTROL

Two methods of swarm control, dequeening and requeening, and separation of queen and brood, have been under test for three years. Five colonies were used for testing each method. (For a complete description of methods, see Report for 1926, p. 20).

RESULTS OF SWARM CONTROL BY DEQUEENING AND REQUEENING AND SEPARATION OF QUEEN AND BROOD, 1925 TO 1927.

Year	Dequeening and requeening		Separation of Queen and brood	
	Percentage of colonies swarming	Average honey produced per colony	Percentage of colonies swarming	Average honey produced per colony
	%	lb.	%	lb.
1925	None	81	None	98
1926	20	65	20	109
1927	None	85	20	66
Three-year average	6·7	77	13·3	91

In two years out of three a decidedly better honey production was secured from the colonies treated by separating the queen and brood while the two methods were about equally effective in controlling swarming. In 1927 one swarm issued from a hive that was treated by separating the brood and queen. This resulted in a lowered honey production for that colony and therefore decreased the average for the colonies receiving that treatment.

PREVENTION OF SWARMING BY GIVING EXTRA ROOM

Fifteen colonies with colony strength and queens as nearly equal as possible, were selected to study the effectiveness of various methods of giving room to reduce swarming. These were divided into three equal groups. As soon as the brood chamber showed the least signs of congestion in the spring the first group was treated by placing a deep super of drawn out combs without a queen excluder, over the brood chamber thus allowing the queen to use either or both chambers for her brood nest. The second group of colonies were given shallow supers without a queen excluder. The third group was given deep supers with a queen excluder between the super and brood chamber and when the brood next showed congestion, two or three frames of capped brood were raised into this super.

In the two season's test, these treatments did not prevent swarming but retarded it. The last method took the most time to manipulate, was the least effective, and the gave the smallest amount of honey. The second method was the shortest to manipulate, and swarm cells could easily be detected by tipping the supers as all swarm cells were built on the lower part of the shallow super frames. The first method gave the most honey but seemed the most cumbersome in that swarm cells were built in both the lower and upper supers. The shallow super method seems to appeal to large beekeepers as a satisfactory way of detecting preparations for swarming.

COMPARISONS OF DIFFERENT STORES FOR WINTER

Four years' results from comparisons of colonies supplied with some sugar syrup in addition to honey and of colonies having only honey for winter stores, show that it is safer to feed twelve to twenty pounds of sugar syrup to each colony in the fall. The bees store the honey made from the sugar syrup in the empty frames provided, and appear to feed on this when the other honey becomes granulated and too hard for them to use as food where they are confined for long periods in cold weather, and cannot get moisture to soften honey stores. The sugar syrup does not granulate and rarely do the bees cap it, so that it is always available. Where sugar syrup alone was fed with no honey available, it was found that the colonies did not rear as much brood in the spring as was reared where some honey was provided in addition to the sugar syrup.

COMPARISON OF DIFFERENT SIZES OF HIVES

A comparison of ten frame Jumbo hives and ten frame Langstroth hives for five seasons shows that with the Jumbo hive less swarming occurs and also that a slightly better production of honey is obtained. It would appear that the ten-frame Jumbo hive is large enough for any prolific laying queen and by providing ample room reduces congestion very materially.

PACKAGE BEES AS A MEANS OF STARTING COLONIES

Two years' test shows that from May 7 to 21 is the most desirable period to bring in package bees from the south and that a two-pound package is about right for a queen to handle profitably.

QUEEN REARING

Two colonies were selected having tested high-producing queens; one colony to serve as queen mother and the other to produce selected drones. The colonies were prepared by removing the queen and two or three frames of brood from one of them into a new hive. This queen was used as the queen mother, and her colony was requeened. The second colony was encouraged to produce drones by giving combs containing large numbers of drone cells.

Three methods of queen rearing were tried: the first was by placing a frame containing three triangular pieces of foundation in the centre of the brood next to the queen mother. The base of each piece of foundation was fastened to the top bar with the point reaching down about two-thirds the depth of the frame. When eggs and young larvæ were found in this comb it was removed, the bees were carefully brushed off and the lower edges trimmed off each piece of comb up to the newly hatched larvæ. This frame was placed in a colony made queenless twelve hours previously. Five days later all queen cells on the face of this comb were destroyed, leaving only those on the lower edges. Ten days from the time the comb was first given to the queenless colony the cells were ripe and ready to give to mating boxes or colonies to be requeened. This method gave:—

Month	Cells transferred	Accepted	Mated and laying
June	30	29	14
July	25	22	12
August	36	30	21

The second method was by transferring small larvæ to wax-coated wooden queen cell cups. These cups (twenty on a frame) were first dipped into warm wax and primed with a small amount of royal jelly. A very young larva was then carefully transferred to each cell and floated on the jelly. The frame of cells was placed in a queenless colony and in nine days the drawn-out cells were transferred, one each, to queenless hatching and mating boxes containing four frames well stocked with bees, food and some brood, the cell being attached to the comb directly over the brood. When mated and laying the queens were introduced to queenless colonies or disposed of otherwise. The results of this method were:—

Month	Cells transferred	Accepted	Mated and laying
June	90	43	32
July	90	65	57
August	90	33	28

The third method tried was the placing of a frame containing a full sheet of foundation in the centre of the brood nest of a selected queen mother. When this was drawn out and filled with hatching eggs, it was removed and the bees were carefully brushed away. Every second or third row of cells lengthwise and crosswise on one side of the comb was destroyed with a knife, leaving a number of cells containing eggs or larvæ with an empty space around them. This frame was placed horizontally with the prepared side down over the brood nest of a strong queenless colony, placing inch blocks of wood under each corner of the frame to allow the bees to draw out the queen cells. Ten days later the cells were ready to distribute to queenless colonies or hatching and mating boxes. This gave the following results:—

Month	Cells transferred	Accepted	Mated and laying
June	10	9	7
July	11	9	9
August	14	10	7

COMB HONEY VERSUS EXTRACTED HONEY

This project was undertaken to determine if this locality is suitable for comb honey production and to determine if it can be produced as profitably as extracted honey. From the results so far obtained it appears that comb honey production is greatly handicapped by swarming and by the difficulty experienced in getting the bees to work readily in the comb honey section when our quick and abundant honey flow comes. While the comb honey produced is of a very fine quality, a combination of comb and extracted honey so far has been more successful. This year two colonies run for extracted honey, produced 180 pounds and did not swarm while two similar colonies run for comb honey, produced 76 sections, 24 pounds extracted honey, and one swarm and one increase.

METHODS OF BUILDING UP WEAK COLONIES IN THE SPRING

At the first examination in the spring all colonies that had four or less combs covered with bees were treated by one of the following methods with fairly good results: (*a*) by giving to each colony a one pound package of bees shipped in from a southern breeder, (*b*) by giving a comb of emerging brood to each colony, (*c*) by placing weak colonies above a queen excluder over strong colonies. The first method caused considerable fighting and there was some fighting in the last group. The average production of extracted honey per colony was (*a*) 76 pounds (*b*) 77 pounds, and (*c*) 79 pounds.

PROTECTED VERSUS UNPROTECTED HIVES DURING SUMMER

This project was conducted to determine if a colony of bees that was protected during the summer months by a protective case or cover would yield a larger crop of honey than one that was unprotected other than by windbreaks. Three groups were selected of as equal strength as possible. Two groups were placed in single wintering cases and during the summer one of these groups had lifts added to protect brood chamber and honey supers. The other group with brood chambers packed in the wintering cases was left in this packing but without the supers protected during the summer. The third group of colonies had no protection. Fifty per cent of the colonies in the first two protected groups made preparation for swarming while no preparations for swarming were made in the unprotected group. There was no increase made from any of the groups and the average colony production was 80 pounds, 89 pounds and 73 pounds of extracted honey respectively.

RELATION BETWEEN DIVIDED AND UNDIVIDED COLONIES AND HONEY YIELD

The increase or division taken from five hives in this test did not make any surplus honey. The average value of honey produced by the undivided colonies for 1927, with honey at twelve cents per pound, was $10.66, while the average value of honey plus the value of the increase at seven dollars each was $15.66 for the divided colonies.

INCREASING STRENGTH OF COLONY FOR MAIN FLOW

In the spring when colonies were strong enough to need honey supers or a second brood chamber, three or four frames of capped brood with adhering bees were removed from the brood chamber and placed in a new hive. The place made vacant by removing the frames and also the new hive was filled with empty frames of drawn combs. The new hive was given a cover and bottom board and set on top of the original hive, the floor board of the new hive acting as a cover for the old hive. The front edge of the top floor board was filled in beneath so that there was no entrance at the top of the old hive.

Each hive thus had an entrance one above the other. A young laying queen was introduced to the brood in the top hive. When the honey flow began the lower hive containing the old queen was removed, placed on a new stand, the top hive with the new queen occupying the original stand and thus the two field forces of bees were united in the new queen's colony for the main heavy flow. One of the three treated colonies did some fighting at the time of removing the bottom colony and one colony made preparation to swarm in the bottom hive. The three colonies not treated each made queen cells and produced less honey per colony. This project was conducted the preceding year with similar results.

Other Apiary projects are under way and will be reported as sufficient data are accumulated.

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