DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

LACOMBE, ALBERTA

REPORT OF THE SUPERINTENDENT

F. H. REED, B.S.A.,

FOR THE YEAR 1924

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DOMINION EXPERIMENTAL STATION, LACOMBE, ALBERTA

REPORT OF THE SUPERINTENDENT, F. H. REED, B.S.A.

SEASONAL NOTES

The year 1924 will be remembered as one of extremes in climatic conditions. The first six months were extremely dry with a scattered precipitation of only 6.19 inches, but for the second six months the precipitation was unusually heavy with a total of 14.06 inches. The total for the year, 20.25 inches, was 3.03 above the seventeen-year average. Spring frosts were extremely late and severe with 6.5, 5.5, 5.0 and 1.5 degrees of frost on June 19, 22, 23 and 24. This cold week was followed by one of the hottest weeks on record and the highest temperature in seventeen years, 100.8°, was recorded on July 2. September and October were bright and warm, with good harvest weather, but winter suddenly set in with a heavy snow storm and low temperatures on October 29, about fifteen days earlier than usual, and considerable crop was left in stooks in the fields. Perhaps the worst blizzard ever experienced in Central Alberta raged on December 12, 13, 14 and 15 with two feet or more of snow, followed by the coldest week in seventeen years with the coldest day on record on December 17 with -57°.

Central Alberta had poor crops in 1924. The season of 1923 was ideal for production and produced a bumper crop. There was in that year very little precipitation after September 1, but with a very open fall there was a heavy second growth on the stubble. This late growth following the heavy crops practically exhausted the moisture in the soil, and land went into the winter in a very dry condition. A winter of heavy snowfall left enough, but only enough, moisture for germination. Crops came up fairly well, but with almost no rainfall until July 16 there was little growth. Wheat and early seeded oats were headed out before the rains started on July 16. Wheat on summer-fallow was a fair crop, but wheat on stubble was beyond recovery. In a few late-seeded fields a second growth developed but this was too late to produce marketable grain. On all oats not sown on summer-fallow a heavy second growth developed, and with the warm September and October this second growth produced a fair crop of rather immature oats but with yields up to 63 bushels. Barley was seeded late and produced the best crops of the year.

One of the worst features of the grain crop year was that in many fields the weeds got ahead of the grain, and when threshed the grain contained many weed seeds, with a very heavy seeding of weed seeds left on the fields.

There was almost no growth in the hay crops until the rains started on July 16, but after this growth was rapid and timothy, western rye and brome grass produced fair crops of hay which, however, were not cut until late, August 26, as shown in dates of farm operations.

DATES OF FARM OPERATIONS

First working on land (disking)	April 21
Seeding wheat	" 23
Seeding oats	May 8
Seeding barley	" 27
Seeding sunflowers	" 30
Seeding corn	June 2
Seeding mangolds	" 3
Ploughing (spring)	April 22
Ploughing (summer-fallow)	June 13
Cutting alfalfa—1st crop	July 22
Cutting alfalfa—2nd crop	Aug. 25
Cutting hay, timothy, western rye and brome grass	" 26
Cutting wheat	Sept. 4
Cutting oats	" 13
Cutting barley	" 15
Cutting green feed	" 10
Cutting corn	" 4
Cutting sunflowers	" 8
Silo Filling—Oats	Aug. 27
Corn	Sept. 6- 7
Sunflowers	" 8-10
Fall ploughing	" 26
Freeze up	Oct. 30

METEOROLOGY

The current year's records are given in the following table:—

METEOROLOGICAL RECORDS AT LACOMBE, ALBERTA, FOR 1924

Month	Temperature F.					Precipitation			Total Sunshine	Total Wind	Evaporation
	Highest	Date	Lowest	Date	Mean	Rain fall	Snow-fall	Total Precipitation			
						inches	inches	inches	hours	miles	inches
January	48·5	5	−35·0	18	6·12	.....	8·0	0·8	61·4	3,698	.....
February	56·0	25	−27·0	16	20·08	.....	8·75	0·875	115·6	4,544	.....
March	53·5	31	−10·0	30	24·39	.....	10·75	1·075	124·6	6,222	Starting April 20
April	72·0	30	1·0	15	35·08	.....	16·5	1·65	203·8	4,373	1·27
May	88·0	14	21·0	19	49·69	0·97	.....	0·97	273·2	5,760	4·238
June	88·5	30	25·5	19	53·16	0·82	.....	0·82	242·9	5,335	3·672
July	100·8	2	34·5	7	62·91	4·21	.....	4·21	286·0	5,293	4·650
August	87·5	13	28·5	31	57·53	2·95	.....	2·95	224·0	4,398	4·083
September	84·5	4	25·0	26	51·60	0·63	1·6	0·79	201·1	5,119	2·027
October	74·0	18	18·0	12	42·18	0·88	17·8	2·66	155·4	5,635	1·151
November	53·0	29	−19·0	12	26·84	.....	6·5	0·65	99·0	4,354	.....
December	42·5	10	−57·0	17	1·57	.....	28·0	2·80	67·0	5,356	.....
Totals	.....	.....	.....	.....	.....	10·46	97·60	20·250	2,057·0	60,087	21·091

The deep fertile soils of central Alberta are ideal in texture and fertility for producing heavy crops. The limiting factors in crop production are temperature and precipitation. Late spring and early fall frosts in some years do considerable damage, and the precipitation is at times too limited or comes too late in the summer. With sufficient knowledge of what may be expected in temperatures and precipitation these handicaps may be largely overcome by the use of suitable varieties of farm crops, and the adoption of proper methods of cultivation. In a few districts hail has done considerable damage, but we have no data on hail as it has been seen only a very few times and has never caused serious damage at the Station.

Meteorological observations have been taken at Lacombe since 1908, or for seventeen years. Although the period covered is comparatively short a resume of the data compiled will give a general knowledge of the climatic conditions prevailing over Central Alberta during that period, and will form a basis for predicting what may be expected in the future. The averages in the accompanying tables indicate the weather conditions which may be expected.

MONTHLY PRECIPITATION AT DOMINION EXPERIMENTAL STATION, LACOMBE, ALBERTA

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	Average	Above	Below
January	0·2	0·72	0·73	0·55	0·76	0·93	1·45	0·295	0·4	0·75	5·3	0·21	1·34	0·68	0·91	0·20	0·8	0·95	.....	0·15
February	0·97	0·3	0·59	0·48	0·20	1·15	1·0	0·025	1·38	0·52	0·06	0·818	0·40	0·42	0·24	0·50	0·875	0·58	0·295	
March	1·06	0·345	0·33	1·01	0·13	0·81	0·8	0·075	0·52	0·33	0·30	0·77	0·905	1·39	0·3	0·66	1·075	0·64	0·435	
April	0·259	0·275	0·04	1·15	1·26	0·15	0·34	0·32	0·60	1·24	4·6	2·30	2·23	2·61	1·07	0·50	1·65	1·21	0·44	
May	2·912	2·63	1·73	1·51	2·92	0·48	1·285	1·245	2·043	3·262	0·94	3·14	1·62	1·69	1·30	2·04	0·97	1·87	.....	0·90
June	8·215	2·24	3·87	5·62	3·00	2·98	6·07	8·485	3·570	1·49	1·47	1·029	1·495	0·85	1·75	4·30	0·82	3·44	.....	2·62
July	2·1	4·28	1·35	4·39	5·29	3·43	1·11	3·37	4·311	1·13	1·24	2·321	1·52	3·275	1·88	3·81	4·21	2·88	1·33	
August	2·37	0·91	2·61	2·63	4·44	2·435	1·10	0·84	5·218	1·885	3·93	1·635	0·38	0·98	2·94	3·57	2·95	2·40	0·45	
September	0·305	0·43	1·00	2·50	1·27	0·59	2·36	1·833	3·055	2·043	1·125	2·33	1·56	1·47	0·84	0·84	0·79	1·43	.....	0·63
October	0·40	1·05	0·24	0·62	1·56	0·68	0·3	0·533	0·4	1·363	0·015	0·64	0·715	0·0	0·52	0·26	2·66	0·70	1·96	
November	0·0	0·37	0·51	0·78	0·93	0·05	1·5	0·3	1·013	0·0	1·2	1·18	0·01	0·6	0·02	0·05	0·65	0·54	0·11	
December	0·25	0·82	0·3	0·19	0·08	0·07	0·98	0·0	0·4	1·3	0·725	0·62	0·24	0·23	0·675	0·175	2·8	0·58	2·22	
Totals	19·041	14·370	13·3	21·43	21·84	13·755	18·295	17·321	22·91	15·313	20·905	16·993	12·415	15·215	12·445	16·905	20·25	17·22		

MONTHLY MINIMUM TEMPERATURES AT THE DOMINION EXPERIMENTAL STATION, LACOMBE, ALBERTA

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	Average	Above	Below
January	−20·1	−56·1	−24·1	−47·5	−46·0	−35·6	−36·1	−25·0	−52·0	−49·8	−44·1	− 4·6	−50·3	−30·1	−41·1	−29·5	−35·0	−36·9	1·9	
February	−18·1	−47·6	−38·0	−39·2	−23·5	−24·1	−41·6	− 6·5	−29·0	−45·7	−41·6	−40·6	−15·6	−23·1	−36·6	−45·0	−47·5	−31·9	4·4	
March	−17·6	−21·2	− 5·5	− 3·7	−20·0	−21·1	−23·6	− 1·0	−28·0	−14·9	−35·6	−38·1	−29·6	−33·1	−16·1	−10·5	−10·0	−19·4	9·4	
April	− 5·0	3·9	16·7	22·3	17·9	17·4	14·7	14·0	17·9	5·9	3·9	21·4	−24·1	1·4	13·9	3·0	1·0	8·6	.....	7·6
May	27·3	16·9	13·8	−11·9	23·5	18·1	24·3	32·0	19·9	12·9	18·9	12·4	23·4	22·4	19·9	16·0	21·0	18·3	2·7	
June	30·4	30·8	26·7	36·7	25·5	22·9	13·7	32·0	28·8	27·9	26·4	27·9	26·9	29·8	25·1	35·0	25·5	27·8	.....	2·3
July	35·7	37·6	32·4	33·9	30·4	31·9	39·3	35·0	38·3	29·8	32·9	30·4	31·9	29·9	34·9	39·0	34·5	33·9	0·51	
August	26·5	29·4	31·9	29·5	30·0	35·4	33·9	41·0	28·9	30·9	32·7	31·9	34·4	28·4	33·4	31·0	28·4	31·6	.....	3·1
September	14·4	23·9	19·5	21·5	20·8	24·4	23·5	16·1	23·4	23·9	25·4	17·4	24·1	20·4	25·4	22·0	25·0	21·8	3·2	
October	0·1	9·8	7·0	8·9	13·6	9·7	20·0	10·0	16·9	8·4	9·7	−10·6	9·4	14·0	10·4	− 4·0	18·0	8·9	9·1	
November	− 5·1	−19·0	− 2·6	−21·6	2·9	− 0·5	−18·0	− 8·5	−18·1	11·4	4·9	−34·6	− 6·1	−25·1	−10·1	3·0	−19·0	− 9·8	.....	9·2
December	−31·5	−21·0	−22·1	−37·6	−10·6	−13·3	−18·0	−12·0	−42·2	−42·1	− 8·7	−38·6	−30·1	−37·2	−36·1	−32·0	−57·0	−28·8	.....	28·2

MONTHLY MAXIMUM TEMPERATURE OF THE DOMINION EXPERIMENTAL STATION, LACOMBE, ALBERTA

Month	1908	1909	1910	1911	1912	1913	1914	1914	1916	1917	1918	1919	1920	1921	1922	1923	1924	Average	Above	Below
January	48·8	35·0	46·9	40·0	42·4	45·3	46·1	40·8	27·9	42·8	46·8	48·8	43·8	49·8	48·8	43·5	48·5	43·9	4·6	
February	55·6	47·2	41·1	43·6	52·8	55·6	48·6	42·8	62·7	44·7	47·8	51·6	48·8	55·3	43·5	64·2	56·0	50·7	5·3	
March	54·6	47·5	65·6	59·6	54·8	52·1	64·0	64·8	59·7	48·3	63·8	50·3	54·8	51·8	49·0	55·2	53·5	55·8	.....	2·3
April	71·6	58·3	77·8	76·0	65·8	77·8	72·6	76·8	71·8	58·8	71·8	77·4	50·8	73·1	68·8	83·0	72·0	70·25	1·75	
May	84·6	81·3	81·5	83·4	82·7	77·4	77·1	76·3	71·8	75·8	78·8	88·9	76·0	75·9	81·3	80·0	88·0	80·05	7·95	
June	79·2	80·0	89·7	80·0	89·6	81·8	84·8	75·8	77·9	83·3	83·8	90·5	89·3	83·8	89·1	87·5	88·5	84·4	4·1	
July	86·4	82·8	85·1	85·0	78·3	84·8	87·6	79·8	82·8	85·8	92·6	92·6	90·7	94·6	86·8	85·5	100·8	87·18	13·62	
August	86·4	86·5	82·8	80·0	84·5	84·0	85·8	88·6	82·9	85·8	89·8	91·6	91·9	87·3	92·8	88·5	87·5	86·9	.....	0·6
September	85·8	84·5	80·3	76·0	75·8	80·0	80·3	74·3	76·8	82·2	81·8	79·1	86·3	77·0	89·0	90·0	84·5	81·4	3·1	
October	74·8	76·1	77·0	80·5	70·6	81·5	77·0	74·2	74·7	72·8	75·8	72·6	78·0	82·8	76·0	79·5	74·0	76·3	.....	2·3
November	69·8	53·6	43·4	46·0	58·3	59·8	58·8	50·8	57·0	69·6	56·3	54·0	59·3	62·3	26·0	68·5	53·0	57·8	.....	5·8
December	42·6	46·0	47·8	45·8	58·6	57·8	32·8	48·8	44·0	47·8	45·8	49·8	45·6	47·0	54·8	53·0	42·5	47·7	.....	5·2

MONTHLY MEAN TEMPERATURES AT THE DOMINION EXPERIMENTAL STATION, LACOMBE, ALBERTA

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	Average	Above	Below
January	17·60	− 7·8	11·5	− 7·28	5·6	0·67	9·3	15·2	13·5	5·8	6·97	21·5	5·07	8·59	16·2	22·85	6·12	8·85	.....	2·73
February	16·60	− 0·6	1·55	9·46	19·55	12·11	8·9	17·4	16·90	3·1	11·11	12·69	19·67	17·81	1·12	14·78	20·03	11·89	8·19	
March	14·92	15·55	2·8	29·36	19·37	18·5	26·65	27·84	23·79	20·3	14·45	28·77	19·18	19·94	21·65	24·34	24·39	20·65	3·74	
April	10·3	31·1	43·79	35·09	41·85	42·2	40·1	47·56	40·94	31·9	41·19	42·86	25·85	37·5	38·03	38·37	35·03	36·69	.....	1·61
May	51·0	49·1	49·29	47·15	49·8	46·81	47·89	51·44	45·65	46·9	46·0	48·03	44·92	48·75	49·59	48·83	59·69	48·28	1·41	
June	54·9	55·45	58·2	57·03	59·19	56·97	55·81	52·10	53·3	53·6	52·32	56·43	54·53	58·97	57·39	58·43	53·16	55·75	.....	2·59
July	61·0	55·2	58·6	56·40	56·66	57·65	62·25	51·46	59·53	61·8	61·54	60·02	64·09	60·57	60·08	62·09	62·91	59·52	3·39	
August	56·45	57·95	54·6	53·57	57·7	57·6	58·1	63·78	55·2	58·5	59·29	58·63	59·65	61·78	58·73	57·53	58·05	58·05	.....	0·52
September	50·1	44·1	47·78	47·7	46·41	50·9	51·2	36·78	48·0	49·2	52·33	50·4	50·94	46·4	53·55	51·36	51·60	48·75	2·85	
October	41·1	42·95	41·21	38·9	39·24	25·55	47·1	42·02	38·1	36·1	42·9	27·9	39·67	45·09	42·62	47·7	42·18	40·61	1·57	
November	32·3	17·3	21·25	15·73	30·45	29·25	35·58	24·28	26·3	39·0	30·58	14·7	25·54	18·6	29·03	32·83	26·84	26·44	0·40	
December	25·45	10·95	15·61	14·7	21·98	20·0	11·3	5·53	6·5	3·21	16·24	12·92	14·53	13·0	7·65	18·8	1·57	12·94	.....	11·37

MONTHLY HOURS SUNSHINE AT THE DOMINION EXPERIMENTAL STATION, LACOMBE, ALBERTA

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	Average	Above	Below
January	117·5	116·9	115·6	68·6	103·5	63·3	73·5	70·0	89·0	73·8	57·2	74·2	91·0	72·1	81·6	70·2	61·4	82·3	.....	18·9
February	115·1	191·0	155·0	152·1	119·3	103·2	120·1	109·8	131·9	119·1	119·7	100·7	146·2	99·8	141·8	105·7	115·6	126·1	.....	10·5
March	141·0	171·8	202·9	166·4	203·7	164·1	153·8	163·9	129·0	184·1	191·6	156·1	149·7	122·2	177·2	132·8	124·6	160·9	.....	36·3
April	219·0	213·0	212·1	227·4	196·2	260·8	74·2	214·8	201·1	150·8	236·3	205·2	100·3	231·8	156·3	240·9	203·8	202·8	1·0	
May	202·8	199·4	287·7	231·8	235·9	277·1	291·9	130·1	179·3	203·3	195·8	231·0	217·8	229·1	258·1	243·1	273·2	229·0	44·3	
June	201·9	313·7	297·0	247·8	304·0	271·9	218·7	179·6	198·1	255·8	259·7	284·9	264·5	284·4	254·9	241·9	242·9	254·2	.....	11·3
July	314·3	300·0	325·2	267·9	177·1	336·3	316·8	239·4	229·5	348·7	296·9	259·0	354·3	302·6	311·2	275·3	286·0	290·6	.....	4·6
August	292·4	325·2	249·3	231·9	177·7	311·1	265·3	298·9	253·0	254·4	242·3	245·0	263·7	251·0	230·0	265·9	224·0	257·7	.....	33·7
September	217·1	227·1	193·7	176·6	175·2	240·4	172·9	170·2	176·0	175·3	212·9	188·0	202·0	184·5	189·8	239·0	204·1	196·8	7·3	
October	112·2	143·5	165·3	176·4	147·5	141·7	120·6	144·7	138·6	123·6	157·2	97·7	155·1	171·6	160·5	222·0	155·4	149·0	6·4	
November	133·3	113·5	51·9	107·8	88·5	146·2	84·8	121·0	122·0	162·9	118·5	102·1	94·1	87·6	129·8	132·1	99·0	111·5	.....	12·5
December	133·3	90·3	71·4	86·7	74·2	136·7	66·1	83·4	94·3	53·7	60·2	97·4	84·5	99·7	65·9	102·0	67·0	86·3	.....	19·3

TEMPERATURE

Temperatures are frequently the limiting factors in crop production. This is especially true when crops easily injured by frost are considered. There are, however, few staple farm crops that cannot be grown with more than fair success in central Alberta.

Nineteen hundred and twenty-four was an unusual year, the highest and lowest temperatures in the history of this Station being recorded. The temperature of 100.8° recorded on July 2 was the highest and –57.0° recorded on December 17 was the lowest ever recorded at the Station. These are extreme temperatures, and a review of the maximum and minimum temperature tables clearly shows that they are not what may be expected. The average of the lowest temperatures during January, our coldest month, is -36.9; during July, our hottest month, is 87.18°. The averages of the maximum and minimum temperatures for the different months indicate the extremes which may be expected during these months.

PRECIPITATION

Precipitation records are the most important weather data for farmers of the district, for upon the amount and the date on which precipitation occurs depends to a large extent the kind, yield and quality of the crops produced.

It will be noted that usually the heaviest precipitation occurs during the six growing months, April to September inclusive. While in 1924 there was 20.25 inches precipitation, this came at seasons when it was of little use for the main crop. June, 1924, had only 0.82 inches rainfall, being the driest June on record. This was followed by a very hot and dry two weeks in July. The rains during July did not start until the 16th, being too late for the cereals and hay but saved the feed situation. Only 14.14 inches were received before freeze-up, the balance of 6.11 inches being too late for the current season's crop. The bright spot in the situation is that this moisture will be available for next year's crop, while the snow forms an excellent winter protection for all biennial and perennial crops. From the standpoint of moisture and winter protection the prospects for next year's crop are unusually good.

SUNSHINE

Some interesting points are brought out when the sunshine, precipitation and temperature records are co-related. It will be noted that our hottest and wettest months also have the most sunshine. This is explained by the fact that most of the precipitation is received in the form of showers, hence there is a minimum cloud duration for the amount of moisture received. The fact that there is less sunshine during the coldest months somewhat exaggerates the facts as they actually are. While the number of hours between sunrise and sunset are much less in the winter months, our cold weather is always accompanied by clear, bright sunshiny days, while the mild weather during the winter months is always accompanied by cloudy weather, the reason being that our mild weather is usually the result of chinook winds; the cloud effect being the clouds which constitute the chinook arch. As Central Alberta is apparently on the border of the area visited by the southerly chinook winds, these clouds which constitute the chinook arch are usually overhead when the chinook is in progress.

WIND AND EVAPORATION

Data on wind velocity and evaporation have been recorded for two years only. These are important factors in crop production. The district appears to be favourably situated in this respect, as high winds which result in great

damage to crops by covering young plants or cutting them off with drifting soil, or by causing excessive evaporation from the soil and transpiration from the growing plants, have never caused serious damage in the district. It is true that the evaporation has exceeded the precipitation received during the growing season; on the other hand, the crops have always made an excellent showing where there was a little reserve subsoil moisture to carry the crops over critical periods.

ANIMAL HUSBANDRY

HORSES

The horses on December 31, 1924, numbered twenty-seven and consisted of five pure-bred Shires including one colt foal, seven pure-bred Clydesdale females, two cross-bred Shire-Clydesdale filly foals, four grade Clydesdale mares, seven grade Clydesdale draft geldings, and two pure-bred Hackney drivers.

The three foals are good individuals. The pure-bred Shire colt is a big strong-boned foal with good quality. He is making very rapid growth and looks like a real drafter. He is by the three-year-old stallion, Hawton Carlton, out of Coxall Day Dawn. Both the cross-bred fillies are from good pure-bred Clydesdale mares. One by Hawton Carlton out of Jean of Kilallan is an upstanding filly combining in a striking manner the quality of the Clydesdale and the substance of the Shire. She is one of the two best fillies ever raised at this Station. The other cross-bred foal is by Marden Jupiter out of a very low-set, aged imported Clydesdale mare, Lily McTaggert. She is like her dam, very low-set and deep bodied.

The Clydesdale mare, Jean of Kilallan, was this year shipped away to be bred to a pure-bred Clydesdale stallion, but as it was very difficult to secure in the district a Clydesdale stallion with good size, four of the other pure-bred Clydesdale mares were bred to the senior Shire stallion, Marden Jupiter. Two of the grade mares were also bred to this horse.

The Shire stallions both did a good season's service considering the sluggish condition of the horse industry and the discouragement caused by the extremely dry spring and unfavourable crop condition generally in May and June. The July rains caused some activity in horse breeding, but few mares were bred owing to lateness of the season. In spite of the foregoing, Marden Jupiter served 39 mares during the 1924 season, including 10 Shires, 11 Clydesdales, 1 Percheron and 17 grades. Hawton Carlton stood at J. W. Forster & Sons' ranch, Nateby, Alberta, where he was bred to a number of the pure-bred Shire mares of their stud.

During the year the outstanding merit of the Shire horses received from the Shire Horse Society of England in 1923 was amply demonstrated at the Spring Shows in Alberta and at the Royal Winter Fair, Toronto, and the International Live Stock Exposition at Chicago. The Shire stallions, Marden Jupiter and Hawton Carlton, and a yearling Clydesdale filly, were exhibited at the Calgary and Edmonton Spring Shows, where they were the subject of many favourable comments from good horsemen. The senior stallion, Marden Jupiter, was specially commented upon.

In the early fall it was decided to exhibit the Shire stallion, Marden Jupiter, the mare, Essendon Jet, and the Clydesdale filly, Jeannie Dale, at the Royal Agricultural Winter Fair, Toronto, and the International Live Stock Exposition, Chicago. In accordance with this decision these horses were fitted well and came out in great bloom. The Shire stallion and mare carried off both male and female Grand Championships at both shows. At the time of showing,

Marden Jupiter weighed 2,510 pounds and Essendon Jet 2,170 pounds. This great scale combined with quality and bold, true action created a very favourable impression in horse circles. This specially applies to Chicago where the Shire horsemen were loud in their praises respecting the outstanding quality and action, coupled with tremendous scale which these horses possess. Marden Jupiter was considered by many horsemen to be the best draft stallion at the "International".

BEEF CATTLE

The Aberdeen-Angus herd numbers 80 head, made up of 18 bulls, 3 steers and 58 females of all ages.

The senior herd sire, Eliminator of Gwenmawr 3rd, —17474—, is proving to be a sire of good cattle. He is out of Blackbird McHenry 83rd —2983—, sired by Edward of Glencarnock —5948—, by Leroy 3rd of Meadowbrook —4625—, which was Champion of Canada and U.S.A. in 1912. During the past year a show herd made up mainly by his get was shown at the Western Canada "A" Circuit Summer Fairs, Royal Agricultural Winter Fair, Toronto, and International Live Stock Exposition, Chicago. The winnings were as follows:—

Calgary.—
4 Firsts, including "Three Get of of Sire."
6 Seconds
6 Thirds
1 Fourth
2 Fifths
1 Sixth
Reserve Jr. Champion Male
Reserve Jr. Champion Female
Reserve Sr. and Reserve Grand Champion Male

A total of 21 prizes and 3 Reserve Championships and 1 Reserve Grand Championship.

Edmonton—
5 Firsts, including first on Junior Herd and Breeder's Herd.
8 Seconds
3 Thirds
2 Fourths
Junior Champion Male
Reserve Senior and Reserve Grand Champion Male

A total of 18 prizes, 1 Championship and 2 Reserves.

Saskatoon—
4 Firsts
3 Seconds
6 Thirds
2 Fourths
Junior Champion Male
Reserve Senior Reserve and Grand Champion Male

A total of 15 prizes, 1 Championship and 2 Reserves.

Regina—
10 Firsts, including "Get of Sire," "Progeny of Cow," "Junior Herd" and "Senior Herd"
5 Seconds
2 Thirds
1 Fourth
Grand Champion Male
Senior Champion Male
Junior Champion Male
Reserve Grand Champion Male
Reserve Grand Champion Female

A total of 18 prizes, 1 Grand Championship, 3 Championships and 2 Reserve Championships.

A grand total at the four Western Canada summer fairs of:

1 Grand Championship
5 Reserve Grand Championships
5 Championships
7 Reserve Championships
23 Firsts, and a total of 88 prizes in all.

All animals winning Grand Championships, Reserve Championships, both junior and senior male and female, were sired by Eliminator of Gwenmawr 3rd —17474—.

An equally good showing was made at Toronto and Chicago in November and December. L.E.S. Prince Eliminator, the same bull which was Reserve Senior and Reserve Grand Champion at Calgary, Edmonton and Saskatoon and Grand Champion at Regina during the summer was Senior Champion and Reserve Grand Champion at the Toronto Royal and stood fourth in his class at Chicago. This bull with more flesh, according to the judge, would have stood higher at Chicago, but as he is barely three years old he was not forced to the extremely high degree of fitness which prevails among the entries at the Chicago International. The winnings at the Toronto Royal and International were as follows:—

Bull, two years—1st, Reserve Senior Champion and Reserve Grand Champion.
Senior Bull Calf—1st.
Aged Cow—8th.
Heifer, two years—1st and 5th and Reserve Senior Champion.
Heifer, Senior Yearling—2nd.
Heifer, Senior Calf—6th.
Graded Herd—4th.
Get of Sire—4th.
Progeny of Cow—5th and 6th

All of the above animals except the senior bull calf and aged cow are get of Eliminator of Gwenmawr 3rd —17474—.

Placings at "Chicago International":—

3-year-old Bull—4th.
Bull calf stood 2nd in strong class.
Females and group were placed just outside the money.

A "Pride of Aberdeen" bull, Prideman Glencarnock 4th —31949—, a son of the famous Blackcap Revolution —27520— by the great breeding bull, Earl Marshall —183780—, is a good young bull that is being developed for a herd sire. A few calves have already been dropped to his service, and they are promising individuals, being particularly well-topped calves showing plenty of breed character.

An important addition to our Aberdeen-Angus sires was made during 1924 when Earl Eric of Glencarnock —32463—, a calf born September 10, 1923, was purchased from James D. McGregor, Brandon, Manitoba. He is a richly-bred Enchantress Erica sired by Eurotas of Glencarnock —9449— by Evreux of Harvestoun (imp.) —5650—, and International Grand Champion. His dam is the good breeding cow, Eblinette —13831— by Earl Eric of Ballindallock (imp.) —4333—. The breeding of this bull is right, and as an individual he shows an abundance of breed character, is deep, thick, low set, carries a wealth of natural fleshing, is the early maturing kind and a good feeder. He won first in his class at the 1924 Toronto Royal and second at the Chicago International the following week.

BULLS SOLD

Eight Angus bulls were sold at the Spring Bull Sales. Five of these sold at an average price of $227 per head, the highest being $360 for Eliminator Lad L.E.S. —31798—, a son of Eliminator of Gwenmawr 3rd —17474—. The remaining three bulls were sold at the Edmonton Bull Sale at an average price of $121.66 per head. The total of 8 head made an average price of $187.50 per head.

STEER-FEEDING

Steer-feeding at this Station has been limited to steers from our pure-bred and grade Angus herds. On January 21, 1924, five pure-bred steers and one grade Angus steer were put on feed at an average weight of 937.5 pounds per head. They were fed for a period of 67 days and made an average daily gain per day per head of 2.37 pounds.

Five of these steers, four pure-breds and one grade were exhibited as a "lot of 5" at the Edmonton Spring Show. Owing to lack of uniformity of the lot due to the grade steer being off type, they were not in the prize money but were the highest priced "lot of five" sold, bringing $6.65 per hundredweight.

Prideman L.E.S., a pure-bred steer, was donated to the University of Alberta, April 26, 1924. This calf was born October 27, 1923, and is sired by Prideman Glencarnock 3rd. He was exhibited by the University of Alberta at the Royal Agricultural Winter Fair, Toronto, in November, and was placed third in a strong class of senior calves, and was one of a group of "three steers under 1,000 pounds "that was placed second. Following the Royal these steers were exhibited at the Ottawa Winter Fair where Prideman L.E.S. stood sixth and was one of the fourth-prize group of "three under 1,000 pounds". He is being further developed by the University for exhibiting next year.

DAIRY CATTLE

The dairy herd comprises 60 head of pure-bred Holsteins, and 10 head of grade Holsteins. The pure-bred breeding herd is made up of 2 herd bulls, Ottaws Korndyke Keyes—41184—and Midnight King Jewel—31945—and 45 females of all ages. Thirteen out of sixteen normal pure-bred Holstein calves dropped during the year were bulls. Six bulls were sold during the year ranging in ages from six weeks to eighteen months, making an average price of $103 each.

Record of Performance work is one of the main features of the management of the dairy herd. At the close of 1924 there are twelve cows on test including three daughters of Ottawa Korndyke Keyes—41184—, his first daughters to be tested. These heifers are in two-year-old form and were also tested under the R.O.M., making creditable seven-day records as follows:—

Name	Age	Milk	Butter
		Lbs.	Lbs.
Rosa Keyes L.E.S. No. 107864	2 years, 4 months, 22 days	353·3	16·72
Korndyke Johanna L.E.S. No. 107866	2 years, 6 months, 12 days	380·2	16·37
L.E.S. May Echo Korndyke No. 94302	2 years, 11 months, 17 days	396·9	15·28

The butter record of Rosa Keyes L.E.S. is the highest two-year-old seven-day record that has been made at this Station.

No outstanding yearly records have been completed during the year, but several cows and heifers which have freshened during the year promise to make creditable records.

The production of cows which completed their lactation period in 1924 is given in the following table:—

LACTATION PERIODS OF PURE-BRED HOLSTEINS COMPLETED DURING YEAR 1924

Name and Number of Cow	Age at Freshening	Days Milking	Pounds of Milk	Pounds of Butterfat	Pounds of 80 p.c. Butter	Average Test
	years					
L.E.S. Evergreen Johanna No. 56199	6	369	15,452	597·94	747·42	3·87 (semi-official)
L.E.S. Korndyke Rosa No. No. 34367	8	320	15,089	478·79	598·4	3·16
L.E.S. Daisy Johanna No. 31601	9	226	7,866	275·4	344·25	3·5
L.E.S. Korndyke Rosa Echo No. 35780	8	327	9,836	329·61	412·03	3·35
L.E.S. Royalton Korndyke Star No. 42578	9	275	6,577·2	213·17	253·94	3·24
May Echo Lady No. 39918	9	312	14,112·8	443·95	551·9	3·14
L.E.S. Evergreen Rosa No. 56204	6	130	5,702·4	210·31	263·28	3·68
L.E.S. Johanna Alcartra No. 75007	3	320	19,125·8	621·99	777·28	3·25
L.E.S. May Echo Gretchen No. 75006	3	260	13,259·9	456·87	571·07	3·44
Averages	6·8	285·4	11,891·23	403·22	502·28	3·39

NOTE.—Cows with lactation periods less than 300 days were used as nurse cows at the end of the period stated, excepting L.E.S. May Echo Gretchen which was due to breeding troubles.

The "get" of our junior herd sire, Midnight King Jewel —51945, are a decidedly promising lot. We have had six normal calves dropped to his service during the year. This bull has good lines and a strong constitution, is well balanced with great depth of rib, and plenty of breed character. His six nearest dams average 27.88 pounds butter in 7 days.

SUNFLOWER SILAGE VS. CORN SILAGE FOR MILK PRODUCTION

Six cows, at various stages in their lactation periods, were selected and fed sunflower silage for 20 days, after which they were fed corn silage for another 20-day period. Records of the weight of milk produced during these periods were kept as well as the butter fat production. The results are shown in the table following:—

SUNFLOWER SILAGE VS. CORN SILAGE FOR MILK PRODUCTION

Names of Cows	Production during twenty days on Sunflower Silage			Production during twenty days on Corn Silage		
	Milk	Fat		Milk	Fat	
	lbs.	p.c.	lbs.	lbs.	p.c.	lbs.
L.E.S. Evergreen Rosa	898·6	3·1	27·85	877·0	3·1	27·18
L.E.S. Korndyke Rosa Echo	571·2	3·3	18·85	543·2	3·4	18·46
Grade 126	713·6	3·6	25·69	673·3	3·3	22·22
Grade 41	935·2	3·7	34·60	809·7	3·1	25·1
L.E.S. Daisy Johanna	628·7	3·7	23·26	572·0	2·8	15·61
L.E.S. Ianthe Aaggie DeKol	393·1	3·6	14·05	343·6	4·0	13·74
Total production for each period	4140·4	.....	144·30	3,818·8	.....	122·31

It will be noted that the total production of the six cows during the sunflower silage period was greater by 132.6 pounds milk and 21.99 pounds butter fat, or an average of 1.1 pounds of milk and 0.16 pounds fat per cow per day. A closer analysis shows that the decrease in production after the corn silage was substituted for sunflower silage is consistent with each cow.

MINERAL MIXTURES FOR DAIRY COWS

In conjunction with other remedial measures a mineral mixture was fed to the dairy herd during the past year in an endeavour to overcome breeding troubles, and also to tone up the general health of the herd. This mixture contained the following constituents and was fed at the rate of one tablespoonful per cow per day:—

	Lbs.
Calcium phosphate	10
Sodium phosphate	10
Epsom salts	12
Glauber salts	4
Sulphur	10
Potassium iodide	1/3

While we have no method of measuring the actual effectiveness of the minerals, we are of the opinion that definite beneficial results attended their use.

SHEEP

The disposal of the entire flock of breeding ewes and ewe lambs at the Lacombe Sheep Sale October 8, 1924 practically concluded the first sheep breeding experiment at this Station. A grading-up experiment in sheep was commenced in 1917. The foundation stock consisted of 400 range ewes of Merino breeding and pure-bred rams of each of the following breds: Shropshire, Oxford, Hampshire, Leicester, Cheviot and Corriedale. Rams of each breed were bred to an equal number of ewes, and the female progeny of the respective crosses were again bred to rams of the same breed, which practice was continued with each succeeding generation.

The breeding flock for the 1923-24 season consisted of 334 ewes over one year of age of all breeds. There were 69 ewe lambs in the flock which were not bred. The entire flock was pastured on the usual range 35 miles northwest of Lacombe.

When the sheep were sold on October 8, 1924 the different breeds of ewes from 1 to 4 years of age sold at the following prices:—

63 Cheviots	at	$15 75	per head
54 Corriedales	at	14 00	"
98 Shropshires	at	13 25	"
40 Hampshires	at	13 25	"
21 Hampshires	at	13 00	"
61 Oxfords	at	13 00	"
68 Leicesters	at	11 00	"
10 aged ewes	at	12 00	"

This made an average of $13.28 for 415 head of breeding ewes.

The ewe lambs of the different breeds sold as follows:—

13 Cheviots	at	$12 00	per head
4 Corriedales	at	11 50	"
22 Leicesters	at	11 00	"
16 Oxfords	at	10 50	"
21 Hampshires	at	10 00	"
12 Shropshires	at	9 75	"

This made a good average of $10.67 per head for a total of 88 head.

Out of the remaining lambs five wether lambs of each breed were selected for the feeding and slaughter test next spring, and the remainder of the wethers, lambs and cull ewe lambs, which were not sold at the sale, were fattened and sold at $14.75 per cwt. The grading-up experiment will not be entirely completed until the group of feeder lambs, referred to above, have been marketed in April. The complete report of this experiment is being published as a bulletin.

SWINE

Owing to light crops, unfavourable harvesting and threshing weather conditions, high grain prices and comparatively low hog prices, the year of 1924 has not been a good one for the hog industry in Alberta, and there will likely be a reduction in the number of breeding sows carried over into 1925. Provided that the reduction is made up by the bringing in of more bacon type sows, good rather than harm will have come to the industry.

At the Experimental Station at Lacombe, herds of swine of bacon type, *i.e.*, the Yorkshire, Tamworth and Berkshire breeds, are maintained. Yorkshires are the most numerous and popular, Tamworth ranking next and Berkshires running an easy last.

One of the main features of the work with swine is breed comparisons, the above breeds and some of their crosses being compared in every possible way to determine the breed or cross most suitable and profitable under western conditions. To give all breeds a fair chance, representative sows and the best boars procurable are used, many of the latter having been selected from the best herds in western as well as eastern Canada, and one boar being imported from the Old Country in 1923.

During the year, three Yorkshire boars, two bred at the Central Experimental Farm, Ottawa, and one bred at Eaton Hall Farm, Eversley, Ont., have been added to the herd. In addition, two Berkshires, a boar and a sow, were obtained from the Central Experimental Farm, Ottawa, which should strengthen the Berkshire herd.

Duroc-Jersey swine which had been bred at this Station for ten years were discarded in 1924 as not being economical producers nor of the desired bacon type. In their place a herd of Tamworths has been established, made up of a draft of six sows and a boar from the Ontario Agricultural College, Guelph, and fourteen sows and a boar from western breeders, the latter boar being from the University of Saskatchewan herd. These should make a nucleus from which a strong herd of Tamworths can be built up.

ALBERTA BACON BREEDERS' COMPETITION

A pair of Yorkshire barrows and a pair of Berkshires, barrow and gilt, were exhibited at the Alberta Bacon Breeders' Competition, held at the University of Alberta, Edmonton, November 6 and 7, 1924. The Yorkshires were twelfth on the hoof and first on the rail. These barrows were slaughtered at the age of six months, twenty-three days, and weighed 215 pounds and 195 pounds respectively.

The pair of Berkshires stood thirteenth on the hoof and fifteenth on the rail, and were the highest scoring Berkshires in the competition, both alive and dressed. They were slaughtered at the age of seven months, three days, and weighed, under the same conditions as the Yorkshires, 183 and 199 pounds respectively.

EXPERIMENTAL WORK

The year 1924 was a difficult one in which to conduct swine experiments, and in fact for general swine management. The spring and early summer were very dry, with almost no growth of pastures, and pastures were not good until late August. July was a very hot month, and with this combination of dry, hot weather and short pastures the spring pigs did not do as well as usual. The fall pigs fared even worse with winter and deep snow starting on October 29, a cold November, and by far the coldest December in 17 years. The fall litters were farrowed in the main piggery and moved out when about two weeks old, as it has been found that they do better in the small straw-covered cabins with plenty of air and exercise than when closely confined inside. A few young pigs

were lost during the extremely cold weather, and a few had ears frosted, but 144 fall pigs are being wintered. The worst feature of the cold winter is that young pigs will not take the necessary exercise.

The following tables give the data secured from the respective projects during 1924. Notes respecting any variations in the experiment or results which are due to weather conditions are given in connection with the project affected.

Before studying the data contained in the following tables the reader should first become acquainted with the following facts:—

1. All gains, costs, etc., are averages based on the actual weights of "lots" of hogs from five to ten head in each lot.

2. For the purpose of calculating the amount of feed required to produce one hundred pounds of gain, the buttermilk, when fed, consumed by each lot is converted into terms of meal on the basis of four hundred pounds of buttermilk equal to one hundred pounds of meal, and the result is added to the actual pounds of meal used.

3. In determining the cost per hundred pounds gain the buttermilk was valued at 20 cents per hundred pounds, the actual cost. Other feeds are valued at current prices which obtained at the time the experiments were being conducted.

4. Readers should bear in mind that owing to wide differences in prices for grain in different localities and different years that the "cost to produce one hundred pounds of gain" will vary greatly. The other results will remain fairly constant, and may be generally applied in calculations. The main points of value to the farmer are:—

(a) Meal requirements to produce one hundred pounds gain.
(b) Daily meal consumed per head.
(c) Daily gains per head.
(d) Methods of feeding and kinds of feed used.

TABLE No. 1

Project—3 per cent Ration vs. Full Feed for Bacon Production.
Object—To determine influence of limited and full rations on type and quality of finished hogs.

		Lot No. 1 Yorkshire 3% Ration	Lot No. 2 Yorkshire Full Feed
Number of pigs in lot		10	10
Initial weight per head (average)	lbs.	44·6	37·0
Finished weight per head (average)	"	188·3	181·3
Days on test (commencing September 17, 1923)		155·0	133·0
Daily gain per head (average)	"	0·92	1·08
Meal consumed per head per day (average)	"	3·21	3·58
Buttermilk consumed per head per day (average)	"	3·55	4·57
Meal required to produce 100 lbs. gain	"	347·00	329·00
Cost per 100 lbs. gain	$	3·86	3·67
Feed consumed per head during feeding period of each lot.			
Buttermilk, per head, average	lbs.	550·0	530·0
Tankage, per head, average	"	3·6	3·4
Shorts, per head, average	"	41·1	27·9
Oats, per head, average	"	245·3	248·2
Barley, per head, average	"	128·4	114·0
Wheat, per head, average	"	78·8	82·0

NOTE.—Cost of gain is based on—
Buttermilk.....at 20c. per cwt.
Tankage.....at $45 00 per ton
Shorts.....at $22 00 "
Oats.....at 20c. per bush.
Barley.....at 42c. "
Wheat.....at 60c. "

Method of Feeding.—Feeding was done by hand and all meal was fed dry, the buttermilk being fed after the meal had been cleaned up.

Shorts were fed for the first week, after which a change was made to equal parts of shorts and oats, which was continued for one month, after which barley gradually replaced the shorts and equal parts oats and barley were fed up to one month before slaughtering. During the last month a ration of one-third oats and two-thirds wheat was fed. A limited amount of tankage was fed during the period of changing from shorts and oats to barley and oats.

In this experiment the hogs on the 3 per cent ration required twenty days longer in which to reach practically the same weight as the hogs on full feed. They also required an average of 18 pounds more grain per 100 pounds of gain. The hogs on full feed were always more thrifty looking, but they finished considerably shorter and thicker, thus suggesting that hogs on a somewhat limited ration may produce a larger per cent of select bacon. These hogs were sold at $6.25 per cwt., but made a good profit over cost of production.

TABLE No. 2

Project—Breed Test on Self-feeders during winter, Yorkshires vs. Berkshires vs. Duroc-Jerseys vs. Cross Breds.

Objects—To determine difference in economy of production between the different lots representing the different breeds and cross breds. Also for comparing self-feeding vs. hand feeding with Table III.

Proceedure—Eight pigs as uniform as possible of each breed were selected and placed in lots with self feeders. Each lot was fed the same proportions of the different feeds used.

—		Lot 3 Yorks.	Lot 4 Berks.	Lot 5 Durocs	Lot 6 Cross-Breds
Number of pigs in lot		8	5	7	6
Initial weight per head (average)	lbs.	26·6	26·2	27·6	29·1
Finished weight per head (average)	"	175	192·8	178·1	183·0
Days on test (commencing October 10, 1923)		134·0	181·0	154·0	134·0
Daily gain per head (average)	"	1·1	0·83	0·95	1·07
Meal consumed per head per day (average)	"	4·73	4·81	5·16	5·35
Buttermilk consumed per head per day (average)	"	3·97	2·76	3·73	3·97
Meal required to produce 100 lbs. gain	"	426·8	581·0	540·0	500·0
Cost per 100 lbs. gain	$	3·78	5·23	4·86	4·44
Feed consumed per head during feeding period of each lot:					
Buttermilk, average	lbs.	531·2	500·0	528·6	533·3
Tankage, average	"	7·0	7·6	7·7	8·83
Shorts, average	"	48·1	53·2	51·7	61·5
Oats, average	"	262·6	341·0	324·1	313·2
Barley, average	"	101·1	94·6	103·9	122·8
Wheat, average	"	81·5	249·4	174·9	81·0

NOTE.—Cost of gain is based on—
Buttermilk.....at 20c. per cwt.
Shorts.....at $22.00 per ton
Oats.....at 28c. per bush.
Barley.....at 42c. "
Wheat.....at 60c. "

It will be noted that the number of hogs in the different lots varies. This variation is due to the fact that the Berkshires, Durocs and cross-breds, apparently, did not have sufficient constitutional vigour to withstand the cold weather and heavy feeding, the result being that three Berkshires, one Duroc and two cross-breds died. All lots originally contained eight pigs. The following notes give briefly and concisely our observations respecting the lots:—

(1) All lots left in open cabin until December 1, then moved to tight, straw-banked cabins for winter.

(2) Yorkshires took plenty of exercise, stood the cold well and finished even.

(3) Berkshires made slow gains, three died, remainder finished very uneven.

(4) Durocs made slow gains, one died, remainder finished very uneven.

(5) Cross-breds made slow gains while in open cabins and two died, but after getting into winter cabins the remainder made good gains and finished fairly uniform.

At the commencement of the test all lots were fed a ration composed of one-third shorts and two-thirds oat-chop with 5 per cent tankage added. This meal mixture was continued for six weeks when barley was gradually substituted for shorts. Equal parts oats and barley were fed for another seven weeks when wheat was gradually substituted for barley and also increased to two-thirds wheat and one-third oats, which mixture was fed to the various lots until they were finished.

The cross-bred hogs in this experiment were one-quarter Duroc-Jersey and three-quarters Yorkshire, which may account for the closeness to the Yorkshires in the results. A summary of the breed comparisons is given in table 6. All the hogs were sold at $6.25 per cwt.

TABLE No. 3

Project—Breed test—hand-fed during winter, Yorkshires vs. Berkshires vs. Duroc-Jerseys vs. Cross-breds.

Object—To determine difference in economy of production between the different breeds and crosses. Also for comparing hand-feeding vs. self-feeding with Table 2.

—		Lot 7 Yorks.	Lot 8 Berks.	Lot 9 Durocs	Lot 10 Cross-Breds
Number of pigs in lot		7	7	7	5
Initial weight per head (average)	lbs.	39·0	39·7	55·0	32·1
Finished weight per head (average)	"	206·7	182·1	179·3	171·2
Days on test (commencing December 1, 1923)	"	146	152	130	152
Daily gain per head (average)	"	1·14	0·93	0·95	0·91
Meal consumed per day per head (average)	"	4·6	4·65	5·00	4·41
Buttermilk consumed per day per head (average)	"	4·41	4·23	4·94	4·61
Meal required to produce 100 lbs. gain (average)	"	400·0	496·3	523·6	483·8
Cost per 100 lbs. of gain	$	3·54	4·51	4·61	4·29
Feed consumed per head during feeding period of each lot:—					
Buttermilk, per head, average	lbs.	643	643	643	700
Shorts, per head, average	"	31·0	31·0	37·6	29·0
Oats, per head, average	"	258·7	270·7	275·1	229·1
Barley, per head, average	"	6·0	6·0	7·0	4·2
Wheat, per head, average	"	213·0	238·4	170·7	221·6

NOTE.—Cost of gain based on:—
Buttermilk.....at 20c. per cwt.
Shorts.....at $22.00 per ton
Oats.....at 28c. per bush.
Wheat.....at 60c. "

Method of Feeding.—For the first six weeks of the feeding period all lots were fed a meal mixture of one-third shorts and two-thirds oats. During the seventh week a mixture of equal parts oat, barley and shorts were used; the eighth week an all-oat ration was fed, following which one-third wheat was added, the proportion of wheat being gradually increased to two-thirds of the meal allowance during the last five weeks of the feeding period.

The cross-breds in this experiment were from a Berkshire boar on a Duroc-Jersey sow.

TABLE No. 4

Comparison of the results obtained from different methods of feeding by summarizing the data under Tables 2 and 3 on Winter Feeding.
Also a comparison of the economy of gains made by the different breeds based on the total average gains of lots on both self-feeding and hand-feeding.

Breeds	Average daily gain per head (lbs.)			Meal required to produce 100 lbs. gain (lbs.)			Cost per 100 lbs. gain (dollars)		
	Self fed	Hand fed	Average	Self fed	Hand fed	Average	Self fed	Hand fed	Average
Yorkshires	1·1	1·14	1·12	426·8	400·0	413·4	3 78	3 54	3 66
Cross-breds	1·07	0·91	0·99	500·0	483·8	491·8	4 44	4 29	4 36
Durocs	0·95	0·95	0·95	542·0	523·6	532·8	4 86	4 61	4 73
Berkshires	0·83	0·93	0·88	581·0	496·3	538·6	5 23	4 51	4 87
Grand average	0·99	0·98	0·985	512·4	475·9	494·1	4 58	4 24	4 40

An analysis of Table No. 4 reveals the fact that the Yorkshires have an appreciable lead over the other breeds in economy of production. The cross-breds are a close second in average daily gains but drop down on " meal required to produce 100 pounds of gain ", likewise in " cost per 100 pounds gain ". The Durocs and Berkshires are comparatively close in all respects with the advantage in favour of the Durocs all through.

Comparing the methods of feeding, it will be noted that all lots excepting the cross-bred made slightly greater daily gains on hand-feeding, while the average gains of all lots are very slightly in favour of self-feeding. But in " meal required to produce 100 pounds of gain " there is a more marked difference in favour of hand-feeding, while the average of all lots shows a saving of 63·5 pounds of meal on the hand-fed lots over the self-fed for every 100 pounds of gain produced.

Coming to the " cost per 100 pounds gain," here again the hand-fed lots make the better showing in all cases with an average for all lots of 34 cents per 100 pounds gain in favour of hand-feeding. It is only fair to state in this connection that no labour charges were made against either method of feeding. Therefore, the more labour required for hand-feeding would largely offset the saving in feed and cost per 100 pounds gain.

A more detailed analysis in respect to the saving " in cost of gain " effected by hand-feeding shows that the 26 head of hogs involved in the hand-feeding experiment made a total gain during the feeding period, averaging 145 days, of 2,724 pounds, which at a saving in cost of gain of 34 cents per 100 pounds meant a total saving of $9.26, which allows for approximately 6½ cents per day for the extra labour required for hand-feeding.

Respecting the labour requirements for the two methods of feeding, the difference is in the feeding of the meal only, i.e., in the self-fed lots the meal was put in the hoppers of the self-feds in 400-pound or 500-pound lots, while in the hand-feeding the meal must be carried to the lots twice per day.

From the above statement it would appear that when the extra labour involved is considered the hand-feeding has no advantage over self-feeding. There is one other important phase, however, which has not been referred to: the effect of the different feeding methods on the type of the finished hogs. Unfortunately these hogs were not officially graded at the conclusion of the test, but from our observations we feel certain that none of the self-fed hogs would grade " select ", while there were a number of the hand-fed hogs that would be graded into the " select " class or approach very near the standard.

TABLE No. 5

Project—Inside vs. outside winter feeding.
Object—To determine economy of gain made by hogs grown and finished in the piggeries as compared to hogs grown and finished outside in winter cabins.

—		Lot 11 Inside	Lot 12 Outside
Number of pigs in lot		9	7
Initial weight (average)	lbs.	71·5	72·8
Finished weight (average)	"	179·22	206·7
Days of test (commencing January 15, 1924)		100	100
Daily gain per head (average)	"	1·07	1·33
Meal consumed per day per head (average)	"	5·23	5·13
Buttermilk consumed per day per head (average)	"	3·17	3·14
Meal required to produce 100 lbs. gain	"	485·5	400·0
Cost per 100 lbs. gain	$	4·35	3·44
Feed consumed per head during feeding period of each lot			
Buttermilk, average	lbs.	316·7	314·3
Shorts, average	"	7·1	6·0
Oats, average	"	215·9	209·0
Wheat, average	"	7·1	6·1

NOTE.—Cost of grain based on—
Buttermilk.....at 20c. per 100 lbs.
Shorts.....at $22 per ton.
Oats.....at 28c. per bush.
Wheat.....at 60c. per bush.

Table 5 shows that greater daily gains per head on less pounds of meal and at less cost were made by the lots fed outside with cabins for shelter than were made by the lots fed in the piggery.

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TABLE 6.—BREED TEST AND METHOD OF FEEDING UNDER SUMMER CONDITIONS

OBJECT—To determine difference, if any, between economy of gains obtained from the different breeds and different methods of feeding.

—		Cross-breds			Yorkshires				Berkshires			
		Lot 13 Self-feeders	Lot 14 3 p.c. Ration	Average	Lot 15 Self-fed	Lot 16 Full-fed	Lot 17 3 p.c. Ration	Average	Lot 18 Self-fed	Lot 19 Full-fed	Lot 20 3 p.c. Ration	Average
Number of pigs in lot		6	6	.....	6	6	6	.....	6	6	6	.....
Initial weight (average)	lbs.	83·66	81·0	82·33	50·33	50·1	51·33	50·55	50·33	48·0	50·83	49·72
Finished weight (average)	"	188·3	173·3	180·8	195·3	184·5	185·5	188·4	184·6	188·5	186·6	189·9
Days on test (commenced June 3, 1924)		65·0	65·0	65·0	100·0	100·0	100·0	100·0	115·0	115·0	115·0	115·0
Daily gain per head (average)	lbs.	1·61	1·42	1·51	1·45	1·34	1·34	1·37	1·17	1·22	1·18	1·28
Meal consumed per day per head	"	5·57	4·32	4·47	4·57	4·21	3·76	4·18	5·01	4·37	3·82	4·4
Buttermilk consumed per day per head (average)	"	5·00	5·00	5·00	4·25	4·25	4·25	4·25	3·62	3·62	3·62	3·62
Meal required to produce 100 lbs. gain	"	423·6	292·2	407·9	387·2	390·8	358·4	378·8	506·3	431·4	400·0	445·9
Cost per 100 lbs. gain	$	5 55	5 10	5 33	4 93	5 00	4 57	4 83	6 60	5 62	5 09	6 04
Feed consumed per head during feeding period of each lot—												
Buttermilk (average)	lbs.	325·0	325·0	325·0	425·0	425·0	425·0	425·0	416·3	416·3	416·3	416·3
Shorts (average)	"	.....	.....	.....	29·0	21·7	17·2	22·6	29·2	21·7	17·2	22·7
Oats (average)	"	178·0	126·1	152·1	229·7	204·8	179·5	204·7	284·0	240·0	284·5	269·5
Wheat	"	184·1	154·8	169·4	198·5	195·0	180·0	191·2	262·8	240·3	193·5	235·5

Cross-breds were from a Berkshire boar on a Yorkshire sow. The 3 per cent ration produced the most economical gains.

TABLE No. 7

Project—Feeding for Bacon and a Breed test as well.
Object—To determine the most satisfactory ration to use for growing and finishing bacon hogs.

—		Lot 21 Yorks.	Lot 22 Berks.
Number of pigs in lot		12	12
Initial weight per head (average)	lbs.	29·83	29·83
Finished weight per head (average)	"	190·08	188·33
Days of test (commencing June 3, 1924)		156·0	164·0
Daily gain per head (average)	"	1·03	0·97
Meal consumed per day per head (average)	"	3·35	3·91
Buttermilk consumed per day per head (average)	"	2·94	2·79
Meal required to produce 100 lbs. gain (average)	"	326·1	404·1
Cost per 100 lbs. of gain (average)	$	4·78	5·15
Feed consumed per head during feeding period of each lot			
Buttermilk	lbs.	458·3	458·3
Shorts	"	34·7	34·7
Oats	"	158·4	152·0
Wheat	"	76·0	72·2
Barley	"	222·2	267·1

NOTE.—Cost of gain in Lots 21 and 22 based on—
Buttermilk....at 20c. per cwt.
Shorts....at $22 per ton.
Oats....at 40c. per bush.
Wheat....at $1 per bush.
Barley....at 70c. per bush.

The hogs in table No. 7 were marketed when up to weights, individually, on the following dates:—

SALES STATEMENT

6	Yorkshires	sold	October	31	3 selects.
1	"	"	November	3	1 select.
2	"	"	"	5	2 selects.
3	"	"	"	20	2 "
3	Berkshires	"	"	6	No selects.
7	"	"	"	20	"
2	"	"	"	20	"

A glance over the data in table No. 7 will reveal to the reader that the Yorkshires are again well ahead of the Berkshires, particularly in meal requirements to produce 100 pounds of gain, also in cost of gain. Probably the most striking contrast is shown in the sales, from which it will be noted that eight of the twelve (66 per cent) Yorkshires graded "select", while the lot of Berkshires did not produce one select hog.

Both lots were fed the same proportion of meal. Starting with equal parts shorts and oats for the first month, then for a week equal parts shorts, oats and wheat were used, after which shorts was discontinued and the wheat gradually increased to equal parts wheat and oats. Eight weeks before marketing, barley was substituted for wheat in the proportion of two-thirds barley and one-third oats, the barley being gradually increased until it made up the entire meal portion of the ration during the last six weeks. These hogs were fed on pasture until the last six weeks, when they were taken into the piggery for finishing.

All the hogs started on test on June 3 were sold at an average price of $7.90 per cwt.

TABLE No. 8

Project—After-weaning rations—Feeding oat-chop and oat-chop with hulls removed to young pigs after weaning. Also, a comparison of buttermilk and oil meal and tankage.
Object—To determine the detrimental effect of oat hull on weaner pigs, and if oil meal and tankage makes a satisfactory protein supplement.

		Lot 23 — Buttermilk, oat chop	Lot 24 — Buttermilk, oat chop, hulls removed	Lot 25 — Tankage 5 per cent, oil meal 5 per cent, oat chop	Lot 26 — Tankage 5 per cent, oil meal 5 per cent, oat chop with hulls removed
Number of pigs in lot		10	10	10	10
Initial weight per head (average)	lbs.	40·2	38·7	35·4	37·0
Weight at conclusion of test	"	74·6	87·3	67·3	70·5
Days of test (commencing September 3, 1924)		46·0	46·0	46·0	46·0
Daily gain per head (average)	"	0·48	0·73	0·69	0·86
Meal consumed per head per day (average)	"	1·71	1·88	1·69	1·63
Buttermilk consumed per head per day (average)	"	4·66	4·16	.....	.....
Oil meal and tankage consumed per head per day (average)	"	.....	.....	0·17	0·17
Meal required to produce 100 lbs. gain (average)	"	668·0	439·0	370·0	328·0
Cost per 100 lbs. gain	$	6 04	4 22	3 43	3 12
Gains made per head during—					
First 15 days feeding	lbs.	8·1	9·8	7·6	9·0
Second 15 days feeding	"	5·7	10·5	11·2	13·4
Third 15 days feeding	"	8·5	13·5	13·1	17·1
Fourth 15 days feeding	"	12·1	14·8	.....	.....
Feed consumed per head during feeding period					
Oats (average)	lbs.	78·9	89·5	77·9	89·7
Buttermilk (average)	"	280·0	250·0	.....	.....
Tankage (average)	"	.....	.....	4·0	4·0
Oil meal (average)	"	.....	.....	4·0	4·0

Cost of gain is based on:—
Oats.....at 40c. per bush.
Buttermilk.....at 20c. per cwt.
Tankage.....at $45.00 per ton
Oil meal.....at $45.00 "

In lots 24 and 26, which were fed oat-chop with hulls removed, all " amounts of feed consumed " in the tabulation is calculated on the weight of oat-chop before the hulls were removed. For removing the hulls the chop was sifted through the ordinary screen door wire screening, which removed about 20 per cent of the chop as hull or roughly about 65 per cent to 70 per cent of the hulls in the oats. The portion of the hull that remained was the very fine particles which would not be seriously detrimental to the young pigs.

By briefly reviewing table No. 8 the reader will observe that the lots which were fed oat-chop with hulls removed consumed slightly more feed per head per day than the lots eating straight oat-chop, but, what is more important, they made greater daily gains and used less feed to produce 100 pounds of gain. It will also be noticed that the lots (25 and 26) which were fed tankage and oil meal as protein supplement made greater daily gains as compared to lots 23 and 24. The " meal required to produce 100 pounds of gain " in these lots includes all feeds used. The buttermilk was converted into terms of meal on the usual basis of 400 pounds equal to 100 pounds of meal, while for comparative purposes the tankage and oil meal were converted to terms of oat-chop on the basis of 100 pounds, being equal to 500 pounds oat-chop.

However, aside from data in connection with table No. 8 the condition and appearance of the different lots of pigs was decidedly in favour of the lots receiving the oat-chop with hulls removed. Regarding the effect of buttermilk vs. oil meal and tankage on outward appearance, the contrast was not marked although the tankage-fed and oil-meal-fed lot appeared slightly more thrifty.

TABLE No. 9

Project—Hogging-down peas: Yorkshire gilts vs. Tamworth gilts.
Object—To determine if peas can be profitably grown and hogged down rather than harvested and threshed.

—		Lot 27 Yorks.	Lot 28 Tams
Number of pigs in lot		7	7
Age (average)	dys.	127	143
Initial weight per head (average)	lbs.	101·57	103·14
Weight at end of test (average)	"	112·85	115·00
Days on test (commencing September 13, 1924)		13·0	13·0
Daily gain per head (average)	"	0·86	0·91
Meal consumed first 7 days:—			
Oats (at 40c. per bush.)	"	65·0	65·0
Wheat (at $1.00 per bush.)	"	33·0	33·0
Value of gain in weight made by lot while on pasture at 8c. per lb	$	6 32	6 64
Cost of meal fed	$	1 31	1 31
Value of peas per lot (¼ acre)	$	5 01	5 33
Value of peas per bush	$	0 42	0 44

The two lots of peas were equal in area, each consisting of approximately one-quarter of an acre. The gilts were fed a light allowance of meal during the first seven days. The yield per acre was estimated at 48 bushels, which is a four-year average at this Station. The peas were sold to the gilts at an average price of $20.68 per acre standing.

OTHER TESTS

During the late fall the hogs coming off experimental lots Nos. 23, 24, 25 and 26 were placed on identical rations in order to determine the effect, if any, on the finished hog, of feeding oat chop (with hulls) to weaner pigs. Unfortunately before these lots were finished the extreme cold and heavy snowfall interfered to such an extent that the test was discontinued. At the close of the year a test of " Barley vs. Hulless Barley " is under way.

Similar results attended our experiment on " Rations for wintering brood sows ". The continued drifting of snow made it practically impossible to prevent the different lots from jumping fences and mixing.

CARE OF BROOD SOWS

Our methods of feeding and managing our herd of brood sows is briefly as follows:—

Their sleeping quarters is a shed, with entrance on south side, built of woven wire securely fastened to posts for both inside and outside walls and stuffed with straw. This shed is located about 200 yards from the feeding trough. The feed used is oat-chop with one pound of wheat bran per head scattered on the ground or hard snow and ice surface. In this way exercise is forced both by walking to and from the sleeping shed and also in the picking up of the feed.

Feeding of potassium iodide to pregnant sows is recommended to prevent goitre or hairlessness in young pigs. Possibly the most satisfactory method of feeding is to dissolve one ounce of potassium iodide in one gallon of water and feed one tablespoonful of the solution, in either feed or water, per sow per day.

During winters of deep snow or in fact any winter it is good practice to have some fresh sod or earth or soft coal available for the sows.

PALATABILITY OF PASTURES

In the spring of 1924 one of our hog pasture lots was seeded with peas, alfalfa, rape and a mixture of oats and fall rye. These different crops were

seeded in strips the width of the grain drill and the length of the pasture lot. Under this arrangement the hogs were free to choose whichever crop suited their particular taste. When all crops had made sufficient growth to be pastured the hogs were turned in.

The first crop to be eaten was peas; then the oats and rye were cleaned up along with what alfalfa existed. As the spring was very dry the alfalfa did not germinate well, and consequently did not provide a fair test for this crop. However, the last crop to be eaten was the rape, and it seemed that the pigs ate this rather from necessity than preference since all other crops had been cleaned up.

Respecting the suitability of these crops for supplying pasture continually, it must be borne in mind that the peas, when once eaten off, would make little or no further growth, while the oats and rye mixture provided pasture throughout the season, as the fall rye continues to grow until the freeze-up. The same is true of alfalfa under favourable conditions, but as stated above the dry spring prevented good germination. The rape provided late fall pasture, which is important, but in addition to being comparatively unpalatable it is also conducive to sunscalding in Yorkshires, and in fact any breed of hog if they are allowed access to the rape pasture while the leaves are wet with either rain or dew. To counteract this trouble an arrangement whereby the pigs could be moved to an oat and rye pasture or some other cereal or grass pasture while the rape is wet, is one way to overcome this difficulty. However, such a method is hardly practicable for the average farmer.

The rates of seeding for the different crops are as follows, arranged in order of their palatability as determined by the hogs:—

Peas	2 bushels per acre.
Oats and rye	2 bushels oats and 1 bushel fall rye.
Alfalfa	15 pounds per acre.
Rape	6 pounds per acre.

The peas, oats and rye were seeded with a common disc grain drill, while the alfalfa and rape were seeded with the same drill but broadcast by depositing the seed in front of the discs; the main object being to prevent covering the seed too deeply.

Farrowing Statement for 1924

	Spring Litters			Fall Litters			Total of Spring and Fall Litters			Herd Totals
	Yorks.	Berks.	Cross Breds	Yorks.	Berks.	Cross Breds	Yorks.	Berks.	Cross Breds	
Number of litters farrowed in 1924	21	7	2	13	3	4	34	10	6	50
Total pigs farrowed	233	74	17	143	23	48	376	97	65	538
Number pigs per litter (average)	11·09	10·6	8·5	11	7·7	12·0	11·06	9·7	10·8	10·76
Number pigs dead at birth	17·0	8·0	1·0	13·0	0·0	3·0	30·0	8·0	5·0	43·0
Number of pigs dead at birth per litter (average)	0·82	1·14	0·5	1·0	0·0	0·75	0·88	0·8	0·83	0·86
Number pigs died before weaning per litter (average)	2·6	2·16	1·5	2·22	0·7	2·25	2·5	1·6	1·8	2·26
Number pigs weaned per litter (average)	7·62	7·3	6·5	7·76	7·0	9·0	7·7	7·2	8·1	7·64
Percentage of pigs, farrowed alive, raised	74·07	77·4	81·25	77·69	91·3	80·0	75·65	80·9	81·0	77·39

Notes.—Cross-bred litters were from Berkshire sows by Yorkshire boars.

When considering the "percentage of pigs farrowed alive raised," the reader should bear in mind the number of sows of each breed farrowing and the "number of pigs per litter farrowed." In several cases the Yorkshire sows had not teats for all the pigs farrowed and losses were unavoidable.

The 1924 farrowing statement shows that the Yorkshires produced the largest litters both spring and fall, resulting in the highest yearly averages. This is more striking when it is considered that there were over three times more Yorkshire litters farrowed than Berkshires and almost six times more than the cross-breds. It is also worthy of note that the cross-bred (Yorkshire boars and Berkshire sows) litters struck a higher average than the pure-bred Berkshires.

All breeds show a small percentage of pigs born dead, and but slight losses from farrowing to weaning are recorded in all cases.

Coming to the point which means dollars and cents to the farmer, viz. the numbers of pigs per sow raised, it will be found that all breeds made a very satisfactory showing. The Yorkshires with 34 litters farrowed 0.5, or what would be on the 34 sows a total of 17 pigs, higher than the Berkshires, but 0.4 lower than the six cross-bred litters. The average of 7.64 pigs per sow weaned from 50 sows and gilts was an extra good average for such a large number of sows.

It will be of more than passing interest to readers to know that one of the Yorkshire sows farrowed 25 pigs in January and 18 in July, and raised 9 from each litter. While the raising of two litters of 9 pigs each is a good showing for any sow, the loss of 25 of the very large total of 43 pigs farrowed considerably increases the percentage mortality in the Yorkshires.

THREE-YEAR SUMMARY OF FARROWING STATEMENT COMPARING PROLIFICACY OF BREEDS

Breeds	Average Number of Pigs Farrowed and Weaned per Sow During—											
	1922			1923			1924			Three-Year Average		
	Number of Sows	Farrowed	Weaned	Number of Sows	Farrowed	Weaned	Number of Sows	Farrowed	Weaned	Number of Sows	Farrowed	Weaned
Yorkshire	26	11·5	6·4	24	11·2	7·4	34	11·06	7·7	28·0	11·3	7·24
Berkshire	31	7·6	4·8	14	11·1	6·7	10	9·7	·7·2	18·3	8·93	7·04
Duroc-Jersey	23	9·08	5·4	20	9·3	4·8	.....	.....	.....	2 years 21·5	9·21	5·26

NOTE.—The entire herd of Duroc-Jersey breeding sows were sold in the fall of 1923, consequently no farrowing data are available for 1924.

FIELD HUSBANDRY

CROP ROTATIONS

Rotation experiments were started in 1913 and have been continued for eleven years. The first rotations started did not fully cover this important subject, and new rotations have been added as new problems have arisen in agriculture. At present thirteen rotations are under test, while two more are being started. On all these rotations accurate cost of production figures are kept. The actual time required for the different operations, as well as the quantity of seed, manure, binder twine, etc., is recorded. These, along with land rental and use of machinery rental, are charged against the crop produced, while the crop produced is credited with the value of the crop if placed on the market during the regular marketing season.

The reader is referred to the 1923 report for a complete outline and short discussion of the different rotations under test.

In computing the cost of production in the rotation experiments, the following values have been used:—

COST VALUES

Rent per acre	$ 4 00
Manure per ton	1 00
Wheat per bushel	1 00
Barley per bushel	0 60
Oats per bushel	0 50
Fall rye per bushel	0 90
Corn per bushel	3 00
Potatoes per bushel	1 00
Mangolds per pound	0 70
Sunflowers per hundred	13 00
Timothy per hundred	18 00
Sweet clover per hundred	13 00
Alfalfa per hundred	50 00
Rye grass per hundred	15 00
Brome, per hundred	15 00
Red clover per hundred (Altaswede)	50 00
Alsike per hundred	20 00
Machinery per acre	1 00
Tractor per hour	0 60
Silo filling machinery per ton	0 25
Kerosene per gallon	0 27
Gear oil per gallon	1 00
Pasture per month	1 50
Manual labour per hour	0 30
Horse labour per hour	0 10
Twine per hundred	13 50
Threshing per bushel, wheat	0 10
" barley	0 08
" oats	0 06

RETURN VALUES

Wheat per bushel	$ 1 00
Barley per bushel	0 60
Oats per bushel	0 40
Sweet clover per ton	10 00
Hay per ton	15 00
Greenfeed per ton	6 00
Straw per ton	1 00
Ensilage per ton	5 00
Potatoes per bushel	0 75
Pasture per month	1 50

The following explanation of the above cost and return values used in calculating the rotation results may be of interest to many:—

RENT.—The amount of rent is obtained by multiplying the value of the land by the current rate of interest as obtained on first mortgages; to this amount is added the amount of the taxes per acre.

MANURE.—The charge for manure covers only the cost of applying the manure to the land, and does not include any additional value it may have, as the data at present available indicates that it is doubtful if the direct profits from the use of barnyard manure justify the expense of applying it to the land.

MANUAL LABOUR.—The rate for manual labour is an average of the prevailing summer wages for hired help in the district. The number of hours charged to any crop includes only that required to complete the work under average farm conditions, and includes all work required in the growing, harvesting and storing of the crop.

HORSE LABOUR.—The rate for horse labour includes the cost of feed, the interest on the value of the horse, the depreciation in the value of the horse and harness, and the wages for the manual labour required to care for the horse.

MACHINERY.—The charge for farm machinery was established to cover the interest and depreciation on the machinery used on an average farm. Where a tractor is used, a rate per hour is charged to cover depreciation and interest on investment in tractor used. Where silo-filling machinery is used the charge per ton is sufficient to cover the rental of the machinery.

THRESHING.—The charge per bushel for threshing covers the total cost incurred from stook to granary, and is representative of the price charged on custom work in the district.

SEED.—The grass and clover seeding, when it does not fail, is distributed equally to each hay and pasture year in the rotation; when it does fail and there is no hay crop the charge is made against the whole rotation and not against any one crop.

SUMMER-FALLOW.—The entire cost of the summer-fallow is charged against the following crop. The charges against the summer-fallow include rent, machinery and labour.

ENSILAGE.—Ensilage is given a value on the basis of 300 pounds of ensilage in the silo, being equal to 100 pounds of hay in the mow or stack.

MISCELLANEOUS.—The cost values of seeds, twine, oil, etc., are the actual values for the year in the district for the class of material used. The return values which are used are market prices on November 1.

In presenting the data from the rotation experiments the rotation summary only is given. This gives the more important items, while the smaller details of less importance are omitted.

ROTATION "L"

This is a mixed-farming rotation designed for districts where summer-fallowing results in too heavy a growth of straw. It proved quite profitable in wet years, but the results were very unsatisfactory in the past series of dry years.

Eighteen acres of land divided into six three-acre blocks are used in this experiment. The hay mixture used is four pounds each of red clover, alsike clover and timothy. The second year in hay is top dressed with 12 tons rotted manure per acre in the autumn. The third year sod is broken immediately after the hay is harvested, and the land treated as a fallow for the remainder of the season. The wheat stubble is fall-ploughed for oats, and the oat stubble is spring-ploughed for barley. The seeding down is done with the barley as a nurse-crop.

ROTATION "L"—6 YEARS

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

Crop	Yield, 1924	Value	Cost of Production	Profit or Loss
		$ cts.	$ cts.	$ cts.
Hay	1·04	15 67	11 22	4 45
Hay (failure-oats)	0·47	21 05	12 94	8 11
Hay (failure-oat silage)	5·42	27 08	18 28	8 80
Wheat	9·3	10 17	13 40	−3 23
Oats	45·6	25 18	14 76	10 42
Barley	26·3	17 69	13 69	4 00

Average profit per acre, $5.43.

The returns from this rotation are higher than they would have been had oats not been substituted for the hay failures. Oats were the most profitable crop produced in Central Alberta in 1924. The average profit per acre for the season amounted to $5.43. The oat and hay harvest were much later than usual as a result of the very dry weather early in the season which checked the growth. When the rains did start, the hay, oats and barley made a remarkable recovery and produced fair yields, as indicated in the above table. The hay was harvested on August 25 and the oats during the first week in September.

ROTATION "K"

This is a six-year rotation with only two cash crops, hence it would not be at all suitable for the grain growing districts of this province. The hay mixture used is 10 pounds each of alfalfa and western rye grass per acre. A top dressing of 15 tons well rotted manure is given the first year in hay immediately after the crop is removed.

ROTATION "K"—6 YEARS

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

Crop	Yield, 1924	Value	Cost of Production	Profit or Loss
		$ cts.	$ cts.	$ cts.
Corn	2·55	12 74	18 01	−5 27
Wheat	12·7	13 68	11 77	1 91
Barley	43·3	31 08	14 85	16 23
Hay	0·83	12 43	10 83	1 60
Hay	1·02	15 25	10 86	4 39
Hay	0·58	8 66	10 14	−1 48

Average profit per acre, $2.90.

This rotation produced an average profit per acre of $4.21 for the past eleven years and a profit of $2.90 for 1924. Rotation "K" is one of the most profitable under test, and would be quite satisfactory for a live stock rotation in the park belt of Alberta. In this rotation the last year in sod has always been ploughed after the first cutting of hay is made and the ploughing worked down and fallowed for the balance of the season. This treatment does not seem satisfactory for corn, as the growth of the corn on this land is very much slower and the tonnage considerably lower than corn grown on land not fallowed or spring ploughed.

ROTATION "O"

Rotation "O" is a mixed-farming rotation suitable for most districts in Central Alberta. It has sufficient grain in it to make it reasonably suitable for a grain growing district, and sufficient forage crops for most live stock farmers. While potatoes are used at present as the hoed crop, this year might be used for the production of any of the intertilled crops. The wheat following the hoed crop and summer-fallow gives an excellent crop of clean grain. The oats following the wheat usually produces a fair crop of commercial grain, but there usually is too much wheat in it for registered seed grain. The hay is seeded with the wheat following the summer-fallow as a nurse-crop. As a rule excellent stands are obtained in seeding with this crop. The hay mixture used is 10 pounds each of western rye grass and alfalfa per acre.

ROTATION "O"—7 YEARS

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

Crop	Yield, 1924	Value	Cost of Production	Profit or Loss
		$ cts.	$ cts.	$ cts.
Intertilled crop, potatoes, 1924	145·5	109 00	66 19	42 81
Wheat	14·5	15 82	12 64	3 18
Oats	45·2	19 78	15 31	4 47
Summer-fallow			9 26	−9 26
Wheat	16·8	18 43	16 64	1 77
Hay	0·99	14 89	13 99	0 90
Hay	1·08	16 22	14 41	1 81

Average profit per acre, $6.53.

The average profit per acre for the past eleven years was $7.90, while the profit for 1924 was $6.53. This rotation is the most suitable of the rotations which have been under test for a number of years. In addition to being the most profitable it keeps the land in better tilth and cleaner than any of the other rotations. Rotation "O" is recommended for general use as a mixed-farming rotation for Central Alberta.

ROTATION "C"

This is a three-year rotation as practised by many farmers in the grain growing districts.

ROTATION "C"—3 YEARS

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

Crop	Yield, 1924	Value	Cost of Production	Profit or Loss
		$ cts.	$ cts.	$ cts.
Summer-fallow			12 78	−12 78
Wheat	10·9	12 05	13 82	−1 77
Wheat	5·1	5 60	8 66	−3 06

Average profit per acre, −$5.87.

The average profit per acre for the past eleven years was $5.34, while in 1924 Rotation "C" produced an average loss of $5.87 per acre. This can be explained by the fact that wheat was a very poor crop in Central Alberta, while the second crop, which was stubbled in, was a complete failure. In some cases the heads extended only a few inches above the old stubble.

ROTATION "H"

Rotation "H" was started at this Station in 1923. The results this year will be the first which will show the effect of crop sequence, and are being published for the first time. This rotation has given most satisfactory results at the Experimental Station, Brandon, Manitoba, and it is anticipated that it will prove a very useful rotation for Central Alberta.

ROTATION "H"—6 YEARS

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

Crop	Yield, 1924	Value	Cost of Production	Profit or Loss
		$ cts.	$ cts.	$ cts.
Wheat	6	10 17	11 12	−0 95
Oats	58·4	26 44	14 02	12 42
Summer-fallow			10 83	−10 83
Wheat	22	23 98	11 20	12 78
Hay (failure-oats)	40	18 04	13 51	4 53
Hay (failure-oats)	55	24 80	15 23	9 57

Average profit per acre, $4.59.

The profit per acre produced in 1924 was $4.59. This profit per acre is influenced by a failure in the two years in hay, making it necessary to reseed this land with oats, resulting in increased production costs.

ROTATION "LACOMBE"

This rotation combines three of the principal forage crops of the district with one cash crop. In practical use it would provide an abundance of feed and some ready money each fall. The hay mixture used is ten pounds each of western rye grass and sweet clover. The rotation was started in 1923, and this year's results are the first published.

ROTATION "LACOMBE"—5 YEARS

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

Crop	Yield, 1924	Value	Cost of production	Profit or loss
		$ cts.	$ cts.	$ cts.
Sunflowers	9·32	46 62	31 22	15 39
Wheat (ensiled)	2·75	13 75	14 26	−0 51
Hay	1·52	23 02	11 68	11 34
Hay (failure-oat greenfeed)	1·8	10 80	12 91	−2 11
Oat greenfeed	2·38	14 38	14 46	−0 08

Average profit per acre, $4.81.

It will be noted that the second year in hay was a failure while the first year produced a good crop. The reason for this is that both were seeded in 1923. The first year was seeded with wheat, and the second year with oats. The sweet clover winter-killed in both cases.

The average profit per acre produced in 1924 was $4.81. This is quite a fair profit when it is considered that the wheat following sunflowers was a very light weedy crop and was ensiled, and the two years in greenfeed showed little profit. Greenfeed is so plentiful this year and so low in price that it is practically impossible for this crop to show a profit this year.

ROTATION "MANITOBA"

This rotation was started in 1923 and the first results are given below. Rotation "Manitoba" is one of the rotations in general use in many of the older grain growing districts. It is a strictly grain growing rotation, and no plans are made for the return to the soil of any of the organic matter removed with the growing crop.

ROTATION "MANITOBA"—4 YEARS

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

Crop	Yields, 1924	Value	Cost of production	Profit or loss
	$ cts.	$ cts.	$ cts.	$ cts.
Wheat	16·6	18 17	10 14	8 03
Wheat	11·6	12 72	10 16	2 56
Oats	54·6	24 65	13 85	10 80
Summer-fallow	.....	.....	9 67	−9 67

Average profit per acre, $2.93.

This rotation produced an average profit per acre of **$2.93**. It is one of the few rotations which produced wheat at a profit in **1924**.

ROTATION "INTERTILLED"

This rotation is similar to rotation "C" except that one half of the year summer-fallowed in rotation "C" has grain in rows, while the other half has grain seeded thinly. These two methods are compared for grain production, as well as for effect on the succeeding crops.

ROTATION "INTERTILLED"—3 YEARS

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

Crop	Yield, 1924	Value	Cost of production	Profit or loss
		$ cts.	$ cts.	$ cts.
Wheat (*a*)	10·0	10 90	9 92	0 98
Wheat (*b*)	8·0	8 72	9 64	−0 92
Wheat	8·6	9 45	11 35	−1 90
Oats (*a*) (seeded thinly)	46·6	21 02	13 08	7 94
Oats (*b*) (seeded in rows)	26·0	12 52	12 18	0 34

Profit per acre, 57c.

This rotation produced an average profit per acre of **$0.57**. It will be noticed that the oats seeded thinly were the most profitable crop. The oats grown in rows cost more to produce. Also, this method of culture increases the number of days required for the oats to mature to such an extent that not more than 30 per cent of the crop ripened. Further than this oats are not a satisfactory summer-fallow substitute crop for wheat land for the reason that the grain which shatters during harvest volunteers with the succeeding grain crop. Where oats are grown in rows quite a large number of heads droop at the sides of the rows, are cut off by the binder, and fall into the loose soil in the intertilled space and germinate the following year. The wheat grown on this land contained so much oats that the wheat was suitable only for feed. In addition to this the wheat was very irregular in height and maturity, that grown on the intertilled space being taller and later maturing than that grown where the oat row grew. The wheat following the oats seeded thinly was a much

more satisfactory crop in every way. The oats in rows would be more satisfactory if used as a greenfeed or silage crop where it would be cut before it was mature.

ROTATION "SWEET CLOVER"

This rotation was started in 1923. It is also similar to Rotation "C" except that sweet clover takes the place of the summer-fallow. As one-half of the sweet clover block is annual and the other biennial sweet clover it provides a test of these two strains of sweet clover under field conditions.

ROTATION "SWEET CLOVER"—3 YEARS

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

Crop	Yield, 1924	Value	Cost of production	Profit or loss
		$ cts.	$ cts.	$ cts.
Wheat	9·3	10 17	11 15	−0 97
Wheat	8·3	9 45	11 39	−1 94
Sweet clover	2·5	25 00	16 55	8 45

Profit per acre, $1.84.

This rotation produced an average profit per acre of $1.84. The wheat following sweet clover produced a yield of one bushel per acre more than the wheat after wheat. The biennial sweet clover winter-killed and the whole block was seeded with annual sweet clover. This is the second year in succession that the biennial has winter-killed. For this reason the annual seems more satisfactory for this district. It is a much surer crop and produces a fair tonnage of hay almost equal to the biennial in value. The wheat stubble was double-disked for the annual sweet clover. The seed was then broadcast and the land packed. An excellent stand of sweet clover was obtained, although there was a considerable quantity of volunteer wheat among the sweet clover. This appeared to be more of an advantage than a disadvantage, as the wheat appeared to help the sweet clover in curing, and was relished by the stock when the hay was fed.

ROTATION "FALL RYE"

This rotation was started in 1923. It was designed to give additional information as to the economical possibilities of this crop for Central Alberta. As first laid down, the winter rye was cross-seeded in oat greenfeed. This practice has not worked out as anticipated. The winter rye acted as a weed in the greenfeed crop, reduced the yield and grew so much top that it smothered and winter-killed during the following winter. This system has been changed and the oat crop is used for silage, the fall rye being seeded on the disked oat stubble. The growing season in Central Alberta is so short that using the oats as silage is the only system that permits the crop being removed from the field in time for the rye to be seeded early enough to make sufficient growth to come through the winter.

ROTATION "FALL RYE"—4 YEARS

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

Crop	Yield, 1924	Value	Cost of production	Profit or loss
		$ cts.	$ cts.	$ cts.
Wheat	23·3	25 43	15 77	9 66
Oats (silage)	6·99	34 95	21 17	13 78
Fall Rye (failure-oat greenfeed)	1·3	7 80	14 67	−6 87
Summer-fallow	.....	.....	9 08	−9 08

Profit per acre, $1.89.

It will be noted that the profit per acre produced was $1.89. If the winter rye had not winter-killed this profit per acre would have been considerably higher. It is expected that the present method of seeding the fall rye will avoid the winter-killing.

ROTATION "ALFALFA"

This rotation was started in 1923. The alfalfa was "stubbled-in" that spring and a crop of hay cut in August; hence, the present year is the second season's cutting. It has proven one of the most profitable rotations under test this year.

ROTATION "ALFALFA"—1 YEAR

Crop	Yield, 1924	Value	Cost of production	Profit or loss
		$ cts.	$ cts.	$ cts.
Alfalfa	1·33	20 00	9 70	10 30

Average profit per acre, $10.30.

The season of 1924 was so dry that only one cutting was possible. Owing to the exceptionally dry spring following an exceptionally dry fall, the first cutting of alfalfa attained a height of only about eight inches, in fact not enough to pay to cut it. When the rains started during the latter part of July the alfalfa recovered and made a fair crop of hay. It was cut on September 12.

ROTATION "BROME"

This rotation was started in 1923. The brome grass seed was seeded with a nurse-crop of oats. The stand was irregular and weak in the fall, and appeared rather light in the spring. There was very little growth until the rains started in July. The oats which shattered volunteered in the spring, and along with the brome produced a heavy crop of hay.

ROTATION "BROME"—1 YEAR

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

Crop	Yield, 1924	Value	Cost of production	Profit or loss
		$ cts.	$ cts.	$ cts.
Brome	2·16	31 60	7 92	23 68

Profit per acre, $23.68.

The profit per acre produced was $23.68, which makes this rotation the most profitable under test in 1924. Owing to the seasonal precipitation the hay was not ready to cut until September 12.

ROTATION "LIVE STOCK"

This rotation was started in 1923. The three large fields nearest the buildings are used for it. This rotation was outlined to make the best use of land where so much live stock is kept that the production of a large tonnage of the coarser fodders, along with some pasture, is the chief factor in farm management. The first year consists of silage and root crops which include sunflowers, corn and mangolds; the second year oats to be used for silage, greenfeed or grain as desired; the third year pasture consisting of western rye grass and sweet clover, these to be seeded with the previous oat crop.

ROTATION "LIVE STOCK"—3 YEARS

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

Crop	Yield, 1924	Value	Cost of production	Profit or loss
		$ cts.	$ cts.	$ cts.
Hoed Crop—				
Sunflowers	9·7	48 66	30 70	17 96
Corn	5·2	26 11	26 01	0 10
Roots (failure-mangels)	.....	.....	17 73	−17 73
Oats	72·0	32 46	19 74	12 72
Pasture (oats stubbled in)	.....	4 80	13 34	−8 54

Profit per acre, $4.23.

The profit per acre produced in 1924 was $4.23. Owing to unfavourable climatic conditions the mangel crop was a failure. The sweet clover which was seeded in combination with western rye grass with the oats winter-killed during the following winter, and it was necessary to stubble-in some oats with the western rye grass for pasture. The area in pasture carried one animal per acre for the pasture season. The cost per animal per month amounted to $2.78 in the very dry pasture season of 1924.

CULTURAL EXPERIMENTS

The abnormal season of 1924, because of its moisture shortage, exerted such an influence on much of the cultural work that the climatic factor nullified any influence cultural methods might have had. For that reason some of the experiments under way will not be fully reported in this report.

In the "Summer-fallow Treatment" experiment, the yields resulting from the different methods of summer-fallowing show so little difference that, when experimental error is taken into consideration, it might be said that all methods gave the same result. The same statement applies in the "Stubble Treatment for Wheat and Oats" experiment, except that certain treatments appeared to be more efficient in controlling weeds, though all the plots were very weedy. Stubble-burning appeared to be less efficient in controlling weeds than fall or spring ploughing.

GREEN MANURE FOR OATS

Plot No.	Treatment	Yield per acre	
		bush.	lbs.
1	Summer-fallow	58	3
2	Sweet clover ploughed down and land summer-fallowed for the remainder of the season	45	20
3	Sweet clover hay harvested, land ploughed immediately and worked for remainder of the season	44	29
4	Western rye hay harvested, land ploughed immediately and worked for remainder of the season	52	7
5	Summer-fallow	57	12

The experiment with different methods of seeding grass and clover showed few results. In consequence of the very dry spring the crops made little growth. In fact, the hay crops did not make sufficient growth to justify taking yields. Although the grasses were a fair stand, the growth was so slow and short that the weeds got the start and what little growth there was to cut was mainly weeds.

In analyzing this data it will be noted that none of the other treatments were as productive as summer-fallowing. Had the season been more humid the incorporation of the whole crop or the sod in the soil might have had a beneficial instead of a detrimental effect on the yield.

The experiment has not been conducted long enough to note the effect of these treatments on the fertility and tilth of the land.

SUMMER-FALLOW SUBSTITUTES

While the seasonal precipitation in 1923 and 1924 was such that different summer-fallow treatments gave similar yields, such was not the case with the summer-fallow substitute experiment. In this experiment the crops grown on the summer-fallowed land showed a greater difference in yield than is indicated in the following table:—

Treatment of land, 1923	Yield of Wheat per acre 1924	
	bush.	lbs.
Summer-fallow	12	5
Corn	14	10
Sunflowers	10	0
Oat greenfeed	1	40
Summer-fallow	6	40
Oats, 3 bush. per acre	1	27
Oats, 1½ bush. per acre	1	2
Summer-fallow	3	32
Oats, 2 drills alternating with 36-inch intertilled space	4	22
Oats, 3 drills alternating with 36-inch intertilled space	4	35
Summer-fallow	10	50
Oats, 4 drills alternating with 36-inch intertilled space	4	10
Oats, 5 drills alternating with 36-inch intertilled space	6	40
Summer-fallow	12	30

In studying this table it will be noted that the land varies considerably. The yields from the check plots vary from 3½ bushels per acre to 12½ bushels per acre. Apparently the land in the centre of the range of plots is not as productive as at either end. When the soil difference is considered the results are in favour of summer-fallowing as a preparation for wheat in preference to any of the treatments other than corn or sunflowers. The grain in rows treatment gave a decided reduction in yield per acre.

The question of reduced yields in 1924 is no doubt largely due to the moisture factor. The moisture shortage was so acute in 1924 that any previous treatment which utilized any of the moisture resulted in reduced yields. Doubtless some of these summer-fallow substitutes would have given better yields in a year with normal precipitation.

RATES OF SEEDING GRASSES AND CLOVERS

Western rye grass, timothy, brome grass, alfalfa and sweet clover were used in this experiment. In most cases the stands were fair, but no hay was produced by any of the grasses or legumes other than the brome grass. The brome grass was decidedly the most drought-resistant.

PLACE IN ROTATION TO SEED FALL RYE

In this experiment the fall rye is seeded alone on summer-fallowed land and in different combinations with wheat, oats, barley and sunflowers. The results are given in the following table:—

How seeded	Yield per acre	
	bush.	lbs.
August 15th on summer-fallow	6	39
With wheat in spring	...	...
On disked wheat stubble in fall	...	...
With barley in spring	...	...
August 15th on summer-fallow	8	2
On disked barley stubble in fall	7	8
On fall ploughed barley stubble	6	54
With oats in spring	...	...
August 15th on summer-fallow	6	24
On disked oat stubble in fall	...	...
With oats for greenfeed on June 21st	...	...
Between the rows of sunflowers at last cultivation	...	...
August 15th on summer-fallow	6	44
With oats for greenfeed when about 4 inches high	8	32
On western rye grass sod ploughed after hay removed	...	...

Last winter appeared to be rather severe on all winter annuals. The fall rye winter-killed on plots where no yields are given. There is little difference in yield between the plots that did not winter-kill. It will be noted that the winter rye winter-killed on all plots where it was seeded in the spring. There has always been a large amount of winter-killing on plots seeded too early in the season.

One method of seeding winter rye as practised in our rotation experiments and not included in the above experiment is that of stubbling-in winter rye after oats used for silage. Winter rye appears to come through winter with less injury and gives higher yields when seeded about September 1. This last method permits the removal of the green oats and the seeding of the winter rye in time for it to make sufficient growth for best winter protection.

DATES OF SEEDING FALL RYE

Date of seeding	Yield per acre	
	bush.	lbs.
August 22	6	14
July 8	...	...
July 21	...	...
August 10	5	45
August 23	8	2
September 10	13	22
September 25	10	40
October 12	...	...
August 23	8	2

In this experiment the fall rye plots were seeded at 5 pecks per acre with a disk drill on the dates given. It will be noted that the early seedings completely winter-killed while the later seedings gave a higher yield per acre until September 10, after which there was a rapid decline in the yield per acre produced.

DATES OF SEEDING CORN

Date of Seeding	Yield per Acre	
	Green Weight	Dry Matter
	tons lbs.	tons lbs.
May 1	6 1,800	.. 1,379
May 11	4 1,600	.. 1,159
May 21	6 1,800	.. 1,575
May 31	9 ..	.. 1,994
June 10	8 1,700	.. 1,991
June 20	7 700	.. 1,291

It will be noted that the corn seeded on May 31 and June 10 was most productive. The higher yields of these seedings over the earlier seedings was partly caused by a severe frost on June 22, which did more damage to the earlier corn seeded on May 1, 11 and 21 than to the young corn plants grown from seed sown on May 31, June 10 and 20. Taking one season with another May 24 to June 10 appears to be the most suitable time to seed corn in Central Alberta.

DATES OF SEEDING SUNFLOWERS

Date of Seeding	Maturity	Yield per Acre	
		Green weight	Dry matter
		tons lbs.	tons lbs.
May 1	10% bloom	17 1,100	2 373
May 11	"	18 300	1 1,782
May 21	"	13 550	1 629
May 31	"	11 ..	1 1,346
June 10	1% bloom	20 500	2 220
June 20	No bloom	15 1,500	1 970

As was the case with corn, the first three dates of seeding suffered some frost injury, although the sunflowers appeared to make a much more rapid recovery. In spite of this, the earlier seeded sunflowers were the most productive. Where the land can be prepared sunflowers should be seeded not later than May 15.

HORTICULTURE

The season of 1924 was very backward as a result of thirteen frosts in June which varied from one to seven degrees. In addition to this, very dry weather with high winds prevailed until the latter part of July. The rains which came then saved the situation, and the garden made a remarkable recovery.

LACOMBE-GROWN SEED.—Seed of different varieties of trees, shrubs, bush fruits, perennial and annual flowers have been saved during the past few years. These have been grown and in some cases compared with imported seed. In all cases home-grown seed gave quite satisfactory results, and in many cases better than from the commercial or imported seeds.

VEGETABLES

VARIETY TESTS WITH ASPARAGUS.—Two varieties of asparagus, Palmetto and Eclipse, were grown in 1924. There is very little difference in these varieties. A new plantation of this easily grown vegetable was started.

VARIETY TESTS WITH BEANS.—Thirteen varieties of beans were tested last season. They were sown later than usual on June 5 in rows 30 inches apart, and were spaced 2 inches apart in the row. The early maturing varieties give

the best satisfaction. Masterpiece, Bountiful and Davis White Wax are dependable varieties. Three varieties of pole beans were tested. They were clipped back and grown as dwarfs. When treated in this way they were fairly productive and produced pods of excellent table quality.

PLANTING INTERVAL FOR BEANS.—In this experiment two varieties of beans were sown 1 to 4 inches apart in the row, the rows being spaced 30 inches apart. The beans were seeded on June 5. Results indicate that 2 inches apart gives the best results.

GARDEN BEETS, VARIETY AND STRAIN TESTS WITH BEETS.—Seven varieties were used in this experiment. They were seeded on May 15, and were harvested on October 1. There appeared to be little choice as far as quality was concerned, although the Crosby Egyptian was the heaviest yielder. The Crosby Egyptian and the Detroit Dark Red are two dependable standard varieties.

CABBAGE, VARIETY AND STRAIN TESTS.—Twenty-two varieties of cabbage were tested in 1924. They were sown in cold-frames on May 1, and were planted out from June 3 to 6. Owing to the very dry weather and high winds many of the plants died and had to be replaced. The Early Paris Market was the first variety ready for use, but is not a good keeper. The Copenhagen Market is one of the best all-around varieties. It comes in early and keeps well.

CARROT, VARIETY AND STRAIN TESTS.—Ten varieties were used in this test. They were sown on May 15 and were harvested on September 29. They were seeded in rows 30 inches apart and thinned to 2 inches apart in the row. As a result of the very dry weather in the spring the carrots did not make a very satisfactory growth, and there was little to choose in the different varieties other than yield per acre. Chantenay and Oxheart are dependable sorts.

CELERY, VARIETY AND STRAIN TESTS.—Fifteen varieties were used in this experiment. The seed was sown in plots on March 4 and was transplanted in the open on July 4. An excellent crop of celery was harvested. It was crisp and of good flavour. The white self-bleaching varieties seemed most suitable for this district. We would recommend the varieties in the order in which they are given:—Easy Bleaching, Paris Golden Yellow, White Plume and Paris Golden.

SWEET CORN, VARIETY AND STRAIN TESTS.—Fourteen varieties were used in this experiment. They were planted on May 28 in hills 5 feet apart each way. Six seeds were sown to each hill, and the plants were later thinned to three plants per hill. Two rows of each variety were planted, and the suckers were removed from one row of each variety. The results obtained were as follows:—

Variety	Suckers Removed		Suckers not Removed	
	Weight of ears from 6 hills		Weight of ears from 6 hills	
	lbs.	oz.	lbs.	oz.
Sweet Nuetta	22	..	16	..
Yellow Assiniboine	21	10	15	8
60 Day Make Good	20	..	15	..
Improved Early Dakota	18	..	16	2
Pickaninny	17	..	12	..
Early June	17	..	14	..
Mayflower	15	..	10	2
Early Malcolm Ott	15	..	14	2
Sweet Squaw Ott	15	10	12	10
60-Day Lacombe	14	..	..	..
Golden Bantam Moore	15	..	9	2
Golden Justice	14	2	8	10
Early Fordhook	11	..	10	..
Golden Bantam Rennie	10	2	7	10

All the varieties were harvested on September 23. The Pickaninny was the earliest of the varieties under test.

It will be noted that removing the suckers resulted in an increased production of edible ears. This increased yield was due to the forced earlier maturity resulting from the removal of the suckers.

CITRON, VARIETY AND STRAIN TEST.—Two varieties, Red and Colorado, were grown, the Red producing 48 pounds per hill, while the Colorado produced 30 pounds per hill.

CUCUMBER, VARIETY AND STRAIN TEST.—Quite a number were seeded but were frozen before they reached maturity. A number of varieties were grown in the "Farmer's Green House" with marked success.

LETTUCE, VARIETY AND STRAIN TESTS.—Fourteen varieties were sown in the open ground on May 1, and were later thinned to 6 inches apart in the row. The Iceberg and Improved Hanson proved to be excellent varieties.

PEAS, VARIETY AND STRAIN TESTS.—Thirty-five varieties were seeded on May 2, and the first picking was made on July 23. The weights given are green pea-pods with peas in best condition for table use. Almost all the varieties were grown from seed produced at the Station in 1923. Although on account of the dry weather the yields were not quite as heavy as usual, the peas were of excellent quality. The results obtained were as follows:—

Variety	Weight of Green Pods from 30-Foot Row	
	lbs.	oz.
Daniel V. C.	25	7
Seedling No. 2 Invermere	23	7
Seedling No. 8 Invermere	21	10
Alderman	21	2
Advancer	20	15
Carters	22	7
Lincoln	19	11
Stratagem Danby	19	1
Duke of Albany	18	13
American Wonder	18	..
British Wonder	18	..
Gradus and American Wonder, Ottawa	17	13
Gradus Ott	17	11
Seedling No. 1 Invermere	17	..
Seedling No. 3 Invermere	16	3
Daniels Distinction	16	1
Richard Seddon	15	13
English Wonder	14	13
Thos. Laxton	14	7
Gregory Surprise x English Wonder	14	4
Sutton Gem	13	12
Daniel Matchless	13	6
Laxtonian	13	3
Little Marvel	10	10
Laxton Progress	12	8
Advancer x Gregory Surprise	10	3
Gladstone	10	..
Heroine	9	15
American Wonder	9	5
Seedling No. 3 Invermere	8	10
The Pilot	8	10
Gregory Surprise	8	4
Daniel Hundredfold	8	3

DISTANCES AT WHICH TO PLANT PEAS.—In this experiment seed of three varieties was planted at 1, 2 and 3 inches apart in the row. The seed was sown on May 2. There appeared to be little advantage of one distance of planting over another last season. For average seasons planting 1 to 2 inches apart will probably give best results.

PARSNIP, VARIETY AND STRAIN TESTS.—Two varieties were sown in the open on May 12 and were harvested October 2. There was little difference in yield, and the crop was not very satisfactory. Hollow Crown Ottawa produced 35 pounds from a 30-foot row, while Hollow Crown Graham produced 34 pounds.

POTATO, VARIETY TESTS.—Thirty varieties of potatoes were tested in 1924. They were planted on May 29 and were dug on October 8. They were planted in rows 30 inches apart, and the sets were spaced 12 inches apart in the row. The sets were cut to average exactly 2 ounces in weight. The results obtained were as follows:—

VARIETY TESTS WITH POTATOES

Variety	Per cent Marketable	Yield per Acre	
		bus.	lbs.
American Wonder	68	180	20
Ash Leaf Kidney	74	135	25
Blue McIntyre	20	114	50
Burnaby Mammoth	68	187	45
Carter Early Favourite	52	160	20
Cole	54	125	40
Country Gentleman	64	160	20
Duchess of Norfolk	50	149	30
Duke of York	52	80	10
Early Bovee	66	213	25
Early Hebron	75	189	35
Early Norther	80	234	..
Early Ohio	56	152	45
Early Vermont	64	177	40
Epicure	70	201	30
Empire State	76	168	35
Everitt	50	169	40
Extra Early Eureka	68	171	10
Gold Coin	66	153	50
Gold Nugget	78	175	30
Green Mountain	66	134	20
Houlton Rose	70	195	..
Irish Cobbler	70	171	10
King Edward	52	134	20
McDonald Russet	52	137	25
Pioneer Price	72	136	35
Rural Russet	62	123	30
Six Weeks	62	182	..
Table Talk	60	173	20
Wee McGregor	70	151	40

It will be noticed that the yields produced in 1924 are relatively low as compared with other normal years. The reason for these low yields was lack of moisture in the early part of the season. Due to this lack of moisture the potatoes made a very slow development until the rains came during the latter part of July with the result that only the earliest maturing sorts matured. For this reason this year's results are not a fair comparison of the suitability of the different varieties for this district.

The Early Northern continues to be one of the heaviest yielders. This variety has one drawback in that it is a pink variety, which makes in undesirable as a commercial potato.

The varieties recommended for commercial use by this Station are the Early Ohio for the early market, the Gold Nugget for the medium early crop, and the Gold Coin as the main crop. The Station produces certified and registered seed of these varieties in commercial quantities.

POTATO, CULTURAL EXPERIMENTS.—A number of experiments covering different cultural methods were started in 1922. Unfortunately climatic conditions were such that the 1922 results gave very little information; 1923 was a favourable season, but 1924 was very unfavourable for potato production. Gold Nugget was the variety used in the experiment.

Unless otherwise stated, the potatoes in these experiments were planted in drills 30 inches apart and the sets were spaced 12 inches apart in the row. The sets were cut to average two ounces each. This size was used throughout unless otherwise stated. The potatoes were planted on May 29 and were dug on October 9.

PLANTING WHOLE OR CUT POTATOES.—The kind and size of set used, the percentage of marketable potatoes produced, and the yield per acre are given in the following table:—

Description of Set	Distance apart in row	Percentage marketable	Yield per Acre	
			bus.	lbs.
Large whole	1 foot	58	296	50
Large whole	2 feet	66	229	40
Large whole	3 feet	66	202	22
Medium whole	1 foot	64	307	40
Medium whole	2 feet	20	225	40
Small marketable	1 foot	61	234	..
Medium cut in two	1 foot	74	229	40
Medium with two eyes without seed ends	1 foot	68	147	20
Medium with one eye without seed ends	1 foot	62	134	20
Medium with seed ends	1 foot	78	234	..

It will be noted that the whole potatoes gave a larger yield per acre than when all but one or two eyes were removed. The sets with the number of eyes limted, however, produced a larger percentage of marketable tubers. In any case where large tubers are used for seed they should not be planted closer than two feet apart in the row. The large sets gave an earlier maturing crop of potatoes.

POTATOES, DIFFERENT SIZES OF SETS WITH ONE EYE IN EACH SET.—In this experiment the sets were cut to different weights, and only one normal eye left on each set, the object being to determine the influence of the size of the set on the resulting crop of potatoes. The size of set, per cent marketable, and the yields per acre are given in the following table:—

Size of Set	Percentage Marketable	Yield per Acre	
		bus.	lbs.
½ ounce	90	78	30
1 ounce	80	156	45
2 ounce	68	175	30
3 ounce	70	162	30

The size of set influenced the yield of potatoes to a marked extent, the larger sets producing the heaviest yields while the smaller sets produced the largest percentage of marketable tubers.

DIFFERENT SIZES OF SETS AT DIFFERENT DISTANCES APART.—The object of this experiment is to determine the most suitable distance apart in the row to space the various-sized sets and which combination will produce the heaviest yields per acre. The size of the set, the distance apart in the row, the per cent marketable, and the yield per acre are presented in the following table:—

Size of Set	Distance apart in row	Percent marketable	Yield per acre	
Ounces	inches		bus.	lbs.
1	12	74	132	10
1	18	72	108	20
1	24	80	82	30
2	12	78	229	40
2	18	74	151	40
2	24	68	121	20
3	12	76	247	—
3	18	68	177	40
3	24	68	186	20

In this experiment the one-ounce sets produced an average yield of 107 bushels 40 pounds, the two ounce sets 167 bushels 33 pounds, and the three ounce sets 203 bushels 40 pounds of tubers per acre. There appears to be little difference in the per cent marketable potatoes produced. The two highest yields per acre were produced by the three- and two-ounce sets planted one foot apart in the row.

SETS OF EQUAL SIZE AND VARYING NUMBER OF EYES.—The sets used in this experiment were uniform in every way except that the number of eyes in the sets of the different lots varied, the object being to determine the effect of the number of eyes per set on the yield of potatoes. The results obtained are presented in the following table:—

Number of eyes per set	Per cent Marketable	Yield per Acre	
		bus.	lbs.
1 eye	68	190	40
2 eyes	56	186	20
3 eyes	62	203	40
4 eyes	66	216	40

The results obtained in this experiment indicate that a number of stalks in a hill will give slightly better results than one single stalk.

SETS FROM DIFFERENT PARTS OF THE POTATO.—In this experiment sets of equal size were cut from the stem end, the seed end and from the middle portion of the potato, the object being to determine if this factor exerted any influence on the yield of tubers. The results are presented in the following table:—

Part of potato set was taken from	Per cent Marketable	Yield per Acre	
		bus.	lbs.
From stem end	70	152	40
From seed end	65	150	20
From middle portion	75	149	30

The results obtained in this experiment indicate that it makes very little difference which portion of the potato the set is taken from when the size of the set remains constant.

ONE, TWO AND FOUR SETS PER HILL.—The object of this experiment is to determine whether there is any advantage in halving or quartering potatoes with the object of increasing the number of stalks per hill and thus, possibly, increasing the resulting crop. The hills were spaced three feet apart in the row, and either one whole, two halves or four quarters were planted in each hill. The results obtained are given in the following table:—

Sets per hill	Per cent marketable	Yield per acre	
		bush.	lbs.
One whole potato	70	257	50
Two half potatoes	72	231	50
Four quarter potatoes	75	145	10

The data furnished in this experiment indicates that halving or quartering the potatoes decreases the yield but increases the percentage of marketable tubers. As the increase in the per cent marketable potatoes does not compensate for the loss in yield, it is doubtful if it would be advisable to quarter or halve the tubers.

PLANTING FRESHLY CUT SETS.—In this experiment one lot was cut seven days before planting, while the other lot was cut and planted on the same day. The results are presented in the following table:—

Description of set	Per cent marketable	Yield per acre	
		bush.	lbs.
Cut and planted on the same day	72	158	10
Cut and planted seven days after cutting	62	177	40

The results indicate that it is an advantage to cut the tubers a few days ahead of planting time and allow the freshly cut surfaces to heal over before planting. But at other Stations this has not been the case, and several season's results are necessary to determine the better practice here.

PLANTING POTATOES AT DIFFERENT DEPTHS.—In this experiment the potatoes were planted seven, five and three inches deep. The results obtained are presented in the following table:—

Depth of planting	Per cent marketable	Yield per acre	
		bush.	lbs.
3 inches deep	62	147	20
5 inches deep	68	173	20
7 inches deep	64	153	50

The results indicate that five inches is the most suitable depth to plant potatoes. There was very little sunburning in the three-inch planting as is usually the case. The soil was loose and the early part of the season was dry, and the tubers were set much deeper in the ground than usual as a result. The five-inch planting placed the tubers in the moist soil, while the shallower planting was more affected by the dry season. In the deep planting the plants did not come up as quickly and were not as vigorous.

HILLED VS. LEVEL CULTIVATION FOR POTATOES.—The cultivation in this experiment was similar except that one lot was hilled while the other was given level cultivation. The results were as follows:—

Cultivation given	Percentage marketable	Yield per acre	
		bush.	lbs.
Hilled	60	195	—
Level	60	153	50

The results obtained in this experiment this year were decidedly in favour of hilling. There appears to be a greater difference than one could expect, and too much stress cannot be placed on this point until the experiment has been repeated for at least five years.

PUMPKIN, VARIETY AND STRAIN TESTS.—Three varieties of pumpkins were tested in 1924. They were planted in the open during the latter part of May. Although the year was unfavourable the King of Mammoth gave 95 pounds, the Connecticut Field 80 pounds, and the Small Sugar 72 pounds per hill.

RHUBARB, VARIETY AND STRAIN TESTS.—Ten varieties of rhubarb were under test in 1924. The results were as follows:—

Variety	Date ready for use	Yield from 1 hill
		lbs.
Victoria	May 23	25
Daws Champion	" 14	24
Early Scarlet	" 14	24
Prince Albert	June 1	22
Hobday Giant	May 20	21
Linnaeus	" 20	20
Prima Donna	" 29	20
Monarque	June 4	19
Paragon	" 4	18
Early Raspberry	May 20	17

These varieties were all planted in 1922. It will be noted that there is not a great deal of difference in the yield per hill, but there is considerable difference in the time the varieties were ready for use. The earlier varieties are naturally the most valuable.

Ruby, a new variety originated by the Division of Horticulture, of the Central Experimental Farm, Ottawa, is very promising in yield, and is superior to any of the varieties now under test in quality and colouring. Varieties recommended are Ruby, Linnaeus, Victoria and Prince Albert.

SQUASH, VARIETY AND STRAIN TEST.—Eight varieties were tested in 1924. They were seeded on June 6, but on account of the dry weather and late spring frosts did not produce a satisfactory crop.

TURNIP, VARIETY AND STRAIN TEST.—Four varieties of turnips were used in this experiment. As a result of the dry weather they did not produce a very satisfactory crop. The Milan was the first ready for use.

TOMATO, VARIETY AND STRAIN TESTS.—Twenty-one varieties were seeded in flats in the greenhouse on March 14, were transplanted twice, and were

planted in the open on June 28. As killing frosts occurred late in June, it was not possible to plant them out before this date. The results obtained were as follows:—

Variety	Green		Ripe	
	lbs.	oz.	lbs.	oz.
Sutton Open Air	22	4	..	5
Alacrity and Hipper	19	10	..	..
First of All Lac	16	10	..	14
Sutton Best of All Lac	15	10	1	..
Sutton Best of All Lac	12	2	..	4
Alacrity and Earlibell	12	2	..	8
Red Canner	12	8	..	..
Earliana	11	10	..	..
Alacrity	10	14	..	12
Early Mascot	10	2	..	10
Avons Early	9	14	..	7
Daniel Open Air Lac	9	4	1	2
King George	8	10	..	..
Bonny Best Stokes Lac	8	10	1	7
Rosy Morn	8	2	..	3
Golden Queen	8	2	..	..
Burbank	7	6	..	10
Bonny Best Lac	6	10	1	..
Golden Nugget	6	10	..	..
Bonny Best	5	6	..	10
Pink Ott	5	0	..	..
John Baer	5	0	..	14
Pepper	4	0	..	..
Chalk Early Jewel	3	12	..	..
Self Pruning	3	4	..	..
Rosy Morn	2	7	..	..
Rennie Yellow	1	7	..	3
Early Detroit	1	5	..	4
Matchless	1	7	..	..
Norton	1	2	..	..
Coreless	..	7	..	..
Super Scarlet	..	12	..	..
Stone	..	4	..	..
Rennie's Giant Yellow	..	4	..	..

The tomato varieties did not produce very heavy yields in 1924 as a result of the late planting and unfavourable growing season. Very few of the varieties ripened fruit, while the amount of green fruit produced is below normal.

The Experimental Station has been selecting tomatoes for earliness from some of the early maturing varieties with the object of eventually obtaining a selection that will ripen the bulk of its fruit in the open. Although no marked progress has been made as yet, the results are very promising. The varieties recommended are Earliana, Bonny Best and Alacrity.

HERBS.—A number of the different herbs have been tested during the past few years. They always winter-kill, however, and have to be reseeded each year.

EGG PLANT.—Egg plants have been grown, but they always freeze before they develop fruit of any size.

PARSLEY.—Two varieties of parsley were tested last season. They were seeded May 2 and were harvested in September. There was little difference in the varieties as neither made a satisfactory growth.

SPINACH.—Two varieties were used in this test. The Victoria was ready for use first, but the New Zealand was most satisfactory as it did not bolt to seed as quickly.

BUSH FRUITS

The season of 1924 was very unfavourable for bush fruits. As a result of the lack of snow during the previous winter, strawberries winter-killed badly, while raspberries and other bush fruits suffered a certain amount of injury, although protected in the usual manner.

VARIETY TEST OF RASPBERRIES (OLD PLANTATION)

Variety	Yield of 6 bushes	
	lbs.	oz.
Marlboro	31	11
Early King	27	3
Sunbeam	24	4
Herbert	18	15
Cuthbert	20	8
St. Regis	17	14
Chegwin	14	13
Golden Queen	10	3
Sarah	11	11
Shaffer Colossal	9	0

VARIETY TESTS OF RASPBERRIES (ON 3-YEAR-OLD PLANTATION)

Variety	Yield of 6 bushes	
	lbs.	oz.
Sunbeam	8	13
Herbert	8	8
Cuthbert	6	4
Chegwin	4	3
Regis	1	15
Shaffer Colossal	1	1
Sarah	..	11
Brighton	..	9

It will be noted that the yields produced by the different varieties are much below normal. The heavy frosts during the latter part of June did considerable damage to the bloom, as well as the new growth on the canes. The fruit on both plantations was harvested between June 28 and September 12. The varieties recommended are Herbert, Cuthbert and Early King.

VARIETY TESTS WITH BLACK CURRANTS (NEW PLANTATION)

Variety	Yield of 6 bushes	
	lbs.	oz.
Beauty	14	5
Kerry	14	4
Eagle	9	8
Ogden	6	0
Eclipse	6	0
Climax	4	7
Saunders	3	12
Magnus	3	8
Collins	2	15
Merveille de la Gironde	1	12
Black Naples	1	11
Topsy	1	9
Clipper	..	13
Ethel	..	8
Bang Up	..	5

The blacks were the only currants not seriously injured by the 5.5° of frost on June 22. They were picked from August 23 to 28.

The red and white currants and the gooseberries were badly frozen by the frost on June 22.

STORM-SASH GREENHOUSE

This is a small greenhouse constructed of storm-sash used in winter on other buildings. It was in use from the first week of March until November. Three crops were grown in it. Crops which require early seeding, such as tomatoes, celery, snap-dragons, etc., were first seeded. This was followed by tomatoes and cucumbers. The third crop consisted of flowers lifted with a ball of earth and transplanted into the greenhouse. While cucumbers were a failure in the open and tomatoes produced very little ripe fruit, a good crop of cucumbers, 134 pounds of ripe and 84 pounds of green tomatoes were grown in this temporary greenhouse. Over 60 per cent of the tomatoes ripened in the greenhouse, although the plants were not set out until quite late.

CEREALS

The cereal tests at Lacombe were disappointing during the past season. As a result of unfavourable climatic conditions the yields were so light, and in most cases they were so misleading, that it was deemed inadvisable to publish any of the results. The usual number of varieties were under test in duplicate plots. In addition to this a large number of varieties of wheat, barley and oats were seeded in rod and head-row plots, and these like the large plots, were a complete failure as far as experimental results were concerned.

FORAGE CROPS

The past season was very unfavourable for experimental work with forage crops. The land was dry and the precipitation so much below normal that spring-sown seed did not germinate uniformly enough to justify comparisons being made, and, although a large number of varieties of the different classes of roots, annual hays, corn and sunflowers were seeded, no yields were taken. Most of the seed sown did not germinate until after the rains started during the latter part of July. The grasses and legumes made very little growth in their normal growing season, most of the growth being made after the rains occurred.

VARIETY AND STRAIN TESTS WITH TIMOTHY

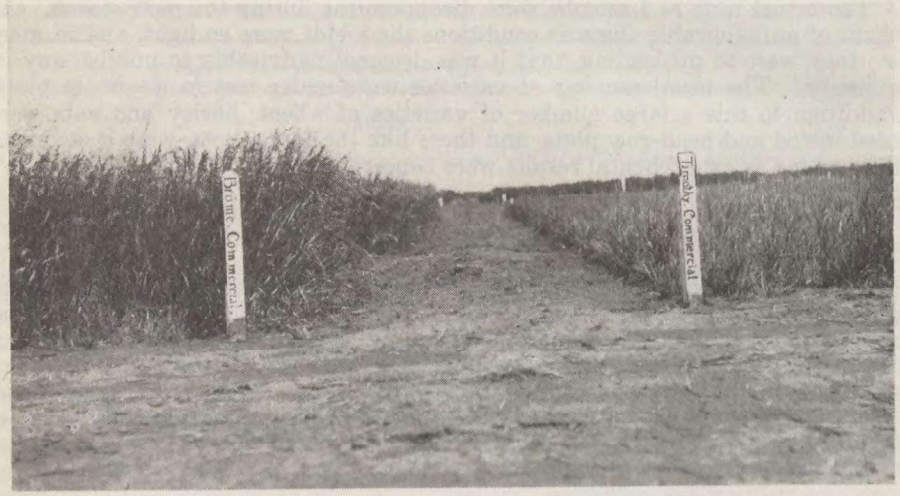
Variety	Per cent dry matter	Yield per Acre			
		Green weight		Air dried weight	
		tons	lbs.	tons	lbs.
Boon	38·81	3	1,740	1	1,406
Boon	32·62	3	740	1	492
Commercial	33·68	4	40	1	1,007
Commercial	34·73	3	1,500	1	925
Ohio Commercial	33·68	4	440	1	1,292
Ohio Commercial	35·45	4	920	1	1,568
Ohio 3937	35·23	3	1,280	1	912
Ohio 3937	31·81	4	400	1	1,108

These varieties of timothy were cut on September 8. At the normal harvesting season there was no growth whatever as a result of the dry spring. When the rains came during the latter part of July the timothy plots made a rapid recovery and made such a growth that it was considered advisable to harvest them. While the yields as presented are not as dependable as they would be had the growing season been normal, they nevertheless indicate to a certain

degree the relative value of the varieties. The percentage dry matter and the yield per acre, both green and air-dried weights, are given. The Ohio Commercial was the tallest variety and was the most promising in appearance. There appeared to be little difference in the other varieties.

VARIETY AND STRAIN TESTS WITH WESTERN RYE

Variety	Per cent dry matter	Yield per Acre			
		Green weight		Air dried weight	
		tons	lbs.	tons	lbs.
Grazer	48·68	4	680	2	774
Grazer	47·41	4	920	2	795
Commercial	40·80	4	480	1	1,816
Commercial	41·35	4	520	2	4



Brome grass on left and timothy on right. Note the relative growth of the two crops in a dry season. Timothy did not develop heads, while brome and western rye attained a fully developed crop.

The western rye grass plots were cut on August 15. The yields were slightly in favour of Grazer, a new variety developed by the Division of Forage Crops of the Central Experimental Farm, Ottawa. It will be noted that the percentage dry matter was higher in this crop than in either the timothy or brome grass. Another point where it exceeds the other two grasses is in the yield of hay per acre. These yields were produced during the dry weather, and the western rye grass appeared to withstand the drought much better than the timothy, as indicated in the accompanying illustration.

VARIETY AND STRAIN TESTS WITH BROME

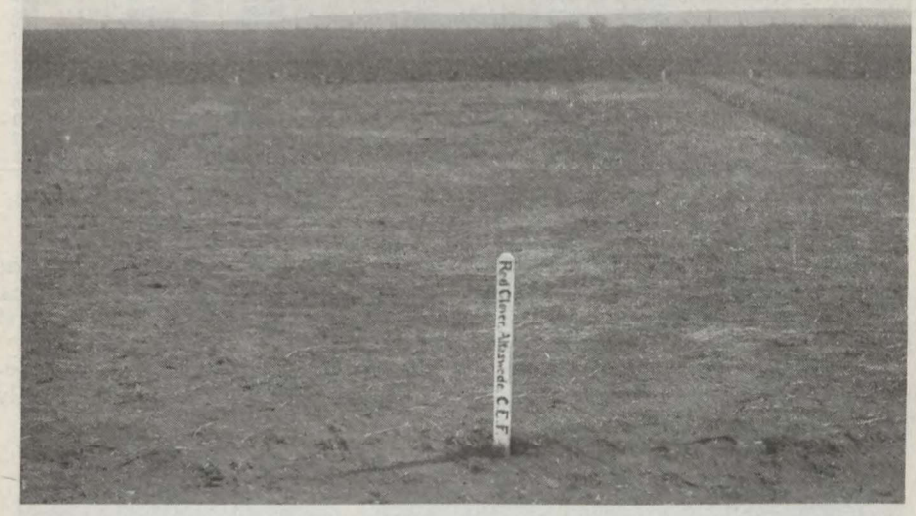
Variety	Per cent dry matter	Yield per Acre			
		Green weight		Air dried weight	
		tons	lbs.	tons	lbs.
Commercial	33·52	4	1,760	1	1,806
Commercial	29·44	4	1,920	1	1,373

Only one variety of brome grass was grown. Like the western rye grass, the brome developed a fair stand of hay in spite of the very dry season, and proved much more drought resistant than timothy. It was harvested in the normal harvesting season.

In comparing the percentage dry matter of these three grasses it will be noted that the dry matter content of the western rye was much higher than the brome or the timothy, which was mostly second growth. This gives a fair basis for comparing the feeding value of the different hays as harvested.

VARIETY TESTS WITH SWEET CLOVER

Variety	Per cent dry matter	Yield per Acre			
		Green weight		Air dried weight	
		tons	lbs.	tons	lbs.
Arctic, White Flowered Biennial—					
First cutting	22·88	3	1,920	1	59
Second cutting	28·34	3	320	1	22
Yellow Flowered Biennial—					
First cutting	24·64	3	1,160	1	5
Second cutting	31·59	3	320	1	149
White Flowered Biennial—					
First cutting	23·32	4	440	1	279
Second cutting	30·10	1	1,660	0	1,354
White Flowered Biennial (Grundy County)—					
First cutting	26·02	2	1,320	0	1,543
Second cutting	38·37	2	1,160	1	322



Altaswede, one of our hardiest strains of red clover, winter-killed during the winters of 1922-23 and 1923-24

In this experiment the first cutting was made on July 14 and the second cutting on September 8. At the first cutting the sweet clover was approximately 10 per cent in bloom, while it was in full bloom at the second cutting. Although it was in full bloom when the second cutting was made, it did not appear unduly woody. The dry matter content of the second cutting is higher than in the first

cutting; also, in most cases the second cutting is equal to the first cutting. One explanation for the high relative yield of second growth is the abnormal growing season in which the moisture supply for the first growth was limited while there was a fairly abundant supply for the development of the second growth.

In going over this table one might get quite enthusiastic about sweet clover. The results are somewhat misleading, as the sweet clover in the large field of the Station has completely winter-killed during the past two winters; hence, sweet clover is not a very dependable crop for this district.

A plot of each of the above varieties was permitted to ripen seed. In this test the Arctic seed pods were just beginning to turn brown, the yellow-flowered biennial had 50 per cent of its pods ripe, the white-flowered biennial seed pods were just beginning to ripen, while 60 per cent of the seed pods of the Grundy County sweet clover was ripe. As our season is usually too short for sweet clover to ripen its seed properly it was considered that the Grundy County, because of its earliness, would be the most suitable to grow for seed production.

VARIETY AND STRAIN TESTS WITH ALFALFA

Variety	Source	Per cent dry matter	Yield per Acre	
			Green weight	Air dried weight
			tons lbs.	tons lbs.
Grimm	Northern Seed Company	32·64	3 1,900	1 844
Grimm	Northern Seed Company	40·80	2 860	1 41
Grimm	C.P.R., Brooks, Alta	32·64	3 460	1 390
Grimm	C.P.R., Prooks, Alta	40·80	2 1,400	1 538
Grimm	McCannus	30·82	3 1,060	1 471
Grimm	McCannus	41·84	2 1,940	1 851
Grimm	R. B. Lyman	33·68	3 120	1 327
Grimm	R. B. Lyman	42·51	3 40	1 899
Baltic	Steele Briggs Seed Co	33·68	3 700	1 546
Baltic	Steele Briggs Seed Co	41·79	2 1,320	1 500
Turkestan	Steele Briggs Seed Co	40·52	2 600	1 70
Turkestan	Steele Briggs Seed Co	39·09	2 500	1 25
Turkestan	Steele Briggs Seed Co	34·46	2 680	.. 1,825
Turkestan	Steele Briggs Seed Co	41·79	1 1,720	.. 1,886
Variegated	Steele Briggs Seed Co	44·99	2 860	1 479
Variegated	Steele Briggs Seed Co	41·18	2 160	.. 1,955

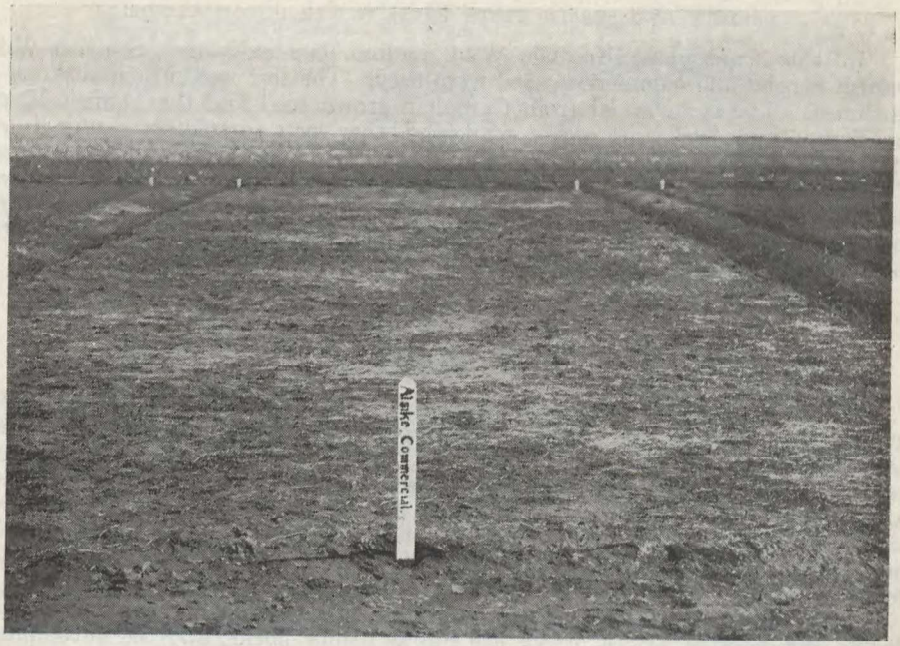
ALFALFA

The season of 1924 was not favourable for alfalfa production; hence, the table is not a true indication of the comparative value of the different varieties. As a result of the moisture shortage during June and July there was no first cutting, the only crop harvested being cut on September 8.

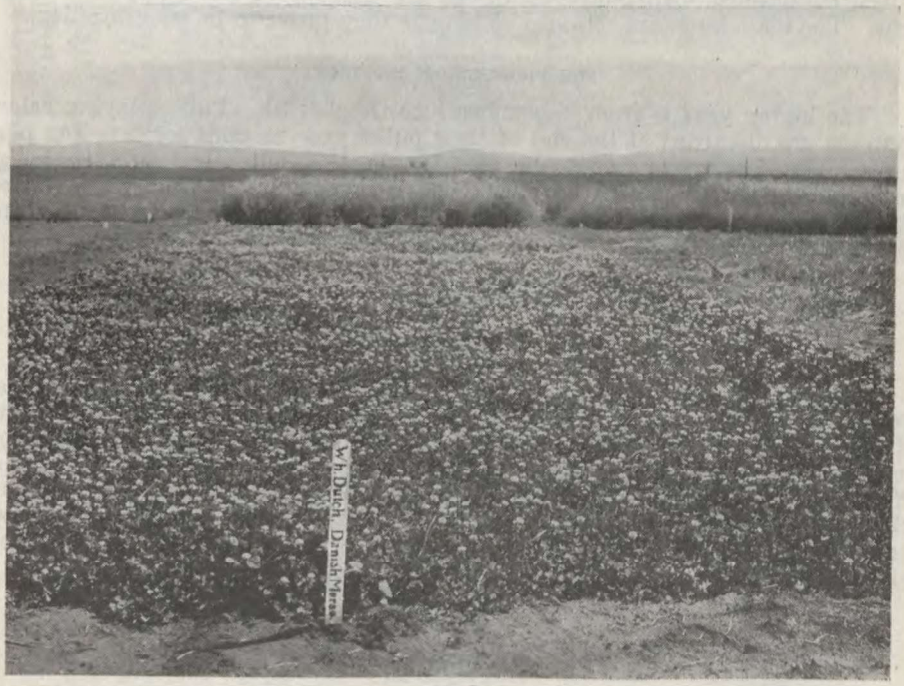
Of the varieties tested the Shoobut was the least promising. A large percentage of this variety winter-killed, and the crop harvested contained fully 75 per cent weeds.

VARIETY AND STRAIN TEST WITH RED AND ALSIKE CLOVER

One variety of alsike and twelve varieties of red clover were seeded in duplicate plots on well-summer-fallowed land without a nurse-crop. The seed germinated well, making a perfect stand, and the plots went into the winter in excellent condition. All were completely winter-killed. As red clover has winter-killed both in the plots and fields during the past four winters, the proof is quite conclusive that red and alsike clovers are not safe crops for this district. The red clover varieties tested contained Altaswede and other hardy strains.



Alsike, like red clover, is not always winter-hardy at Lacombe.



Danish Morso, white Dutch clover, is a winter-hardy strain offering possibilities as a pasture and lawn clover for central Alberta.

VARIETY AND STRAIN TESTS WITH WHITE DUTCH CLOVER

In this experiment Kentish Wild, Ladino, Danish Morso, Scottish Wild, Danish Stryno and commercial seed were used. The test was principally one of hardiness. The commercial from Canadian-grown seed and the Danish Morso and Stryno appeared quite hardy, while the other sorts completely winter-killed. The varieties which were hardy were quite promising as lawn or pasture clovers. The Danish Morso appeared to be the best lawn clover, the Danish Stryno was the best pasture and hay clover, while the Commercial appeared to be intermediate in these respects. The Danish Stryno flowers very freely, makes the most upright growth, and suggests possibilities in seed-production.

POULTRY

The year 1924 was very satisfactory from the standpoint of the poultry work at this Station. Several high egg-records were made by individual pullets, and the average egg production was good. The hatching records were very good both in the number of eggs required to produce chicks and the low mortality among the chicks hatched. For the first time practically every chick hatched was leg-banded and later wing-banded, and as only eggs from high-producing hens and pedigreed cockerels were set, a good foundation has been laid for later breeding work.

Two breeds of poultry are kept at the Station, Barred Plymouth Rocks and White Wyandottes. Both breeds are run as utility flocks, and the development of heavy laying strains of good type with large eggs is emphasized in the breeding work. By careful selection of both males and females standard breed-type is well maintained. All pullets and hens are trap-nested throughout the entire year. The male birds are retained as long as they prove to be good breeders.

EGG PRODUCTION RECORDS

The laying year is from November 1 to October 31. Pullets laying below 150 eggs are discarded at the end of their pullet year as unfit for breeding purposes. The hens laying eggs to be used for the 1925 hatch had an average egg production as pullets of 181 for the White Wyandottes and 176 for the Barred Rocks. The highest individual records made by pullets during the year ending October 31, 1924, were:—

Barred Rocks, 271, 227, and 202.
White Wyandottes, 227, 224, 200, 199, and 198.

INCUBATION

A twelve-hundred-egg-size Candee incubator was the only incubator used during 1924. This machine hatched 52.77 per cent of the fertile eggs. The chicks were reared under Buckeye coal brooders, which gave very satisfactory results, being much more reliable than the coal-oil type of brooder. A total of 751 chicks was hatched during 1924, of which 474 were White Wyandottes and 272 were Barred Rocks. Comparisons of the hatchability of eggs from the two breeds, comparisons for the different months, and comparisons of eggs from pullets and mature hens are given in the accompanying three tables.

1924 HATCHING RESULTS

Hatching Results for Settings by the Month

Time set	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent of total eggs hatched	Per cent of fertile eggs hatched	Number of chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for 1 chick hatched	Total fertile eggs for 1 chick hatched	Total eggs required for 1 chick when wing banded
February	208	58	27·88	44	21·15	75·86	38	86·32	4·73	1·32	5·47
March	932	518	55·58	259	27·79	50·00	238	91·89	3·59	2·00	3·91
April	825	491	59·51	275	34·54	56·00	238	86·55	3·00	1·78	3·46
May	598	260	43·68	153	25·58	58·85	85	55·56	3·9	1·7	7·03
June	264	96	36·36	20	7·58	20·83	11	55·00	13·2	4·8	24·00
Total	2,827	1,423	50·33	751	26·57	52·77	610	81·22	3·76	1·98	4·7

Note.—At six weeks old the wings of the chicks are sufficiently developed for bandi g, and as after that age the mortality is very low, six weeks or "when wing-banded" is used for the comparative count in hatching results. March and April are the best months for hatching in Central Alberta if suitable conditions for caring for the chicks are available. The fertility of the eggs and vitality of the young chicks is highest, and the number of eggs required for one chick when wing banded is much lower during these months than during the colder month of February or the warmer months of May and June. Also the March and April hatched pullets prove to be the best layers. They start laying early but not too early in the fall, and continue laying during the winter.

Hatching Results from the Two Breeds

Time set	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent of total eggs hatched	Per cent of fertile eggs hatched	Number of chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for 1 chick hatched	Total fertile eggs for 1 chick hatched	Total eggs required for 1 chick when wing banded
February	8	2	25·00	2	25·00	100·00	2	100·00	4·0	1·0	4·0
March	402	315	75·87	105	26·1	33·33	95	90·48	3·83	3·0	4·23
April	321	264	82·24	114	35·51	43·18	86	75·44	2·81	2·31	3·73
May	191	144	75·4	56	29·32	38·89	36	64·2	3·41	2·57	5·36
Total	922	725	78·63	277	30·04	38·2	219	79·42	3·32	2·61	4·21

1924 HATCHING RESULTS—*Concluded*

White Wyandottes

Time set	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent of total eggs hatched	Per cent of fertile eggs hatched	Number of chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for 1 chick hatched	Total fertile eggs for 1 chick hatched	Total eggs required for 1 chick when wing banded
February	200	56	28·00	42	21·00	75·00	36	85·71	4·8	1·33	6·1
March	530	203	38·3	154	29·00	75·86	143	92·85	3·44	1·31	3·7
April	504	227	45·04	161	31·94	70·92	142	88·7	3·13	1·41	3·55
May	407	116	28·5	97	23·83	83·61	49	50·5	4·19	1·19	8·3
June	264	96	36·36	20	7·57	20·83	11	55·00	13·2	4·8	24·00
Total	1,905	698	36·67	474	24·88	67·9	381	80·38	4·02	1·47	5·00

Note.—This table gives the hatching results of the two breeds. It will be noted that the fertility is considerably higher in the Barred Rocks, while the percentage of fertile eggs hatched is decidedly in favour of the White Wyandottes. The livability of the chicks is practically equal though slightly in favour of the Wyandottes as shown by per cent chicks hatched alive when wing banded. In total eggs required to produce one living chick when wing banded the Barred Rocks have a slight advantage over the White Wyandottes.

Hatching Results from Hens and Pullets—Hens W. W.

Time set	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent of total eggs hatched	Per cent of fertile eggs hatched	Number of chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for 1 chick hatched	Total fertile eggs for 1 chick hatched	Total eggs required for chick when wing banded
February	159	34	21·38	25	15·72	73·53	23	92·00	6·36	1·36	6·91
March	300	134	44·67	108	36·00	80·59	105	97·22	2·78	1·24	2·86
April	374	181	48·39	143	38·23	79·00	136	95·1	2·61	1·13	2·75
May	342	96	25·11	85	24·85	88·55	43	50·58	4·00	1·13	7·95
June	255	96	37·64	20	7·84	20·83	1	55·00	12·75	4·8	23·2
Total	1,430	541	37·83	381	26·64	70·42	318	83·46	3·75	1·42	4·5

PULLETS (W. W.)

Time set	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent of total eggs hatched	Per cent of fertile eggs hatched	Number of chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for 1 chick hatched	Total fertile eggs for 1 chick hatched	Total eggs required for 1 chick when wing banded
February	41	22	53·66	17	41·46	77·27	13	76·47	2·41	1·28	3·15
March	230	69	30·00	46	20·00	66·67	38	82·6	5·00	1·8	6·00
April	130	46	35·38	18	13·84	39·13	6	33·34	7·32	3·0	21·67
May	65	30	30·07	12	18·46	40·00	4	33·34	5·42	2·5	16·25
June	9	0									
Total	475	157	33·00	93	19·57	59·23	61	65·59	5·1	1·68	7·8

NOTE.—This table compares the hatching results obtained with eggs from mature hens and pullets. The results are decidedly in favour of the hens in spite of the fact that 1,430 eggs from the mature hens were set against only 475 eggs from the pullets. The 1924 results help to confirm the results of previous years, indicating that eggs from mature hens are much more satisfactory than eggs from pullets for hatching.

FEEDING

The standard grain mixture or "scratch feed" used at the Station is made up of 100 pounds wheat, 100 pounds oats and 50 pounds corn. In summer rather less corn is fed. The scratch is fed first thing in the morning and shortly before the hens roost in the evening; the heavier feed being given in the evening. The standard dry mash is made up of 100 pounds fine ground wheat, 100 pounds fine ground oats, 50 pounds corn meal, 25 pounds beef scrap and 3 pounds charcoal. This is constantly before the hens in hoppers. A wet mash is fed to the layers at noon. This is made up like the dry mash with the addition of 25 pounds of oilcake meal, and is moistened just enough to make it crumble. Just after noon greenfeed of some kind is fed, mangels, alfalfa leaves or sprouted oats. Mangels are the most satisfactory. These feeds are varied at times, and this winter it has been found that the hens prefer the oats after they have been soaked over night in warm water to the oats fed dry in the scratch feed. McKay's lime granules are now fed in place of grit and oyster shell. It takes the place of both, is cheaper, and produces better egg-shells.

As corn is usually expensive in Alberta the question of its value is important. For six months, December 1, 1923, to May 31, 1924, rations with and without corn were compared for egg production. The grain feeds in one pen were the standard scratch and the standard mash, both containing considerable corn, while in the other pen the corn was left out of the scratch and mash and barley and barley meal substituted. The results were:—

CORN VS. BARLEY IN RATION

	No. of birds	No. of eggs laid	Grain	Dry mash	Grit	Greenfeed
Corn	12 W.W.	1,025	518	182	22	270
Barley	12 W.W.	770	423	155	28½	270

The pullets used were as nearly alike as possible in breeding, age and condition. The eggs laid were of practically the same weight per dozen in both pens, and the condition of the birds at the end of the experiment was practically alike. Broodiness was very low in both the pens. The pullets receiving the corn in the rations produced considerably more eggs at a lower cost per dozen.

During the same six months an experiment was conducted to compare tankage, beef scrap and buttermilk for egg production.

BEEF SCRAP VS. TANKAGE VS. BUTTERMILK

	No. of birds	No. of eggs laid	Grain	Dry mash	Grit	Greenfeed
Tankage	12 B.R.	1,033	441	191	26	270
Beef Scrap	12 B.R.	876	468	188½	23	270
Buttermilk	12 B.R.	627	401	142	17	270

The pullets were of the same breeding and condition, but age was unknown as they were not pedigreed. Some of the pullets were broody and some were poor layers, which lowered the production. Tankage is lower in price than beef scrap, but in the first year of this experiment the pullets fed tankage produced considerably more eggs than those on beef scrap.

BREED TEST

Commencing November 1, 1923, a comparison for egg production was made of a pen of 31 White Wyandottes and a pen of 32 Barred Rock pullets. Both pens were made up of the average run of the 1923 pullets, and appeared about equal in type and quality. Both were fed the standard feeds with buttermilk, which is always fed to laying stock.

BREED TEST

	No. of birds	No. of eggs laid	Grain	Mash	Grit	Greenfeed
White Wyandottes.....	31	2,847	867	507	41½	600
Barred Rocks.....	32	2,836	854	409	37½	600

The Wyandotte pullets produced an average of 91 eggs and the Rocks an average of 89 eggs in the 11 months. There is not much difference in the egg-laying qualities of the two breeds as represented at this Station, but the Wyandottes have slightly better average records.

FEEDING BREEDING PENS FOR FERTILITY AND HATCHABILITY IN EGGS AND VITALITY IN CHICKS

Although it cannot be called an accurate comparison, as there were other factors than the feeds which might have influenced the results, the following comparisons will be interesting. Three pens of ten Wyandotte hens with a cockerel in each were fed exactly the same with the exception of the mash used. The males in the wet and dry mash, and dry mash pens were full brothers, and the male in the " no mash " pen was a cousin of the other two.

WET AND DRY MASH VS. DRY MASH VS. NO MASH

No. of hens 10 per pen	No. of eggs set	Infertile	Bloodrings	Dead germs	Dead in shell	Hatched	Died in 3 weeks
Wet and dry mash.....	296	65	19	40	53	129	16
Dry mash.....	263	96	12	31	41	83	11
No mash.....	301	57	14	46	58	125	25

It will be noticed that in the pen fed dry mash there were more infertile eggs and fewer blood rings, dead germs, and died in shell than in the other two pens. The vitality was about the same in the two pens fed mash, but much lower in the " no mash " pen. The percentage of chicks hatched and alive at the end of three weeks was quite the highest in the pen fed both wet and dry mash.

REARING FROM CHICKS TO LAYING PULLETS

The chicks remain in the incubator for the first twenty-four hours. The second day they are transferred to the brooder, but are not fed until they are forty-eight hours old. Feed lightly for the first week as overfeeding causes bowel troubles. The third day the chicks are given a little fine bran, chick grit, and buttermilk to drink. From the third day until two weeks old the chicks are fed the following ration every two hours each day: equal parts fine bran, shorts and oat chop free from oat hulls. To this is added a small quantity of chick grit and cod-liver oil. A little fine cracked wheat is fed in the litter morning and evening. Buttermilk is before the chicks all the time, and greenfeed is fed once a day.

When the chicks are two weeks old the following ration is used: a prepared commercial scratch feed and a chick mash composed of the following: bran, 100 pounds, shorts 100 pounds, oat chop free from hulls 100 pounds, corn meal 50 pounds, beef scrap 20 pounds, bone meal 20 pounds, charcoal, 5 pounds, cod-liver oil 1 pint per 100 pounds mash. This mash is before the chicks in the hopper all the time, and the scratch feed is fed morning and evening. Buttermilk is used as drink all times. All drinking vessels are kept thoroughly clean, and brooders are cleaned once each week. Green feed is fed each day which consists of alfalfa leaves, mangels or sprouted oats. Of the three, mangels are used most extensively. A wet mash is fed at noon each day.

When the chicks are eight weeks old they are put on range and their ration is slightly changed. Equal parts cracked corn and wheat are used in place of the prepared feed, and cod-liver oil is discontinued after warm weather sets in. Both grain and mash are fed in hoppers, and this manner of feeding with the above rations is carried on until the chicks are put in laying houses in the fall. After pullets are placed in the laying houses the following ration is used:—

DRY MASH

Bran	50 lbs.
Shorts	100 "
Oat Chop	200 "
Barley Chop	100 "
Tankage	15 "
Charcoal	3 per cent.

The scratch feed is fed in deep litter morning and evening. A safe rule to follow in feeding scratch feed is one quart to fifty hens in mornings and two quarts at night. Pullets may be given more than this, and should have all they will clean up.

The dry mash is kept in a hopper before the pullets at all times, and plenty of fresh buttermilk and fresh water is supplied for drink. Green feed is fed every day, consisting of alfalfa leaves, mangels and sprouted oats.

Reared in this way a pen of twenty-seven White Wyandotte pullets, hatched at the Station in March, 1924, commenced laying at 4½ months old and laid an average of 25·5 eggs each during the two months September and October.

BEES

The results obtained with bees at this Station in 1924 were far from satisfactory. Owing to the extremely dry and cool weather there were very few wild flowers in bloom early in the season, and even fruit blossoms were dried up. Later in the season when there was more bloom the weather was cold, windy and wet, and the bees were unable to collect nectar. The result was that the bees required feeding at seasons when they should have been storing honey. Very little honey was stored, and most of the possible income from the apiary was from the increases made during the season.

WINTER PROTECTION

In this experiment two colonies were packed in a wintering case and wintered in the open. This case was large enough to allow six inches of cut straw to be placed on the bottom and sides between the hives and box, with eight inches on top of the hives. Twenty-one colonies were wintered in the basement of the office where the temperature averaged about 45·0° F. They were removed from the basement on the 18th of April. Of those placed in the basement three colonies died, while the two wintered in the open were much stronger at the time of the first spring examination than any of the basement-wintered colonies. The winter of 1923-24 was comparatively mild, but this experiment in outside wintering gives promise of good results, and will be continued.

INCREASES IN 1924

Data concerning the increases made last season are presented in the following table.

INCREASES IN 1924

Colony number of increase	Date started	From colony number	Kind of increase	Queen left with increase	Weights in fall before feeding
					lbs.
24	June 6	8	Two frames bees and brood.	Ripe queen cells	38
25	June 6	2	" "	"	40
26	June 6	1	" "	"	42
27	June 6	7	" "	"	40
28	June 27	1	" "	"	54
29	July 19	9	" "	"	45
30	Aug. 9	1 and 2	" "	Old Queens	55
31	Aug. 9	3 and 4	" "	"	48
32	Aug. 9	5 and 6	" "	"	45
33	Aug. 9	7 and 8	" "	"	49
34	Aug. 1	17	Swarm	"	45
35	Aug. 9	9 and 16	Two frames bees and brood.	"	60

Colonies Nos. 30, 31, 32, 33 and 35 are divided, each half being queened with the queen from one of the parent colonies.

All the ripe queen cells used were from the strongest and best colony in the apiary, which is queened with a queen bred at the Central Experimental Farm, Ottawa.

The season was so unfavourable that the increases showed little difference in development.

SUMMER PROTECTION

In this experiment six colonies had both the brood-chamber and supers protected with Kootenay cases, two had the brood-chamber only protected with Kootenay cases, while the remainder were unprotected. Those colonies with both the brood chamber and supers protected produced an average of 17 pounds per colony, those with the brood chamber only protected produced 15 pounds per colony, while those with no protection produced an average of 12 pounds per colony. In the unprotected lot, four colonies did not store any honey for extraction.

COMPARISON BETWEEN HIVES

In this experiment the ten-frame Langstroth and the ten-frame Jumbo hives are compared. The bees seemed to build up faster in the smaller hives. It is believed this was largely due to the unusually cool and dry weather in April, May and June, with lack of flowers and blossoms caused by frost and drouth.

PREVENTION AND DETECTION OF SWARMING BY MANAGEMENT

Shallow supers were used on nine colonies to facilitate the detection of swarming. These supers were given in the spring as soon as the bees covered nine combs in the regular brood chamber. In all cases where queen cells were started they were started on the lower bar of the frame of the shallow super.

QUEEN-REARING AND REQUEENING

Fifteen queens were received from the Central Experimental Farm, Ottawa. These were all used for requeening. In addition to this, twenty queens were reared at the Station. These were reared in artificial queen cells grafted from our best stock. No difficulty was experienced in rearing in this way as many queens as were needed.

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