DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

INVERMERE, B.C.

REPORT OF THE SUPERINTENDENT

R. G. NEWTON, B.S.A.

FOR THE YEAR 1927

Pæonies in the perennial border.

Printed by Authority of the Hon. W. R. Motherwell, Minister of Agriculture, Ottawa, 1928

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DOMINION EXPERIMENTAL STATION, INVERMERE, B.C.

REPORT OF THE SUPERINTENDENT, R. G. NEWTON, B.S.A.

THE SEASON

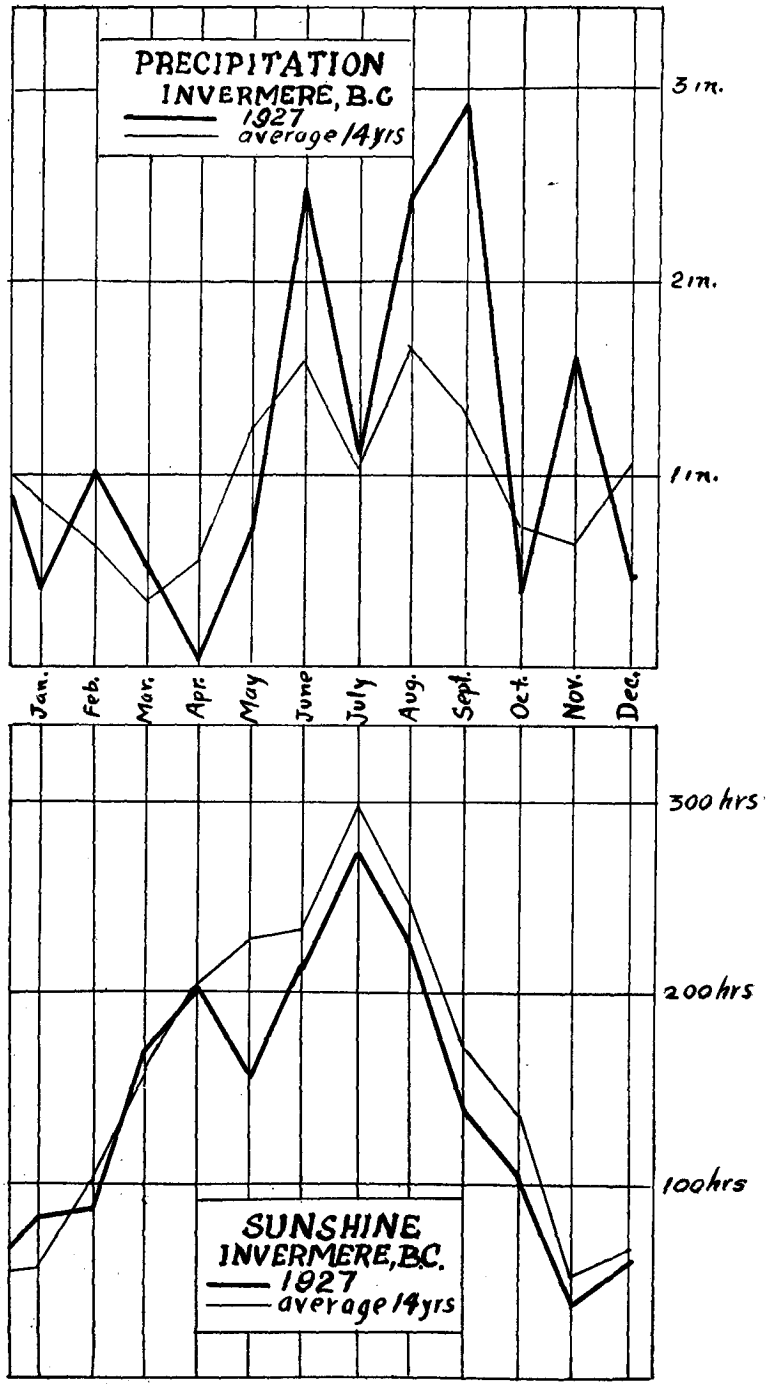
From a perusal of the following table and three charts a general idea of the weather during 1927 can easily be obtained. The mean temperature throughout the whole year followed very closely that of the general average. The precipitation was comparatively high, and as might be expected, the number of hours of sunshine was particularly low.

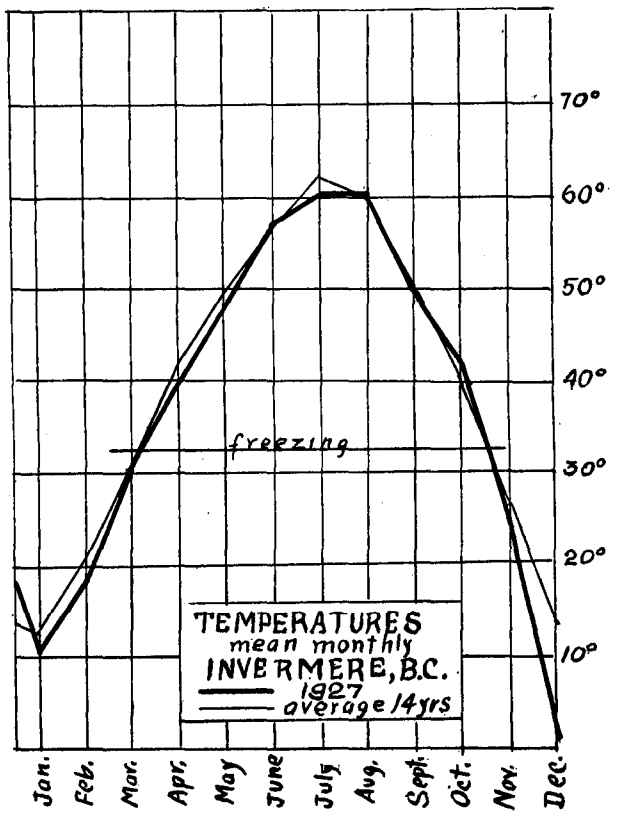
The spring was cool and the soil was well supplied with moisture, making seeding conditions more suitable than is generally the case. Germination of all crops, particularly legumes and grasses, was almost perfect, but very little growth took place until the latter half of June. Irrigation water was plentiful and warm drying winds were less troublesome than usual. July was a normal month. The first cutting of hay was above the average and was put up in good condition. August and September were dull months and the 5·3 inches of rain were received in twenty-four showers. The second crop of hay suffered very badly and in many cases was not harvested. Heavy winds occurred during the early part of August, but very little damage was done to standing crops. Threshing was somewhat delayed owing to frequent rains, but was accomplished in the latter part of September without any apparent loss. October was a very pleasant month and work on the land was possible during the whole month. The first snow fell on November 5 and was followed by frequent flurries. On December 6 the temperature suddenly dropped to 6 degrees below zero. Zero weather continued for the next eighteen days, then six days were quite mild, but on December 30 the mercury dropped to 27 degrees below, while on the last day of the year 39 degrees below was recorded, the lowest temperature on record at this Station.

METEOROLOGICAL RECORDS, 1927—EXPERIMENTAL STATION, INVERMERE- B.C.

	Temperature °F								Precipitation				Sunshine	
	Mean		Maximum			Minimum					Total Precipitation			
	1927	Average 14 yrs.	Highest	Date	Mean maximum	Lowest	Date	Mean minimum	Rain	Snow	1927	Average 14 yrs.	1927	Average 14 yrs.
									in.	in.	in.	in.	hours	hours
January	11·4	13·1	43	2	21·0	−36	21	1·7	0·03	4·0	0·43	0·85	83·6	58·7
February	18·8	20·5	48	21	31·0	−20	18	6·6	.....	10·2	1·02	0·62	87·0	102·3
March	31·0	30·8	57	31	43·1	7	1	18·9	0·04	5·0	0·54	0·36	171·4	163·0
April	40·1	42·1	70	24 & 26	53·7	14	20	26·5	0·03	.....	0·03	0·54	202·7	204·7
May	47·8	50·0	75	15	60·0	25	7	35·6	0·71	.....	0·71	1·25	153·3	229·8
June	57·4	57·2	84	7 & 21	70·5	32	3	44·4	2·43	.....	2·43	1·60	211·0	236·1
July	61·0	62·9	92	21	76·6	35	10	45·5	1·10	.....	1·10	1·03	275·0	299·0
August	61·1	60·5	86	3	75·4	40	26	46·9	2·39	.....	2·39	1·64	230·2	250·5
September	50·6	50·7	74	21	62·0	30	18	39·2	2·90	.....	2·90	1·31	142·3	176·5
October	43·4	41·2	67	16	53·7	23	31	33·1	0·41	.....	0·41	0·72	137·5	137·9
November	25·0	27·0	48	4	32·1	4	26	17·9	0·05	15·5	1·60	0·66	42·0	54·3
December	1·9	14·1	38	4	8·6	−39	31	−4·7	.....	5·1	0·51	1·10	64·4	58·9
Totals	.....	.....	.....	.....	.....	.....	.....	.....	10·09	39·8	14·07	11·74	1,776·4	1,971·7

Precipitation for the six growing months, April to September, 1927—9·56 inches.
Average precipitation for six growing months for the past 14 years—7·45 inches.
Highest temperature recorded at the Station—98 degrees, on July 2nd, 1924.
Lowest temperature recorded at the Station—39 degrees, on December 31st, 1927.


PRECIPITATION
INVERMERE, B.C
1927
average 14 yrs
3 in.
2 in.
1 in.
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
300 hrs
200 hrs
100 hrs
SUNSHINE
INVERMERE, B.C.
1927
average 14 yrs



ANIMAL HUSBANDRY

HORSES

At the end of the year there were fourteen head of horses and colts on the Station, on the Windermere area and three light horses on the Invermere area. They consist of the following: One registered Clydesdale stallion, three registered Clydesdale mares, three grade Clydesdale mares, four grade geldings, and three filly foals (one registered and two grades).

MANAGEMENT

As all the horses are used in active work on the farm no experimental feeding has been undertaken. Good timothy and alfalfa hay is used as a roughage. In addition horses at work receive crushed oats and a small ration of bran. Mature animals at work take about 2½ tons of hay and 3,500 pounds of grain during the year. Horses not at work during the winter run out on the stubble areas and receive a light hay ration. In-foal mares are regularly worked or exercised up to foaling, and in addition to the regular hay and grain ration they receive on the 1st and 15th of every month, commencing with October, one-eighth ounce of potassium iodide (a level teaspoonful) in the drinking water. This treatment, during the past few years, would seem to have exerted a beneficial prophylactic action as regards joint ill.

BREEDING OPERATIONS

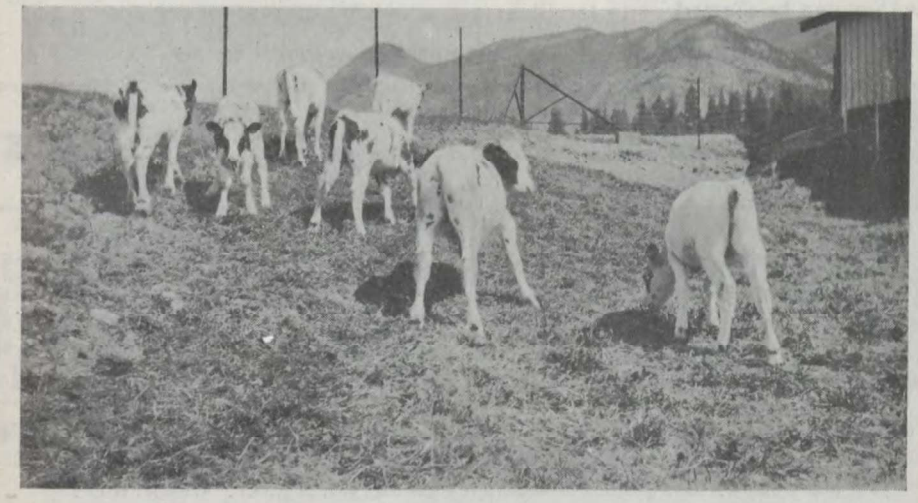
The Clydesdale stallion in use at the Station is "Indian Head Rex," eight years of age, and raised on the Indian Head Experimental Farm. He is sired by "Scotlands Bluebell," imp., by "Scotland Yet." His dam is "Moselle," imp., by "Everlasting." His breeding therefore is of the best. Unfortunately he is not made use of to the extent that his individuality and breeding would warrant.

Five of the Station mares were bred, but only three proved to be with foal. They gave birth to three filly foals on April 15, 22 and 27 respectively. The mares were kept under good sanitary conditions and at birth the navel cords of the foals were tied and thoroughly disinfected. Later they were treated with navel ill bacterin. They have developed particularly well although the dams were worked half of each day throughout the season.

CATTLE

The Ayrshire herd at the end of the year numbered 22 head, made up of two herd sires, six cows, four two-year-old heifers, two yearling heifers, six heifer calves, and two bull calves. During the year two bull calves were disposed of, while a junior herd sire from the Central Experimental Farm, Ottawa, reacted to the tuberculin test and was slaughtered. The herd again passed a clean test under the accredited herd system. The production of the herd has been well maintained during the year, all cows and heifers being put on R.O.P. as they freshened.

This year's lot of calves are from the herd sire, "Ottawa Lord Kyle 22nd" —87607—. They are particularly typey and growthy individuals, and most of the calves to be dropped this coming season will be by the same sire. It is the policy of the Station to distribute high-class bulls and an occasional female at reasonable prices, and preferably to parties purchasing pure-bred sires for the first time. This policy tends to develop the breeding of high-grade dairy cattle, and does not materially interfere with sales of private breeders, but rather encourages the breeding of pure-bred stock and opens up new markets for the breeders.



A breedy lot of calves sired by the senior herd sire, Ottawa Lord Kyle 22nd.

HERD MANAGEMENT

The Ayrshire breed is well adapted to agricultural conditions throughout eastern British Columbia. Speaking generally, the pastures are comparatively poor, usually consisting of the open range or a rough hilly portion of the farm unsuited to cultivation. Under these conditions the Ayrshires will undoubtedly make a better showing than the other dairy breeds. The Ayrshire is a good forager. This character is no doubt inherited from the early ancestry that originated in the hills of Scotland. On this account Ayrshires will make a good living where other breeds may fail. The pasture on the Windermere area last season consisted of rough hillside, but 30 acres of pasture land were seeded down and a very fair stand obtained, so that another season the pasture should be greatly improved. To overcome the lack of pasture soiling was practised and this system of producing succulent fodder, cutting and hauling and feeding in a limited area, may help towards the keeping of more cows on the small farms of the province. The crops used can vary considerably and can extend over a comparatively long period. It may consist of cuttings of clover and alfalfa, sweet clover, fall-sown rye, spring-sown grains, mixture of oats and peas, peas or sunflowers. If there is sufficient silage to carry over the summer months this may form the bulk of the ration. Grain is regularly fed to the cows that have freshened or are freshening, also to the young stock, as in the early stages of growth the cheapest gains can be made. In the winter the ration largely consists of sunflower silage, alfalfa hay and grain mixture. Some roots are fed, but the silage is the main succulent fodder. From 25 to 35 pounds of silage and roughly 10 pounds of hay are fed daily. The grain ration is fed at the rate of 1 pound of meal mixture for every 3½ pounds of milk produced. This varies slightly according to the individuality of the cow and the stage of her lactation period. Dry two-year-olds and dry cows are cheaply wintered on silage and hay. The meal mixture is made up of bran 100 pounds, oat chop 100 pounds, barley chop 50 pounds, oilcake 50 pounds, 1 per cent iodized salt, and 2 per cent of steamed bone meal. The iodized salt has had a beneficial result in keeping down goitre, while the bone meal has supplied the mineral content to the ration.

The calves are removed from their dams as soon as born and raised on whole milk for the first six weeks or two months and are then gradually changed over to skim-milk and fat substitutes. They are fed grain and alfalfa as soon as they can be started.

RECORD OF COWS AT INVERMERE STATION IN 1927

Number and Name of Cow	Age at commencement of test	Number of days milking	Production		Average per cent fat
			Milk	Fat	
			lb.	lb.	
Lady Nancy's Skylark—76693	7	304	11,356	522	4·6
Lady Nancy of Eden 4th—54139	12	305	10,049	432	4·3
*Ottawa Merry May—76065	6	305	9,395	390	4·15
*Grandview Edith 3rd—95498	2	305	8,825	370	4·19
*Flavia 2nd E.—73564	7	301	9,642	360	3·73
*Invermere Lady Nancy—93188	2	305	7,131	317	4·45
Ottawa Dunlop Blossom—76064	6	303	6,914	283	4·1
Invermere Skylark—86909	3	305	5,154	232	4·5
Totals	.....	.....	68,466	2,906	.....
Averages	.....	.....	8,558	363	4·25

*The above animals have qualified to date during the past year in R.O.P. (Honour Roll).

SWINE

Yorkshire is the only breed kept at the Station and it is undoubtedly the most popular bacon breed in the country at the present time. The demand for young breeding stock has been extremely brisk, and a ready sale has been found for all stock. The increased interest in dairying has no doubt stimulated the hog industry. The district however is capable of carrying many more pigs than it is doing, as at the present time the district is not supplying its own needs, while the Province as a whole only supplies about a third of its requirements. The majority of the pigs in the district are Yorkshires, and the success of the pig clubs in recent years has had a big influence in popularizing this breed.

The Station is endeavouring to distribute outstanding boars and sows at reasonable prices in order to encourage the industry. On account of sales of young stock no feeding experiments have been undertaken. Some work with fall and spring litters is under way, but to date fall litters have been found more difficult to raise and do not respond to the feed as do spring litters.

At the end of the year were on hand 2 boars, one at Windermere and one at Invermere, and for community service, 4 brood sows, one young sow and five feeders.

SHEEP

A small flock of pure-bred Hampshires, ten shearling ewes and a ram lamb, were obtained in September from the E. P. Ranch at High River, Alberta. The ewes are all from imported dams, eight being sired by Herriard Goldmine 13, imp. —4263—, and two by Prince Major, imp. —4282—. The ram is from Princeton Patience, imp. —4281—, and sired by Pendley Gold Fleece —7205—. Some of the ewes have been bred to Pendley Gold Fleece, and the balance have been bred to the young ram.

In selecting the Hampshire breed for this Station and district it was felt that the Station could materially assist the local sheepmen by being able to supply them with outstanding rams to use in their flocks which consist largely of grade Oxfords.

Foundation flock of shearling Hampshire ewes.

While each of the down breeds has its own peculiar excellencies, the Hampshire combines constitution, size, hardiness, ability to withstand rough treatment, excellence of fleece, strength and vigour of lambs, motherly qualities of ewes, docility and marked prepotency when crossed with other breeds of sheep. It is the heaviest of the down breeds, mature rams weighing up to 300 pounds and ewes up to 225 pounds. It matures early and is becoming increasingly popular in the spring market. The ewes breed well and yield an abundance of milk. It feeds up readily and carries a thick fleshy body of prime mutton. The fleece runs from 8 to 10 pounds of unwashed wool, in some cases on a par with the smaller down breeds. In the fall of 1928 there will be a limited number of ram lambs to dispose of. These rams should find a ready sale and should materially improve the offspring from the grade flocks in the district, both in early maturity and fleshing qualities of the lambs, as well as in an improvement of the grade of wool.

FIELD HUSBANDRY

The yields of all field crops have been very satisfactory and in most cases have been above the average. All hay crops including alfalfa, grass and clover mixture and pea-oat hay have yielded at the rate of over five tons per acre. Potatoes were just about normal, while peas have given very heavy yields. "Lincoln", a garden pea, produced 12½ bushels on a quarter of an acre.

ROTATIONS

Four rotations have been carried on at the station. These rotations were commenced with the idea of finding the most profitable crops for the district, of maintaining soil fertility, chiefly humus, and of finding out which was the most suitable rotation of crops. Since these rotations have been under test for five years the results should be of general interest to the district served by this station.

The outstanding feature of these results is the profitableness of certain crops, namely potatoes, peas and alfalfa. As might be expected those rotations (A and D) made up chiefly of these crops show the largest net profit over the five-year period.

In calculating the profit or loss from the various rotations the following values were used:—

COST VALUES

	$
Rent of land and irrigation charges per acre	9 75
Manure, spread on land, per ton	2 00
Wheat per bush	2 00
Oats per bush	1 00
Peas per bush	3 00
Potatoes per ton	45 00
Sunflowers per 100 pounds	15 00
Alfalfa per 100 pounds	55 00
Western rye grass per 100 pounds	10 00
Red clover per 100 pounds	42 00
Alsike clover per 100 pounds	30 50
Teamster per hour	0 35
Manual labour per hour	0 33
Single horse per hour	0 15
Machinery per acre	2 85
Twine per pound	0 25
Threshing per bush.—Wheat and peas	0 15
Oats	0 10

RETURN VALUES

Hay per ton	$ 20 00
Wheat per bush	1 50
Wheat straw per ton	2 00
Oats per bush	0 75
Oat straw per ton	4 00
Peas per bush	2 50
Pea straw per ton	4 00
Potatoes—commercial—per ton	25 00
Potatoes—small—per ton	7 00
Silage per ton	6 65

All cost of production figures are calculated per acre. Owing to the limited area available for rotations the plots at Invermere are either half or quarter-acre in extent.

Rent.—The amount of rent is obtained by charging the value of the land with the current rate of interest as obtained on first mortgages and to this is added the amount of taxes per acre. Irrigation changes are also included under this heading.

Manure.—Manure is given a value of $2 per ton, $1 for the manure itself and $1 for spreading. The cost of manure is distributed over the different crops in the rotation, the first crop being charged with from 40 to 50 per cent. The remaining charge is distributed proportionately among succeeding crops.

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 against a crop includes only that required to complete the work under average farm conditions and includes all work required in growing, harvesting and storing the crop.

Horse Labour.—The rate for horse labour includes cost of feed, interest on value of the horse, depreciation on value of the horse and harness, and the value of the manual labour required to take care of the horse.

Machinery.—The charge for farm machinery covers interest and depreciation on the machinery used on the average farm. For silo filling machinery a fair rental is charged against the silage crop.

Threshing.—The charge per bushel for threshing is representative of the price charged in the district.

Alfalfa, Clover and Grasses.—When the seeding does not fail the charge for this seed is distributed equally to each hay or 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.

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

Miscellaneous.—The cost of seed, twine, etc., is the actual cost in the district. The return values used are those of the district generally.

ROTATION "A"

First year—Alfalfa.
Second year—Peas.
Third year—Potatoes—manured, 16 tons per acre.
Fourth year—Wheat.

ROTATION "A"—FOUR YEARS

Rotation Year	Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit per acre	
		1927	Average five years			1927	Average five years
				$	$	$	$
1	Alfalfa	5·3 tons	4·6 tons	106 00	28 85	77 15	65 08
2	Peas	53·8 bush.	44·3 bush.	142·90	49 72	93 18	75 11
3	Potatoes	14·8 tons	16·1 tons	319 60	213 51	106 09	177 55
4	Wheat	3·4 tons of hay	27·1* bush.	51 00	44 03	6 97	6 63
	Average per acre			154 87	84 03	70 85	81 09

* 3 years average.

In rotation "A" alfalfa is left down more or less permanently, while the other three crops are rotated each year. The alfalfa may be ploughed up and another plot sown at any time that seems advisable. The plot may get killed out by grasses, winter killed, or it may just be desired to use this plot which has been improved by the growing of alfalfa for the other three crops. The hoed crop keeps the land reasonably clean and manure applied at 16 tons per acre to the hoed crop together with the occasional ploughing up of the alfalfa plot maintains very well the fertility of the land.

Rotation "A" shows the highest profit per acre of the four rotations. This is due to the growing of three profitable crops and to the large percentage of land devoted to potatoes. This rotation could be used to advantage in mixed farming and under these conditions part of the hoed crop land should be devoted to sunflowers for silage. When it is desired to increase the quantity of hay the land devoted to grain could be put down to an annual hay such as peas and oats. The potato and pea crop, unless it was desired to grind the peas for feed, would bring in a very handsome cash return.

ROTATION "B"

First year—Potatoes.
Second year—Oats—manured, 12 tons per acre.
Third year—Wheat.
Fourth year—Clover and grasses—6 pounds red clover, 4 alsike, 6 western rye grass, 4 orchard grass, and 4 meadow fescue.
Fifth year—Clover and grasses.
Sixth year—Peas—manured, 12 tons per acre.

ROTATION "B"—SIX YEARS

Rotation Year	Crop	Yield per acre		Value of crop, 1927	Cost of production, 1927	Profit per acre	
		1927	Average five years			1927	Average five years
				$	$	$	$
1	Potatoes	16 tons	*14·6 tons	371 20	215 01	156 19	98 86
2	Oats	60·6 bush.	66·3 bush.	55 10	53 11	1 99	10 48
3	Wheat	35·4 bush.	30·4 bush.	56 50	42 57	13 93	8 63
4	Clover and grasses	5·9 tons	3·8 tons	118 00	38 84	79 16	42 85
5	Clover and grasses	5·0 tons	3·7 tons	100 00	43 56	56 44	39 86
6	Peas	43·3 bush.	40·5 bush.	117 45	48 95	68 50	65 49
	Average per acre			136 37	73 67	62 69	44 36

* Three-year average.

Rotation " B " shows the smallest profit per acre of the four rotations, and at present it is not in favour as a profitable rotation. The two grain crops are not profitable, and clover and grasses have not yielded as well as alfalfa over five years.

ROTATION " D "

First year—Sunflowers.
Second year—Peas—manured, 12 tons per acre.
Third year—Potatoes.
Fourth year—Oats—manured, 12 tons per acre.
Fifth year—Alfalfa.
Sixth year—Alfalfa.

ROTATION "D"—SIX YEARS

Rotation Year	Crop	Yield per acre		Value of crop, 1927	Cost of production, 1927	Profit or loss per acre	
		1927	Average five years			1927	Average five years
				$	$	$	$
1	Mixture of sunflowers, peas and oats	10·6 tons	.....	70 67	73 79	−3 12	29 85
2	Peas	50·7 bush.	38 bush.	250 56	55 79	194 77	132 84
3	Potatoes	16 tons	15·8 tons	364 00	206 02	155 98	160 91
4	Alfalfa	5·5 tons	.....	106 00	28 85	77 15	48 87
5	Wheat	38 bush.	.....	61 40	44 80	16 60	4 23
6	Wheat	40 bush.	.....	64 40	45 10	19 30	37 30
	Average per acre	.....	.....	152 84	76 06	76 78	69 00

Rotation " D " is similar to rotation "A". The land devoted to alfalfa is left down more or less permanently, while the other four crops are rotated from year to year. For the most part the remarks on rotation "A" apply to this rotation. It will be noticed, however, that the proportion of hoed crop is larger, while that of peas is less. The possible land in hay is the same.

This is considered a suitable rotation for dairying. There would be a good supply of succulent crops and hay, while the potatoes would make a good cash crop. Following the hoed crop the peas could be grown as a seed crop. This has been done on this plot, the garden variety, " Lincoln ", having been grown very profitably.

With the three foregoing rotations nothing has been mentioned about pasture. Early pasture is best taken care of by utilizing the rough land which is quite plentiful on most farms. For summer pasture it is advisable to seed some irrigable land to a permanent pasture mixture as outlined for the fourth year of rotation " B ". This will be ready when the early rough pasture has burned up. The second and third crops of alfalfa and clover may be pastured when it is not desired to use them for hay.

ROTATION " J "

First year—Annual hay—2 bushels oats, 1 bushel peas.
Second year—Potatoes.
Third year—Oats—manured, 12 tons per acre.

ROTATION "J"—THREE YEARS

Rotation Year	Crop	Yield per acre		Value of crop, 1927	Cost of production, 1927	Profit per acre	
		1927	Average five years			1927	Average five years
				$	$	$	$
1	Annual hay	5·4 tons	.....	108 00	41 05	66 95	45 37
2	Potatoes	11·3 tons	14·1 tons	235 70	193 67	42 03	134 27
3	Oats	118 bush.	80·3 bush.	109 30	50 20	59 10	15 51
	Average per acre	.....	.....	151 00	94 97	56 03	65 05

Rotation " J " is hardly a suitable rotation for this district. The large profit per acre is due to one-third of the land being planted to potatoes each year. This would only be possible on a farm specializing in potatoes, and even then it is doubtful whether it would be wise to grow potatoes on the same ground every third year. The proportion of land devoted to grain is too large, as it will be seen that the average profit on oats is much less than that on the other crops.

RETURNS AND COST OF PRODUCING FIELD CROPS

Several factors must be taken into consideration in deciding which crops are most profitable. Two of the most important of these are, total value of yield, and cost of production per acre. To secure a large total value per acre large yields of crops which the market demands must be grown. Potatoes, peas and alfalfa are such crops for this district. Climatic conditions are quite suitable for the production of large yields of the crops, and normally good prices can be obtained. The profitableness of a crop is also dependent on economy of production. Every device must be used to keep the cost of production as low as possible. In this connection increased yields is of the most importance since nearly all the operations required in the production of a crop are the same whether the crop be large or small. The total cost of production should always be taken into consideration. The following table shows the difference in financing the growing of the crops mentioned above:—

FINANCING OF CROP PRODUCTION

——	Cost of production, average five years	Profit per acre, average five years
	$	$
Potatoes, rotation "A"	226 75	177 55
Peas, rotation "A"	48 09	75 11
Alfalfa, rotation "A"	26 92	65 08

RETURNS AND COST PER ACRE OF PRODUCING POTATOES—ROTATION "A"

——	1927	Average 1923-27
	$	$
Rent and irrigation	9 75	9 75
Manure	16 00	14 40
Commercial fertilizer	5 58	27 16
Seed	42 30	47 18
Machinery	2 85	2 94
Manual labour	48 53	65 11
Horse labour	14 10	14 70
Digging	44 40	43 20*
Sacks	30 00	35 30†
Total cost per acre	213 51	226 75
Yield per acre	14·8 tons	16·1 tons
Value per acre	$319 60	$404 29
Profit per acre	106 09	177 54
Cost per ton	14 42	14 10

* Average 1926-27. † Average 1924-27.

RETURNS AND COST PER ACRE OF PRODUCING FIELD PEAS (PRUSSIAN BLUE)—ROTATION "A"

——	1927	Average 1923–27
	$	$
Rent and irrigation charges	9 75	9 75
Manure	6 40	5 21
Seed	9 00	6 75
Machinery	2 85	2 94
Manual labour	9 30	11 60
Horse labour	4 35	5 18
Threshing	8 07	6 64
Total cost	49 72	48 07
Yield per acre—Grain	53·8 bush.	44·3 bush.
Straw	2·1 tons	2·3 tons
Value per acre—Grain	$134 50	$113 90
Straw	8 40	9 28
Total value	142 90	123 18
Profit per acre	93 18	75 11
Cost per bush. (considering value of straw)	0 87	1 04

RETURNS AND COST PER ACRE OF PRODUCING ALFALFA—ROTATION "A"

——	1927	Average 1923–27
	$	$
Rent and irrigation	9 75	9 75
Machinery	2 85	2 94
Manual labour	12 56	10 73
Horse labour	3 69	3 50
Total cost per acre	28 85	26 92
Yield per acre	5·3 tons	4·6 tons
Value per acre	$106 00	$ 93 20
Profit per acre	77 15	66 28
Cost per ton	5 44	5 85

RETURNS AND COST PER ACRE OF PRODUCING CLOVER AND GRASSES—ROTATION "B"

——	1927	Average 1923–27
	$	$
Rent and irrigation	9 75	9 75
Manure	8 40	3 72
Seed	3 20	1 28
Machinery	2 85	2 94
Manual labour	13 38	11 96
Horse labour	3 62	3 90
Total cost per acre	41 20	33 55
Yield per acre	5·4 tons	3·7 tons
Value per acre	$108 00	$74 92
Profit per acre	67 80	41 37
Cost per ton	7 63	9 07

RETURNS AND COST PER ACRE OF PRODUCING OATS—ROTATION "B"

——	1927	Average 1923–27
	$	$
Rent and irrigation	9 75	9 75
Manure	12 00	7 98
Commercial fertilizer	6 99	1 40
Seed	1 50	1 88
Machinery	2 85	2 94
Manual labour	8 75	9 41
Horse labour	3 96	4 40
Threshing	6 06	6 63
Twine	1 25	1 10
Total cost per acre	53 11	45 49
Yield per acre—Grain	60·6 bush.	66·3
Straw	2·4 tons	2·1
Value per acre—Grain	$45 45	$47 21
Straw	9 60	8 32
Total value	55 05	55 53
Profit per acre	1 94	10 49
Cost per bush. (considering value of straw)	0 73	0 58

RETURNS AND COST PER ACRE OF PRODUCING WHEAT—ROTATION "B"

——	1927	Average 1923–27
	$	$
Rent and irrigation	9 75	9 75
Manure	7 20	5 10
Seed	2 00	2 60
Machinery	2 85	2 94
Manual labour	10 73	10 34
Horse labour	3 96	4 21
Threshing	5 33	4 57
Twine	0 75	0 75
Total cost per acre	42 57	40 26
Yield per acre—Grain	35·4 bush.	30·4
Straw	1·7 tons	1·7
Value per acre—Grain	$53 10	$44 97
Straw	3 40	3 32
Total value	56 50	48 29
Profit per acre	13 93	8 03
Cost per bush. (considering value of straw)	1 41	1 22

RETURNS AND COST PER ACRE OF PRODUCING SUNFLOWERS—ROTATION "D"

——	1927	Average 1923–27
	$	$
Rent and irrigation	9 75	9 75
Manure	14 40	9 60
Commercial fertilizer	7 73	1 55
Seed	5 37	2 67
Machinery	2 85	2 94
Manual labour	24 41	26 46
Horse labour	6 78	7 85
Twine	2 50	2 10
Total cost per acre	73 79	62 92
Yield per acre	10·6 tons	21·0
Value per acre	$70 67	$92 76
Profit or loss per acre	−3 12	29 84
Cost per ton	6 96	3 00

NEW ROTATIONS

In the spring of 1927 six rotations were started at Windermere (see map):—

Rotation "R"

First year—Hoed crop.
Second year—Oats.
Third year—Clover.

Rotation "S"

First year—Hoed crop.
Second year—Peas.
Third year—Oats.
Fourth year—Clover.

Rotation "T"

First year—Hoed crop.
Second year—Peas.
Third year—Oats.
Fourth year—Wheat.
Fifth year—Alfalfa.
Sixth year—Alfalfa.

Rotation "X"

Exactly the same as rotation "T" except that the plots are three acres instead of half acres in size.

Rotation "U"

First year—Hoed crop.
Second year—Peas.
Third year—Oats.
Fourth year—Wheat.
Fifth year—Alfalfa.
Sixth year—Alfalfa.
Seventh year—Alfalfa.
Eighth year—Alfalfa.

Rotation "W"

First year—Hoed crop.
Second year—Peas.
Third year—Oats.
Fourth year—Wheat.
Fifth year—Alfalfa.
Sixth year—Alfalfa.
Seventh year—Alfalfa.
Eighth year—Alfalfa.
Ninth year—Alfalfa.
Tenth year—Alfalfa.

A tentative system of fertilizing will be adopted until definite information is obtained from the fertilizer experiment mentioned under the heading of "Chemistry." The information obtained will be used in deciding the system of fertilizing to be adopted.

HORTICULTURE

VEGETABLES—VARIETY TESTS

ASPARAGUS

This vegetable does well in this district and should be more widely grown. The first cutting was made on May 5, which was rather later than in most years, and subsequent cuttings were made until June 21. After this date no grass was gathered, thus enabling the plants to build up for another year. In the spring a dressing of barnyard or chicken manure is worked into the ground, and during the summer irrigating and weeding is the only attention necessary. Palmetto is the variety grown, and from 1,000 lineal feet the season's cut was 186½ pounds. The rows are four feet apart, with plants two feet apart in the rows.

BEANS

The season here is too short to bring this crop to maturity as ripe beans, but as a green vegetable it is excellent, heavy yields of fine quality being obtained. This applies more particularly to the dwarf or French varieties. Scarlet runners show a poor yield on account of the vines being killed by early frosts. Broad beans are not seen at their best here, the soil being too light. All beans with the exception of the Scarlet Runner are sown in rows 2½ feet apart. Scarlet Runner requires 5 feet between the rows. The following table summarizes the results obtained:—

BEANS—VARIETY TEST

Variety	Source	Sown	Ready for use	Yield per 30-foot row
				lb.
Masterpiece	O–9637	June 1	Aug. 10	39¼
Yellow Eye Yellow Pod	O–1922	" 1	" 10	37½
Plentiful	Suttons	" 1	" 9	36
Masterpiece	"	" 1	" 9	34½
Int. Ch. Black Wax	O–6876	" 1	" 8	33¾
Round Pod Kidney Wax	O–1925	" 1	" 12	33
Davis White Wax	McDonald	" 1	" 9	32½
Masterpiece	Vaughan	" 1	" 10	30¾
Stringless Green Pod	Burpee	" 1	" 12	28½
Stringless Green Pod	O–5405	" 1	" 12	27¼
Ch. Dwf. Black Wax	Ferry	" 1	" 10	25½
Bountiful	A. Mtn. Seed Co.	" 1	" 12	24¼
Round Pod Kidney Wax	McDonald	" 1	" 12	24
Princess of Artois	O–9388	" 1	" 9	22½
Stringless Green Pod	Graham	" 1	Aug. 12	21
Hodson Long Pod	Rennie	" 1	Sept. 3	10½
Scarlet Runner	"	" 1	Aug. 18	31½
Broad Bean Green Windsor	Sharpe	May 12	" 26	12

BEET

Eleven strains and varieties of this vegetable were tested. Detroit Dark Red again excelled among the turnip rooted beets. Two long beets of outstanding merit are Sutton Black and Sutton Blood Red. Heavy yields of all varieties were obtained.

CABBAGE

These were sown in the open ground on May 17 in rows 2½ feet apart and the plants thinned out to 18 inches apart in the case of large varieties, and 12 to 14 inches for smaller sorts. Nineteen tests were made of the various varieties and strains, and of these Copenhagen Market and Golden Acre excelled for early work. Danish Roundhead and Ex. Amager Danish Ball Head are both good varieties for winter storing.

CABBAGE-CHINESE

Wong Bok and Pe Tsai sown on May 17 were ready for use on July 1. This forms a welcome addition to the limited variety of green vegetables at this season of the year.

CAULIFLOWER

Sown at the same time as cabbage and given the same treatment, Snowball, Danish Perfection and Extra Early Dwarf Erfurt formed nice heads the first week in August. Autumn is not ready until a month later.

CARROTS—VARIETY TEST

Variety	Source	Yield per 30-foot row
		lb.
Select Chantenay	McDonald	109
Chantenay	O–8934	95
Early Scarlet Horn	D. & F.	102
Guerande	Steele Briggs	70
Half Long Nantes	"	65

These were sown on May 17 in rows 30 inches apart. Although the yield was very good it was not up to the usual standard on account of adverse soil conditions during germination.

CELERY

This was sown on March 23 in the greenhouse, pricked off into flats on April 20 and planted in trenches in the open June 11. All blanching in variety tests is done by earthing up as needed. Paris Golden Yellow from D. & F. was very fine.

CELERY—VARIETY TEST

Variety	Source	Weight per twelve heads trimmed
		lb.
Fordhook	Burpee	10
Fordhook Emperor	Schell	10
Emperor	"	14
Golden Self Blanching	McDonald	9
Golden Self Blanching	O–3410	10
Golden Plume	Garrahus	10
Paris Golden Yellow	D. & F.	13
Easy Blanching	Garrahus	14
White Plume Graham	Graham	12
Giant Pascal	"	12

CORN

Pickaninny and Banting from the Central Experimental Farm were the only corn yielding cobs fit for use this year. The cool wet season was not favourable for this crop.

CITRON

Both Green and Red Seeded sown under glass in May and planted in the open ground in June failed to produce a crop.

ENDIVE

Moss Curled sown May 15 made good growth and blanched well under boards in early August.

LETTUCE

Seventeen varieties and strains were sown on May 16. A selection from these to meet every requirement is found in Grand Rapids and Curled Simpson, loose leaf varieties, and Earliest Way-a-head, New York Market and Hanson, head lettuce. Should a Cos be desired Trianon or Paris White Cos are recommended.

ONIONS

White Barletta, Yellow Globe Danvers, Large Red Weathersfield and yellow and red sets were again tried, but on account of maggot and the short season all could be considered failures.

PARSLEY

Champion Moss Curled sown on May 17 made good growth, giving a heavy crop of finely curled leaves.

PARSNIP

Three varieties, Tender & True, Cooper Champion and Hollow Crown were grown. Germination was slow and the season consequently shortened. The results were a lighter crop than usual.

PEPPERS

Harris Earliest, Early Giant and Hamilton Market were sown in heat on April 1 and planted in the open June 14. Only a few ripened, but a fair crop of green fruit was secured.

PEAS

Seed of nearly all varieties of peas was produced here, a great advantage when the relative merits of the different varieties are being determined. Conditions were far from ideal at the time of germination, but later in the season the weather was reasonably cool and suited peas well. Seeding took place on May 12.

PEAS—VARIETY TEST

Variety	Source	Ready for use	Green pods per 30-foot row
			lb.
Bruce (Invermere No. 1)	Invermere	Aug. 1	33
Dwarf Telephone	"	July 28	33
Kootenay (Invermere No. 3)	"	" 30	32
Invermere No. 6	"	" 29	32
Thos. Laxton	"	" 25	32
Gradus X English Wonder	Ottawa	" 22	31
Pioneer	Invermere	" 27	30
Director (Invermere No. 2)	"	" 27	29
First & Best	"	" 16	29
The Lincoln	"	" 29	27
Gregory Surprise	"	" 18	27
Prosperity	"	" 25	25
Quite Content	"	Aug. 1	24
Homesteader	"	July 29	23
Gregory Surprise X Eng. Wonder	Ottawa	" 25	23
Little Marvel	Invermere	" 25	22
Gradus X American Wonder	Ottawa	" 27	20
Rice No. 13	McMeans	" 30	20
Perfection	"	Aug. 1	20
Eldorado	Invermere	July 29	19
Manifold	"	" 25	19
Stratagem	"	Aug. 9	19
Telephone	"	" 1	18
Alaska	McMeans	July 18	18
King Edward	Invermere	Aug. 2	18
Laxton Progress	McMeans	July 29	18
Market Garden	"	Aug. 2	17
Peter Pan	Invermere	July 26	17
Sutton Excelsior	"	Aug. 1	16
British Wonder	"	" 8	16
English Wonder	Ottawa	July 25	16
Early Morn	Invermere	" 18	15
Broder Canner	"	Aug. 5	14
Laxtonian	"	July 27	12
Blue Bantam	"	" 25	11
Giant Stride	McMeans	Aug. 1	8

RADISH

Icicle, French Breakfast, XXX Scarlet Oval, Scarlet White Tip and Saxa sown on May 16 were ready for use from June 13. While all these varieties were good, XXX Scarlet Oval (Rennie) excelled.

SPINACH

Bloomsdale, King of Denmark, Princess Juliana, Victoria, Broad Flanders, Noble Gandry and Ebenezer sown on May 17 yielded heavy crops during July. Special mention is made of Princess Juliana, Noble Gandry and Ebenezer.

New Zealand spinach (Tetragonia) sown at the same time as ordinary spinach continues throughout the season until killed by frost.

SWISS CHARD

Lucullus gave an abundance of leaves and stems throughout the season.

TURNIPS

Extra Early Purple Top Milan, Early White Milan, Snowball and Golden Ball were sown on May 17. The two former were ready for use the second week in July. Snowball came in a week later. Golden Ball, the latest, carries the season for this vegetable into September. Late sowings of this vegetable for winter storage are not advocated here on account of maggot.

TOMATOES

Owing to the shortness of the season this crop is not recommended along extensive lines. For home use and local marketing however, good results may be obtained if a certain amount of care is exercised. All varieties were sown in the greenhouse on April 1, and received two transplantings before being planted in the open on June 14. The distance between the plants in the open is one foot, with the rows 2½ feet apart. All laterals are removed as soon as they appear, and the plants tied to short stakes and stopped at the second truss of fruit. Irrigation is given as needed and a surface mulch of loose soil maintained by hoeing.

TOMATOES—VARIETY TEST

Variety	Source	Date ripe	Weight per ten plants
			lb.
Avon Early	Vaughan	Aug. 25	37¼
Burbank	Burbank	" 26	35¾
Select Earliana	Moore	" 26	34½
Alacrity	O-6557	" 25	34½
Bonny Best S.S	Stokes	Sept. 1	33¾
Sparks Earliana	Ewing	Aug. 26	32¾
Pink No. 1	O-9731	Sept. 6	31
Chalk Early Jewel	S. Briggs	" 1	30½
The Canadian	McKenzie	Aug. 26	30
Bloomsdale	Langdon	Sept. 14	29½
Avon Early	Dreer	Aug. 25	29¼
Penn. State Earliana	Stokes	" 26	29¼
John Baer	S. Briggs	Sept. 6	29
L. G. B. B. No. 3	O-	" 14	28¼
Pink No. 2	O-9730	" 2	28¼
Red Rock	Langdon	" 14	27½
Alacrity X Hipper	O-9725	Aug. 23	26
Bonny Best Field Type	Stokes	" 26	25¾
Best-of-All	Suttons	Sept. 6	24¾
Jewel	Langdon	" 6	22¾
A.B.B. No. 2	O-	Aug. 25	20½
Alacrity X Early Bell	O-9729	" 22	18¾
Danish Export	Wiboltt	Sept. 14	12¼

RHUBARB

This was ready for use May 10. Invermere Giant yielded at the rate of 26½ pounds per root. D.1 and D.2 seedlings, of very fine colour, both raised here, yielded 18 and 8½ pounds per root respectively. Ruby, a highly coloured variety, raised at the Central Experimental Farm, Ottawa, gave 8¼ pounds per root.

POTATOES

This district is suited admirably for the production of potatoes for either seed or culinary purposes. At the British Columbia Provincial Potato Show local growers have secured highest honours, and this season saw the Murray Shield, the Challenge Trophy for certified seed potatoes, won outright by a grower of this district. This trophy during the five years in which it has been offered for competition has been secured by this district four times, the permanent winner having won it on three occasions.

Special attention is given to variety testing, cultural methods, rogueing for disease, etc., and breeding work. Seed potatoes distributed from the Station, and those sold to outside points, almost invariably show wonderful vigour and cropping powers. Seed sent from various parts of the Dominion is constantly under test, but it is seldom that we get seed equalling that of our own growing.

All potatoes in variety tests are grown in rows three feet apart, and the sets, approximately two to three ounces spaced one foot apart in the rows. Planting took place on May 14, and hoeing, earthing up and irrigating as needed.

With the exception of those for which the source is indicated, all the seed used in the following variety tests was produced at the Invermere Station:—

POTATOES—VARIETY TEST

Group	Variety	Yield per acre
		Tons
Green Mountain	Wee Macgregor	25½
	Bella Coola Nugget	25½
	Idaho Rural	25½
	Carman No. 1	25
	Ashcroft	24½
	Green Mountain	23
	Delaware	22½
	Gold Coin	16
Late Long	Sutton Reliance	32
	Columbia Valley Russet	27
	Burbank	21½
	Cambridge Russet	20½
	Royal Russet	20½
	Late Puritan	20½
	Netted Gem	20
	Pride of Multonomah	19½
	Agassiz Special	17
	Bishop	16½
Up-to-Date	Eureka	23½
	Bernardottes	22½
	Queensboro	22
	Up-to-Date	21½
	Toogoods Tremendous	21
	Million Dollar	23½
	Jones White	19½
	U. B. C	19
Rural	Rural Russet	20
	Sir W. Raleigh	16
Rose, Hebron, Ohio and Bliss	Manistee	20½
	Early Norther	20
	Houlton Rose	18½
	Beauty of Hebron	18½
	White Ohio	18
	Early Rose	17
	Bovee	16½
	White Bliss	15
	Bermuda Early	14½
	Bliss Triumph	14½
	Early Ohio	12½
Blues	Blue Snyder	26½
	Blue from S. America	21½
	Salad	16½
	Blue Victor	14
Various Earlies	Earliest-of-All	28½
	Epicure	28½
	Precocity	27
	Early S. George	24½
	Sharpe Express	24½
	*Mitchell Excelsior	22½
	Gold Nugget	19½
	Irish Cobbler	19½
Various Main Crop and Late	Kerr Pink	24
	King Edward	23
	Roderic Dhu	21½
	Pearl	19
	Carmacks (Source, Yukon)	18
	Sourdough "	17
	Arran Comrade (Source, Fremlin)	13

*Source of seed, McLeod.

CULTURAL EXPERIMENTS WITH VEGETABLES

POTATOES

Various cultural experiments with vegetables have been running now for five years, and the following summaries are based on the results of these.

SIZE OF SET EXPERIMENT.—Sets of 1, 2, 3 and 4 ounces have been used, planted in rows 3 feet apart and spaced one foot apart in the rows. The heaviest yields have been obtained from the larger sets, but this has not been found always to be the most profitable, as much depends on the price of seed. The conclusion arrived at is that when seed is cheap it pays to use seed 3 to 4 ounces in weight. Under normal conditions as regards price, 2 to 3-ounce sets are satisfactory. With seed at top prices, sets of one ounce may be used, but as a safeguard it should be seen that the land is in a fine state of tilth, otherwise in the case of cut seed there is the danger of the sets drying out, and a consequent reduction of crop. The land here, being of a light sandy nature, is easily brought down to seed-bed conditions, and drying out of sets is not so prevalent as on heavy clays where pulverizing is very difficult.

EXPERIMENT TO DETERMINE THE BEST DISTANCE BETWEEN SETS.—Sets of 2 to 3 ounces were planted in rows 3 feet apart. Six spacings in the row were used in this experiment, viz., 12, 14, 16, 18, 20 and 22 inches. The heaviest yields were obtained from the closer spacings. These latter also gave a run of smaller tubers. The findings are that for seed and general table stock 12 and 14 inches give best results. Where a larger potato is required, as for instance "bakers," 16 to 18 inches gives better results. The 20 to 22 inches tend to produce tubers too large and coarse, and in the case of round varieties hollow centres are abundant.

EXPERIMENT TO DETERMINE THE VALUE OF SEED FROM VARIOUS DATES OF PLANTING.—This was carried out with two varieties, Early Rose and Wee Macgregor. Plantings continued at intervals of about two weeks from early May until the middle of July. Those planted before the middle of May have suffered at times from late frosts, also from Rhizoctonia destroying the shoots. In both cases this tends to reduce the yield. Mid-May plantings give the best results as regards crop. After this there is a falling off in tonnage. The difference in yield from the plantings around mid-May, and those of early July is about four to one, and as the cost of production is about the same in either case it follows that the late-grown seed is almost prohibitive. While late-grown seed has its advantages in long season districts on account of immaturity, it must be remembered that the shortness of our season never gives over-mature seed.

SPROUTING EXPERIMENT.—Tests with two varieties, Early Norther and Wee Macgregor have been made to determine the effect of sprouted and retarded seed on earliness and yield. Sprouting was effected by placing the tubers thinly in trays in a warm building with subdued light about three weeks before planting. This resulted in the formation of strong sturdy shoots. Two to three-ounce sets of these were planted in rows three feet apart, with sets 12 inches apart in the rows. Dormant tubers of the same size were planted on the same dates. The results obtained show that sprouting forwards the crop about seven days, with an increased yield of 10 to 12 per cent. Whether this can be carried out along profitable lines must be determined by conditions prevailing for treating and the extra handling of the seed. It should be borne in mind that should the potatoes need the corrosive sublimate or other chemical treatment, this should be accomplished before sprouting takes place, otherwise the sprouts are liable to be killed.

PARSNIPS

DATES OF SEEDING EXPERIMENT.—During the five years that this experiment has been under way it has been demonstrated that this vegetable requires the longest season of growth possible here in order to secure a full crop. Hollow Crown sown as early in May as the ground can be brought into suitable condition will produce a full crop of first-class roots. Subsequent sowings show a decreasing yield. By June 1, the chance of securing anything approaching a satisfactory crop is rather remote. It is advisable therefore to get seeding done before May 20 to obtain best results.

CELERY

VARIOUS METHODS OF BLANCHING.—Five methods are practiced, namely:—

1. Planted in a bed 6 feet square with plants standing six inches apart each way.
2. Planted in a row on the level and wrapped with building paper.
3. A double row planted on the level and blanched with boards.
4. Planted on the level and blanched by earthing up.
5. Planted in trenches and blanched by earthing up.

After five years' testing of the above methods they are summarized as follows:—

No. 1. This is a failure. Does not blanch and the stems are tough and stringy. Only useful for flavouring.

No. 2. This yields nice clean celery, but it is light in weight and lacks crispness.

No. 3. Blanched poorly. Heads loose.

No. 4. Rather loose and not well blanched at the top.

No. 5. Well blanched and compact. Crisp with a minimum of stringiness. Flavour good. In every way superior to the other methods employed.

The variety used was Golden Self Blanching.

BEANS

THICKNESS OF SEEDING EXPERIMENT.—This has been undertaken with two varieties, Stringless Green Pod and Round Pod Kidney Wax. Seeds of each variety have been sown thickly in rows 2 feet 6 inches apart. When the plants were well up they were thinned so that they stood 2, 4 and 6 inches apart in the rows. Results obtained show an increased crop from the thick seeding to the extent of from 25 to 50 per cent over the thin seeding.

PEAS

THICKNESS OF SEEDING EXPERIMENT.—Three varieties have been used in this experiment, Thos. Laxton, English Wonder and Stratagem. The same methods were employed as with beans, only the plants were thinned to 1, 2 and 3 inches apart. Over the five-year period the thick seeding has shown a decided advantage as regards increased yield over the light seeding. In the case of Thos. Laxton and English Wonder the crop is nearly doubled. Stratagem also shows substantial gains although not to so great an extent as the former. Here the gain averages from 40 to 50 per cent. The intermediate rates of seeding show proportionate increases over the light.

BEETS

DATES OF SEEDING EXPERIMENT.—This crop does very well here and most varieties when full grown are too large for use as a table vegetable. Sowings have been made throughout the past five seasons at intervals of about ten days,

starting about the middle of May and continuing until early July. The early sowings grow too large for winter storing. Maximum crops of ideal culinary roots can be obtained from sowings made during the first three weeks in June. After this date results get poorer on account of poor stands occasioned by the hot weather at germination time. The variety on which this experiment has been tried is Detroit Dark Red, the most satisfactory of the turnip-rooted beets.

CARROTS

DATES OF SEEDING.—This has been followed on the same lines as those for beets and the results obtained are similar. The early sowings of carrots, however, do not grow too coarse for winter storage as is the case with beets. The reason for this is partly due to the fact that the seed is sown in drills about 3 or 4 inches wide and the plants not unduly thinned, thus ensuring a heavy crop of roots suitable for table purposes. The distance between the drills is 30 inches. This allows plenty of room for cultivating and irrigating. Chantenay has been used in this experiment.

CABBAGE

DATES OF SEEDING EXPERIMENT.—To determine the best dates of sowing for winter storage purposes, Danish Ball Head, a late variety, and Copenhagen Market, an early variety, have been used. The dates have embraced the period from the second week in May until the middle of June. The findings are that to ensure a crop of mature heads of Danish Ball Head seed should be sown as near May 12 as possible. With Copenhagen Market the last week in May or first week in June give good results. Sown earlier than this the heads become over-mature and split. These sowings have all been made in the open ground, in rows 2½ feet apart and the seedlings thinned as soon as large enough to 18 inches apart in the rows.

CAULIFLOWER

DATES OF SEEDING EXPERIMENT.—Extra Early Dwarf Erfurt has been sown in the open ground from the second week in May at intervals of about ten days until the middle of June. From the earliest sowings cauliflower may be expected to be ready for use the first week in August. Sowing at intervals will ensure a supply of this vegetable until the plants are killed by frost. It is not advisable, however, to carry on the sowings after June 15, as very few plants will form curds of value.

TOMATOES

METHODS OF PRUNING.—These experiments have been carried on to determine the best methods for the production of ripe fruit in our short-season district, and must not be taken to apply to districts where a longer season of growth and ripening prevails. Five systems have been tried out as follows:—

1. Plants stopped in the hotbed when four inches high, three shoots allowed to develop, and stopped at the first truss of fruit on each, and all laterals removed.
2. Plants stopped at the first truss of fruit and all laterals removed.
3. Plants stopped at the second truss of fruit and all laterals removed.
4. Plants stopped at the third truss of fruit and all laterals removed.
5. Plants unstopped and all laterals removed.

Three varieties, namely Alacrity, Bonny Best and Danish Export, have been used in this five years experiment. Seed has been sown on April 1, and the plants, as soon as large enough, have been pricked off into flats. Before getting overcrowded they have received another transplanting and finally planted in

the open ground around June 12. They are here set in rows 2½ feet apart with the plants a foot apart in the rows. All plants are staked when set out, and attention paid to tying, the removal of laterals and weeding as occasion demands. Irrigation is applied as needed.

A summary of the results obtained from the five methods employed follows:—

No. 1. In long seasons this yields good results, but the date of ripening is delayed about two weeks, thus defeating the object in view.

No. 2. The crop obtained by this method is very light and the time of ripening but little if any earlier than from method No. 3.

No. 3. Which gives excellent results as to time of ripening and in the weight of crop. Given what may be considered a normal season for this district all fruit carried will ripen.

No. 4. The findings of this are much the same as those on No. 3. Should the season of ripening be prolonged, the third truss of fruit adds materially to the yield. In the event of early frost, which often happens, the top truss is destroyed.

No. 5. Only in exceptionally long seasons will this outyield the former with ripe fruit, so that the extra trouble in tying and training is wasted.

In summing up the various methods of pruning the conclusions arrived at are that the plants trained to a single stem and allowed to carry two or three trusses of fruit will give the best results. If, however, three trusses are decided on it would be better to allow three feet between the rows to allow for the increased height of plants. Where a quantity of green tomatoes is required a few plants can be set out and allowed to grow naturally.

ORCHARD

Three hundred and nineteen apple trees were planted in the spring of 1927. These include varieties such as McIntosh, Rupert, Melvin, Galetta, Duchess, Melba, Joyce, Lowland Raspberry, Charlamoff, Crimson Beauty, Yellow Transparent, Wealthy, Medford, and several new sorts received from the Central Experimental Farm, Ottawa, and from the Experimental Station, Morden, Man.

Several crab varieties were planted, including Transcendent, Hyslop and new sorts from the above-mentioned farms.

The object in planting so many varieties is to find out which will be hardy for the district. The best of such hardy varieties will be recommended for the home orchard and not for commercial plantings. It has been amply shown that the climate is too precarious to make commercial apple growing a success in this district.

FRUITS

APPLE

For nearly fifteen years apples have been grown at the Invermere Station. Results obtained justify the growing of the hardier varieties for home use and local sale, but strictly commercial orchards are not advisable. Yellow Transparent, Duchess, Okabena, Dudley, Charlamoff, Pinto and Wealthy are recommended.

Of crabs, Transcendant and Hyslop yield heavy crops of fruit, the quality of which cannot be excelled.

CURRANTS—BLACK

These succeed very well here, yielding heavy crops. Of the twelve or more varieties tested for fifteen years, preference is given to Topsy, Collins

Prolific, Naples, Climax, Black Eagle and Victoria. Up to the present trouble has not been experienced with borer.

CURRANTS—RED AND WHITE

These also succeed admirably, heavy crops being the rule. Fifteen varieties have been tried out, and of these in reds Fay Prolific, Perfection, Wilder and Rankin, and in whites White Grape, Large White and White Cherry are to be preferred.

GOOSEBERRIES

Due to the ravages of gooseberry mildew Oregon Champion is the only variety with which any success has been attained. Two new varieties are under trial, but it is too early to give any definite information regarding these.

RASPBERRIES

Several varieties have been experimented with in the past. Cuthbert winter-kills badly in some seasons and is not recommended. King and Herbert are hardier and yield better. St. Regis, an ever-bearing variety, is also recommended, for although it may be top-killed during the winter and any chance of an early crop destroyed, the new growths from the base will produce a yield of fine berries up to the time of frost.

ORNAMENTAL

For decorative purposes all the local coniferous and deciduous trees are used. Good results are also obtained from the use of Russian poplar, ash, Manitoba maple, and the willow species.

HEDGES

Approximately 3,000 feet of hedges were planted on the Windermere area. The gardens are divided into areas of about one-and-a-half acres, and each area is surrounded by hedges. The varieties used were caragana, laurel-leafed willow and golden willow. Various trees and shrubs are also used in this work to demonstrate their adaptability for the purpose. The best evergreens are the Douglas fir, spruce and juniper.

FLOWERING SHRUBS

These though somewhat limited in variety when compared with the number that can be grown in more favoured climes, give highly satisfactory results when plantings are confined to the more hardy kinds. Lilacs of all varieties, Spiraeas, Philadelphus (mock orange), Tartarian honeysuckle, and the hardier roses may all be depended on to lend charm and colour in their seasons.

PERENNIAL FLOWERS

A list of the sorts which we have found to be the most satisfactory here is aster, aquilegia, campanula glomerata, delphinium, iris germanica, gypsophila, Iceland poppy, paeony, phlox decussata, pinks, pansies, audbeckia and shasta daisy.

ANNUALS, AND FLOWERS TREATED AS SUCH

These play a great part in decorative and cut flower work. During the last two years asters have deteriorated somewhat, on account of virus disease. In consequence greater attention has been given to antirrinhums. These in the intermediate and Tom Thumb sections give very fine results and are always a source of pleasure to visitors. Clarkia, cosma, datura wrightii, lobelia, marigold, nasturtium, petunia, phlox Drummondii, poppy, portulaca, salpiglossis, ten week

stock, tagetes and sweet peas may all be depended upon to make the garden gay during the summer and autumn months. These for the most part are raised under glass in the spring and planted out when the danger of frost is past.

A collection of geraniums (zonal pelargoniums) of varieties originated at the Central Experimental Farm, Ottawa, is grown in the small greenhouse for autumn and winter blooming. These are very fine and are much admired.

In an endeavour to popularize the tuberous-rooted begonias, a collection of singles and doubles is being gradually built up. These never fail to attract attention, supplying, as they do, colours and forms of bloom to satisfy the most critical.

PLANT BREEDING AND SELECTION

This branch of the work is receiving increased attention, especially as regards garden peas and potatoes.

PEAS

Three selections of garden peas, Invermere No. 1, Invermere No. 2, and Invermere No. 3, have given highly satisfactory results wherever tried out against standard varieties (see annual reports of the various Dominion Experimental Farms and Stations). Besides their heavy yielding ability these selections possess excellent cooking qualities. These seedlings are being increased for distribution, and in the near future more will be heard of them. The three seedlings mentioned above have been recently named, and will in future be known as "Bruce" (Invermere No. 1), "Director" (Invermere No. 2), and "Kootenay" (Invermere No. 3).

Another very promising seedling is the result of a cross between Lincoln and Arthur. This seedling has the fasciated character of Arthur with the wrinkled seed of Lincoln. It is very dwarf in habit, growing only 12 to 14 inches high, and is much branched. These characteristics are fixed and as the culinary properties have proved satisfactory it should be a valuable addition to the home garden where a tall pea is not desired.

Attention is also being paid to the breeding of peas for commercial canning. In view of the preference for small peas for this work, high-producing varieties with this character and of good colour are being bred. At present three of these varieties are being increased so that they can be tried out on a large scale by the canning companies.

Neither have field peas been neglected. By crossing Arthur with itself a very fine strain of Arthur has been produced with fasciation retained to the full. Two selections of field peas of early maturing habit have also been produced, and these might find a place in districts with very short growing seasons.

POTATOES

Several thousand seedling potatoes have been raised during the last five years from both hand-fertilized and naturally fertilized seed. These are rigorously tested and any not reaching a high standard, especially in disease resistance and yielding ability, are immediately discarded. About fifty seedlings were carried into the variety tests with commercial varieties this year.

RHUBARB

Two varieties of rhubarb raised here are well worthy of notice. At present these are known as D.1 and D.2. They are both highly coloured, often carrying the pigment right through the stalk, and of very fine flavour.

A batch of seedlings is raised from seed supplied by the Central Experimental Farm at Ottawa, and the best of these put under trial. Some very promising seedlings are apparent amongst them.

FLOWERS

PANSIES.—A strain of fancy pansies is being built up. The pansies are greatly admired by visitors. In order to guard against deterioration no other representatives of the genus viola tricolor are grown, thus reducing the chances of cross-pollination to a minimum. The flowers of this strain embrace all the colours found in this favourite plant, and are sometimes huge in size, attaining a diameter of four inches.

TUBEROUS BEGONIAS.—Attention is also being paid to these, and the small greenhouse filled with them is a source of enjoyment to visitors. The blooms of some of the seedling singles will measure up to 9 inches in diameter, while the doubles will equal a medium-sized paeony in size.

LILACS.—There are about a thousand seedlings of this favourite flowering shrub in their third season of development. These were raised from seed saved from all the best named varieties in our collection, and hopes are entertained of some new and desirable varieties appearing amongst them.

CHEMISTRY

In 1924 two hundred and eighty acres of land were acquired in the vicinity of Windermere. There are approximately 190 acres that have been under cultivation and irrigation. This area from the standpoint of location and irrigation is ideal for an experimental station. There is a very gentle slope to the south-west which will greatly facilitate irrigation, while the main highway from Cranbrook to Golden runs the full length of the south boundary. The soil, however, cannot be said to be in a very good state of fertility. This is due without doubt to the fact that a one-crop system had been followed by the previous owner, oats having been grown more or less continuously for the past thirty years. No effort was made to keep up soil fertility.

In 1925 the Division of Chemistry collected soil samples from this area and the report is herewith given in full.

EXTRACT FROM THE REPORT OF THE DOMINION CHEMIST FOR THE YEAR ENDING MARCH 31, 1926

The series of soils was collected in July, 1925, four samples of surface and sub-soil being taken at such points as were considered representative of the farm.

Location "A".—About 300 feet from north fence and about 300 feet from edge of oat field. Surrounding area showed an incrustation of bluish grey salts on surface.

Lab'y. No. 80867

Surface soil to depth of 7 inches, light chocolate brown silty loam, mostly silt and very fine sand with a very little clay. In air-dried condition it is loose and powdery (flour-like).

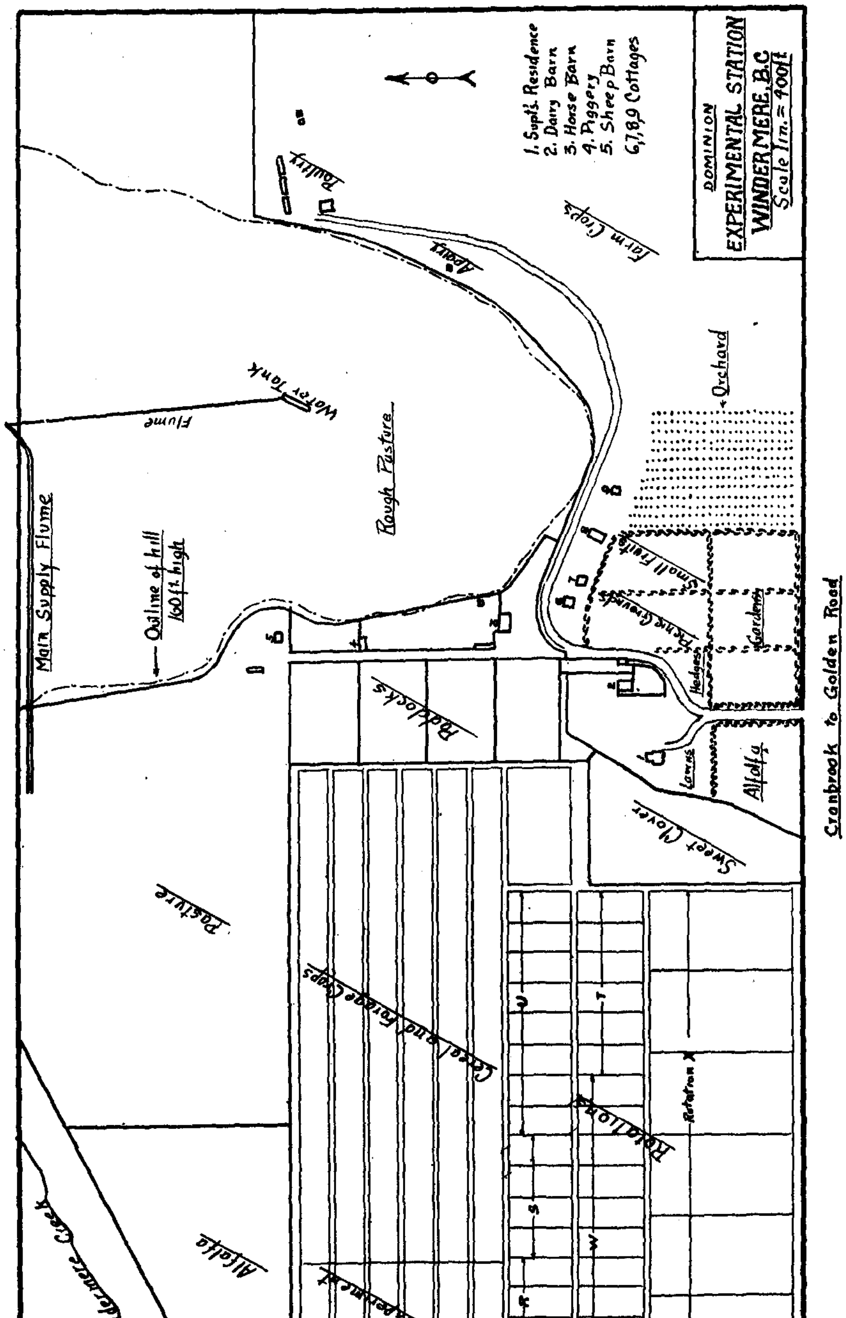
Lab'y. No. 80868

Sub-soil, depth 7 inches to 12 inches—yellowish-brown silty loam, differing from the surface soil by being of a lighter colour and containing somewhat more gravel and clay. Below 12 inches the soil contains a very large amount of coarse gravel and stones.

Location "B".—About 300 feet from west fence and in line with north end of barn.

Lab'y. 80869

Surface soil to a depth 5½ inches; light chocolate-brown silty loam, mostly silt and very fine sand; loose and powdery when air-dried.


DOMINION
EXPERIMENTAL STATION
WINDERMERE, B.C.
Scale 1in.=400ft.
1. Supt's Residence
2. Dairy Barn
3. Horse Barn
4. Piggery
5. Sheep Barn
6,7,8,9 Cottages
Farm Crops
Poultry
Apiary
Orchard
Water Tank
Flume
Rough Pasture
Main Supply Flume
Outline of hill
160 ft. high
Small Fruits
Gardens
Hedges
Paddocks
Lawns
Alfalfa
Sweet Clover
Pasture
Cereal and Forage Crops
Rotations
Rotation X
Fertilizer Experiment
Windermere Creek
Alfalfa
Cranbrook to Golden Road

Lab'y. No. 80870

Sub-soil, depth 5½ to 10 inches—yellowish-brown silty loam containing a fair amount of clay. Below 10 inches the soil is stoney and gravelly.

Location "C".—About 125 feet from the south line fence (highway) and in line with the west side of dairy barn.

Lab'y. No. 80871

Surface soil to a depth of 7 inches, light chocolate-brown, silty loam containing a slightly higher percentage of silt than the other surface soils of the series; loose and powdery.

Lab'y. No. 80872

Sub-soil, depth 7 to 12 inches—yellowish-brown silty loam containing much very fine sand. It extends to a depth of 22 inches and then changes to a gravelly and stoney loam.

Location "D".—About 100 feet west of the line between the original property of John Jones and Walter Jones, and in centre of the cleared area.

Lab'y. No. 80873

Surface soil to a depth of 5½ inches; light chocolate-brown silty loam, loose and powdery.

Lab'y. No. 80874

Subsoil, depth 5½ to 12 inches but extending to a depth of 16 inches when it changes to a gravelly and stoney loam. It is a yellowish-brown silty loam much like the surface soil but differing in colour.

Information with respect to the previous manuring and cropping of these areas was not available but the farm as a whole was thought to be more or less "run down."

PHYSICAL ANALYSIS

The method of analysis employed was that of the Bureau of Soils, United States Department of Agriculture, and furnished seven separates from fine gravel to clay. The results are given in the accompanying table.

In respect to physical characteristics—colour, texture, etc.—the four surface soils of this series are very similar. According to the United States Bureau of Soils classification which requires 50 per cent and over of silt to bring a soil into a "silt-loam" class, all these surface soils with the exception of No. 80871 would be considered as "loams". However, according to the scheme drawn up from sources both European and American and adopted by this Division some years ago, they would be classed as "silt-loams". They have been so designated in the table. The main feature of interest is that these soils consist essentially of sand (fine and very fine) and silt present practically in equal proportions.

The amounts or proportions of sand, silt, clay, etc., of the sub-soils are very similar to those of the surface, a characteristic commonly noted in semi-arid areas. Frequently, the surface soil passes almost imperceptibly into the sub-soil.

CHEMICAL ANALYSIS

The results of a complete chemical analysis of the surface soils are presented in the accompanying table: they comprise the "total" constituents as obtained from digestion with 1·115 sp. gr. hydrochloric acid (A.O.A.C. methods) and "available" phosphoric acid and potash from digestion with 1 per cent citric acid solution (Dyer method). Nitrogen determinations were made by the Kjeldahl process.

Only one sub-soil (No. 80872) was included in this part of the work; it was considered fairly representative of the sub-soils of the series.

COLUMBIA VALLEY SOILS, B.C.—COLLECTED FROM THE NEW EXPERIMENTAL STATION, LAKE WINDERMERE, B.C.

(Mechanical Analysis: Moisture-free Basis)

Lab'y No.	Location	Moisture	Loss on ignition	Gravel greater than 2 mm.	Fine gravel 2-1 mm.	Coarse sand 1--5 mm.	Medium sand ·5--·25 mm.	Fine sand ·25--·1 mm.	Very fine sand ·1--·05 mm.	Total sand	Silt ·05--·005 mm.	Clay ·005--·00 mm.	Classification
		p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	
30867 (A)	Surface soil	1·90	14·37	1·09	1·43	1·30	1·23	4·65	38·12	46·73	48·08	5·19	Silt loam.
30868 (A)	Subsoil	0·98	21·50	8·82	3·71	2·33	2·03	4·69	28·82	41·58	44·04	14·38	Silt loam.
30869 (B)	Surface soil	1·38	15·20	0·93	1·26	1·21	1·31	5·23	39·41	48·42	44·60	6·98	Silt loam, nearly sandy loam.
30870 (B)	Subsoil	0·83	15·90	1·94	0·87	0·94	0·87	3·93	36·23	42·84	40·87	16·29	Silt loam.
30871 (C)	Surface soil	1·88	14·83	0·94	1·16	0·95	1·03	4·57	30·58	38·29	55·82	5·89	Silt loam.
30872 (C)	Subsoil	0·51	17·90	0 ·58	1·34	0·97	0·66	1·93	43·68	48·58	44·76	6·66	Silt loam, nearly sandy loam.
30873 (D)	Surface soil	2·54	12·71	0·42	1·03	0·83	1·27	4·70	37·83	45·66	49·33	5·01	Silt loam.
30874 (D)	Subsoil	1·67	21·60	0 ·88	1·50	2·00	2·40	5·27	36·08	47·25	48·52	4·23	Silt loam.

COLUMBIA VALLEY SOILS, B.C.—COLLECTED FROM THE NEW EXPERIMENTAL STATION, LAKE WINDERMERE, B.C.

Chemical Analysis—On Air-dried Sample

Lab'y. No.	Location and depth	Moisture	Loss on Ignition (organic matter, etc.)	Soluble Mineral matter	Insoluble Mineral matter	Lime (CaO)	Magnesia (MgO)	Oxide of Iron and Alumina (Fe_2O_3 Al_2O_3)	Nitrogen (N)	Phosphoric Acid (P_2O_5)		Potash (K_2O)		Reaction
										Total	Available	Total	Available	
		c.	c.	c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	
	Surface Soils—													
30867	A. 0-7	2·88	7·62	19·87	69·63	5·28	0·48	8·15	0·330	0·205	0·015	0·281	0·016	Alkaline
30869	B. 0-5½	2·13	6·06	24·75	67·06	7·63	0·58	7·98	0·275	0·211	0·014	0·236	0·017	"
30871	C. 0-7	2·24	6·38	24·83	66·55	7·66	0·27	8·57	0·260	0·237	0·012	0·255	0·020	"
30873	D. 0-5½	2·91	7·84	16·76	72·49	3·86	0·28	8·51	0·330	0·208	0·023	0·230	0·029	"
	Sub-soil—													
30872	C. 7-12	0·83	2·52	40·38	56·27	15·78	1·49	9·01	0·070	0·186	0·002	0·208	0·020	"

Loss on Ignition.—This is largely organic matter; owing to the high carbonate of lime content present it possibly includes a small percentage of carbonic acid from destruction of this carbonate.

The organic matter (humus) content is fair for soils of a semi-arid district. The desirability of the up-keep of humus by manuring or green crops turned under is suggested by these data. Additions of organic matter by such methods would serve to increase the moisture-holding capacity of the soil and to maintain a satisfactory condition of tilth.

Nitrogen.—It was thought that these soils were more or less run out or exhausted by poor farming methods but the percentages of nitrogen obtained do not lend support to this impression. They compare very favourably with those of productive soils both in semi-arid and humid districts.

Phosphoric Acid.—The percentages of this element are fair but not equal to those of our best soils. In soils of average fertility the phosphoric acid usually lies between 0·15 and 0·25; very good loams contain from 0·25 to 0·3 per cent. The average for the four surface soils of this series is ·215 per cent.

In respect to "'available" phosphoric acid, as determined by the Dyer method three of the four surface soils are distinctly low, the data indicating that phosphatic fertilizers would give a profitable return. The fourth sample (No. 80873) appears to be sufficiently well supplied with this element in an available condition for present crop requirements.

Potash.—Though all the soils of this series may be considered as coming within the limits tentatively set for good soils, viz., 0·25 to 0·5 per cent, they are not rich in potash. The probabilities are that applications of potassic fertilizers for certain crops, e.g., farm roots, would be profitable.

The data for the " available " potash would indicate that a good proportion of the total is more or less assimilable by crops.

Lime.—All these soils are marked by a high carbonate of lime content—a characteristic feature of soils of the semi-arid districts.

Alkali.—Careful examination has shown freedom from all injurious alkali; there is no reason to fear "rise of alkali" on this land under irrigation.

Drainage.—Gravelly and stoney soil underlies the surface soil at depths varying from 10 inches to 22 inches and ensures adequate drainage—a desirable feature for farming under irrigation.

FERTILIZER EXPERIMENT

It will be noticed from the foregoing report that the soil is fair in nitrogen, but rather low in phosphorous and potassium. The upkeep of humus by ploughing in green crops or barnyard manure is recommended.

With these points in mind an experiment was planned to find out which system of fertilizing will give satisfactory crops and at the same time improve the fertility and humus content of the soil.

In this experiment a four-year rotation of potatoes, peas, oats, clover will be grown under three systems of fertilizing, namely:—

1. Fertilizers plus manure.
2. Fertilizers with a green crop turned under.
3. Fertilizers alone.

Within each system there will be seven different treatments of commercial fertilizers. These are listed below:—

System 1.—

Nitrogen, phosphoric acid, potash and manure.
Nitrogen, phosphoric acid and manure.
Phosphoric acid and manure.

Nitrogen, potash and manure.
Nitrogen and manure.
Phosphoric acid and manure.
Potash and manure.

System 2.—This is exactly the same as system 1, except that instead of applying manure a green crop will be turned under.

System 3.—Similar to system 1, but no manure is used and no green crop is turned under.

The above experiment is to be conducted in duplicate and, including check plots, will take up two hundred and forty one-hundredth acre plots. From the great variety of treatments which are included it is hoped that definite results will be obtained which will be of much value to farmers in the district. This experiment was commenced in 1927. Clovers were seeded and a green crop ploughed under preparatory to fertilizing in 1928.

"INFLUENCE OF ENVIRONMENT" PLOT

Data on the growth and development of Marquis wheat on two plots; one irrigated and one non-irrigated, are obtained each season. Samples are sent to the Dominion Chemist for analysis and the results are correlated with meteorological records. The results of this work, which has been carried on at twenty different points in the Dominion for nearly twenty years, indicate that the excellent quality of the wheat in general of the prairie provinces is very largely due to favourable seasonal conditions which include high temperatures and absence of excessive moisture during the latter stages of the development of the grain. The wheat grown at Invermere without irrigation is extremely high in protein, while that grown with irrigation is the reverse. This investigation is of Dominion-wide rather than of local interest.

The following summarizes the results at this Station for the past thirteen years. The low yield of the non-irrigated plot clearly shows that crop production in this district without irrigation is impossible.

WHEAT—IRRIGATED vs. NON-IRRIGATED

—	Yield per acre			
	1927		Average 1915-27	
	Grain	Straw	Grain	Straw
	lb.	lb.	lb.	lb.
Irrigated	2,427	4,380	2,207	3,863
Non-irrigated	996	1,250	523*	1,213*

*Average 1913-23 and 1926-27.

SUGAR BEETS

Sugar beets from seed of approved factory varieties are grown each season and representative samples are sent to the Dominion Chemist for analysis. The following summarizes the test to date:—

	tons	lb.
Average yield for eleven years	11	666
Average per cent sugar in juice for 11 years	17·79	%
Average per cent co-efficient of purity for eight years	87·38	%

From the above figures one might be led to believe that the growing of sugar beets on a commercial scale in this district might be profitable. There are many other factors, however, to consider, and some of these are just as important as the facts mentioned above. Soil and seasonal conditions should be suitable. In this respect difficulties have been encountered at the Station

in securing a high per cent germination. This is due to the fact that the beet seed requires a plentiful supply of moisture for germination, a soil condition which is generally lacking at seeding time in the Windermere district. In some years it has been found necessary to irrigate before seeding. This practice chills the soil and is likely to cause a crust to form on the surface, which if not broken prevents a large percentage of seedlings from breaking through. A great deal of hand labour is necessary in growing sugar beets, and its cost might alone determine whether a profit or loss results. A large acreage must be sown each year to produce a sufficient quantity for the efficient running of a factory. Further, a good supply of limestone of high purity must be convenient to the factory. It will be seen therefore that the profitableness of growing sugar beets for sugar production in this district is governed by a great many factors and when considered from all angles appears to be more or less questionable.

(This section of the work was under the charge of Mr. H. Chester, and this part of the report has been prepared by him.)

CEREALS

The yield of cereals was quite satisfactory. Each year, however, it is proven (see Field Husbandry section), that the small grains are not a profitable crop in this district. Their cultivation here therefore should be limited chiefly to a nurse crop for clover and alfalfa. Peas, on the other hand, especially when grown for seed, are a profitable crop.

Variety tests of wheat, oats and barley were made again this year in quadruplicate rod row plots. Peas were tested in one-hundredth acre plots.

Wheat.—Huron and Marquis are still dependable varieties for this district.

Oats.—Victory, Banner and Longfellow are productive varieties here.

Barley.—O.A.C. 21, Hannchen and Himalayan, a hulless barley, are recommended varieties.

Field Peas.—Prussian Blue has been found to produce a heavy yield of grain, and is unexcelled as a green manuring crop. In future more attention will be paid to field peas. The number of varieties for testing has been increased, and a more rigorous system of testing will be followed. It is also planned to initiate the production of foundation seed and elite stock seed of Prussian Blue in 1928.

FORAGE CROPS

HAY CROPS

The season was particularly favourable for the growing of hay of all kinds. All alfalfa plots yielded about 5½ tons per acre, while an exceptionally good stand of clover and grasses gave almost 6 tons per acre. Peas and oats yielded nearly 5½ tons per acre.

Alfalfa is the outstanding hay crop. It is a consistently high yielder, and when established is productive for many years.

Experiments to determine the seed production possibilities of alfalfa are to be commenced soon, and from the productiveness of isolated plants there is every reason to believe that this phase is worthy of investigation.

ENSILAGE CROPS

Owing to the shortness of the season and the danger from early frosts, corn is a very uncertain crop. Consequently sunflowers are preferable in this district. Different strains of the Mammoth Russian variety have produced greatest yields. Sunflowers, however, are neither as palatable nor as nutritious as corn. With this in mind several combinations of sunflowers, peas and oats were grown in 1926. The most promising combination was tried out on a quarter of an acre this year, but the results were not as good as is desired, the yield being only 10·6 tons green material per acre. The quality of the silage however was very good. This experiment will be continued.

FIELD ROOTS

Field roots have not been found profitable in this district, due chiefly to the high cost of labour, and the difficulties encountered in growing them (see Sugar Beets).

Carrots seem to be the most productive of the roots, and when once through the ground give very little trouble. They should be planted in double rows as this has greatly increased yields.

POULTRY

White Leghorn is the only breed experimented with. The past season has been a particularly successful one as regards poultry. Good production was maintained throughout the year, and hatching and rearing records were very good. In the fall of 1927 there were over 400 selected pullets for the laying pens that were well developed and ready to give a good account of themselves. The following data show their production for the months of November and December, 1927:—

PRODUCTION OF PULLETS, NOVEMBER AND DECEMBER, 1927

—	Number of birds	Total eggs	Average per pullet	Per cent production
November	417	5,771	13·8	41·4
December	400	7,667	19·18	61·9

The egg size and colour are particularly good, and this flock should turn out some very promising hens another year to carry on the breeding work at this Station.

The principal projects under way at the present time are pedigree breeding, hatching and rearing, experimental feeding and housing and management experiments. On the new farm at Windermere our poultry area is sufficiently large to move our young stock to fresh ground each year, working on a four-year rotation. The primary object in this is to combat worm infection and disease.

The work of trap-nesting all the pullets and hens, keeping individual records, and, by a system of marking the eggs, hatching each hen's eggs in a separate compartment, leg and wing banding, each bird's identity is preserved and pedigrees established in time. Records are also kept of the size and colour of the eggs, and the best individuals are mated with outstanding males.

There is a fair demand for setting eggs and cockerels and these are distributed at reasonable prices throughout the district. There has been some

demand for day-old chicks, but the station has not started into this branch of the industry. The time to order eggs is early in the season as the orders are placed in rotation. Cockerels should be ordered in the fall as at that time a better selection can be obtained, and then the bird will be more or less acclimatized and used to his new surroundings.

HATCHING

Early hatching is essential if the birds are to be developed and ready for business by October or November. At the Station we plan our main hatch for April 15. Due to the long winters some difficulty may be experienced in getting good fertility and hatchability for hatches in March. In many cases it has been found that the eggs, while fertile, will develop to a certain stage and then die. While this may be partially due to incubation troubles, it is also due to the weakness of the germ and viability of the chick in embryo.

The following tables show the hatching results as a whole, and of hatches incubated during the later part of March and April. It will be noted that not only is the fertility better, but the hatchability is greatly improved at the latter date.

INCUBATORS

Three makes of incubators were used during the past year, namely Jubilee, Prairie State and Buckeye. The results were in the order named. Difficulty has always been experienced in keeping humidity requirements in the Buckeye machine. The following table gives in detail the results obtained from the various machines:—

SHOWING TOTAL HATCHING RECORDS FOR 1927

Farm	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number of chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for one chick hatched	Total fertile eggs for one chick hatched	Total eggs required for one chick when wing banded
Invermere	3,138	2,847	90·7	1,073	34·1	37·6	1,007	93·8	2·9	2·6	3·1

SHOWING HATCHING RESULTS FOR SETTINGS BY THE MONTH

Time set	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number of chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for one chick hatched	Total fertile eggs for one chick hatched	Total eggs required for one chick when wing banded
March 17	1,655	1,475	89·1	321	19·3	21·7	303	94·3	5·1	4·5	5·4
April 17	1,483	1,372	92·5	752	50·6	54·8	704	93·6	1·9	1·8	2·1

SHOWING HATCHING RESULTS FROM DIFFERENT MAKES OF INCUBATORS

Incubator	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number of chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for one chick hatched	Total fertile eggs for one chick hatched	Total eggs required for one chick when wing banded
Jubilee	1,035	967	93·4	550	53·1	56·7	518	94·1	1·8	1·7	2·0
Prairie State	823	743	90·2	213	25·8	28·6	199	93·4	3·8	3·4	4·1
Buckeye	1,280	1,137	88·8	304	23·7	26·7	290	95·3	4·2	3·7	4·4

SHOWING HATCHING RESULTS FROM HENS AND PULLETS

—	Total eggs set	Number fertile	Per cent fertile	Number of chicks	Per cent total eggs hatched	Per cent fertile eggs hatched	Number of chicks alive when wing banded	Per cent chicks hatched alive when wing banded	Total eggs required for one chick hatched	Total fertile eggs for one chick hatched	Total eggs required for one chick when wing banded
Hens	1,149	1,080	93·9	412	34·1	38·1	386	93·6	2·7	2·6	2·9
Pullets	1,989	1,767	88·8	661	33·2	37·4	621	93·9	3·0	2·6	3·2

REARING

The young chicks are transferred from the incubator-room to brooder-room under oil-burning hovers. The oil-burning hovers have proved more satisfactory than coal, as the quality of the coal readily obtainable makes it impossible to keep a uniform heat that will last for any length of time. Coal also has a tendency to clinker badly.

FEEDING EXPERIMENTS FOR EGG PRODUCTION

For the second year three distinct winter feeding experiments were tried out from November 1 to April 30. These experiments briefly were:—

Briefly the pens received the following treatment:—

(I) Pens 1 and 2—Beef meal vs. fish meal.

(II) Pens 4, 5, 6, 7—Roots vs. alfalfa vs. sprouted oats vs. Epsom salts.

(III) Pens 8 and 9—Snow vs. water.

Pen No. 3 was used as a control pen.

Pen No. 1.—Standard scratch grain; standard mash with 20 per cent beef meal; green feed; grit; shell, and water to drink (no milk).

Pen No. 2.—Same ration as for pen No. 1, but with 20 per cent fish meal in the mash instead of beef meal.

Pen No. 3—Standard scratch grain; standard mash; green feed, grit, shell, with milk and water to drink.

Pen No. 4.—Same ration as for pen No. 3, but only roots (mangels, etc.) given as green feed *ad lib.*

Pen No. 5.—Same ration as pen No. 3, but with dried clover leaves or alfalfa leaves given as green feed (fed in the litter in the proportion of about 4 pounds per day for 35 birds).

Pen No. 6.—Same ration as for pen No. 3, but with sprouted oats for green feed (fed in a small hopper once a day).

Pen No. 7.—Same ration as pen No. 3, but without green feed. 1½ to 2 ounces Epsom salts daily for each 15 birds (the salts dissolved in water and mixed with the wet mash).

Pen No. 8.—Same ration as pen No. 3, but without milk and water, and snow given in their place (water to be given until such time as snow is available).

Pen No. 9.—Same ration as pen No. 8, but with water given instead of snow.

The birds used in this test were very uniform, and were divided into pens of 25 each. Some interesting data were collected, and while it would not do to take these results as final, still they are suggestive and may be of interest to poultrymen. No particular reason can be given why pen No. 6, fed on sprouted oats, stood so low. The birds to all appearance were on a par with other birds. However, while they consumed the feed they failed to deliver the eggs. The higher total value of eggs in some cases is due to the fact that the price of eggs was not constant but the market price for the various months, while the production of eggs month by month also varied from the different pens. This experiment is being continued over a period of years in order to arrive at some definite conclusions.

Pen No.	Ration	Eggs laid per bird	Value of eggs	Feed cost per bird	Feed cost per dozen eggs	Profit per bird over cost of feed
			$	$	cents	$
1	Meat scrap	111	3 57	1 30	14	2 27
2	Fish meal	105	3 32	1 32	15	2 20
3	Ordinary feed	96	3 04	1 25	15·6	1 79
4	Mangels	95	3 01	1 30	16·4	2 29
5	Alfalfa	92	2 91	1 22	16	1 69
6	Sprouted oats	76	2 40	1 43	22·6	0 97
7	Epsom salts	91	2 88	1 14	15	1 74
8	Snow	88	2 78	1 26	17·1	1 52
9	Water	78	2 47	1 06	16·3	1 41

MANAGEMENT

Scratch grains consisting of equal parts by weight of cracked corn, whole wheat and oats are fed twice daily, morning and evening, at the rate of 12 to 14 pounds per 100 birds, roughly 4 to 6 pounds in the morning and 8 pounds at the evening meal. Dry mash is kept in self-feeding hoppers before the birds at all times. The mash consists of a mixture by weight of bran 100 parts, crushed oats 100 parts, shorts 100 parts, corn meal 100 parts, meat scrap 75 parts, salt 10 parts and charcoal 10 parts. Green feed in the form of clover, alfalfa or mangels is supplied to the birds, while water is constantly on hand, and at times skim-milk. The birds are regularly fed Epsom salts in a mash as needed, half a pound to one hundred hens. Naturally this ration varies to some extent with with the various experiments under way, but this is considered the regular ration. The scratch grains work out at $2.75 per hundred, and the dry mash at $2.50 per 100 pounds. Oyster shell and grit are also before the birds at all times.

PRODUCTION

The production for the past year has been very fair as the per cent monthly production for the year shows:—

Month	*Production* Per cent
November	35·3
December	42·0
January	42·0
February	51·0
March	70·0
April	72·0
May	70·0
June	70·1
July	70·7
August	62·0
September	41·0
October	10·3

Average production—53 per cent.

The highest individual record for the year was 266 eggs. While this is not particularly high as records go, still the general average of the flock is fairly high, as is shown by the following table:—

Egg Record	No. of Hens
260–269	2
250–259	2
240–249	13
230–239	19
220–229	12
210–219	13
200–209	12
175–199	38

APIARY

The past season has been a particularly good one for honey production. The bees came through the winter very well, but some loss was sustained, due to flood waters backing up and destroying some colonies. However this has been taken care of in the future as the apiary has been moved to a new site on high ground which is well protected by trees from the wind. The trees also give a fair amount of shade to the colonies. While the over-wintered colonies produced 1,005 pounds of extracted honey, or an average of 143·6 pounds, the figures for the apiary are considerably reduced, as the colonies were increased up to 20 by purchasing 3 three-frame nuclei and 10 two-pound packages. The average production of nuclei was 45 pounls of extracted honey, and from package bees 60·1 pounds of extracted honey. The package bees gave much better returns than the nuclei and cost $3.25 as compared with $7.50 the cost of a three-frame nuclei.

Apiary on the Windermere area well protected from wind with plenty of shade.

Compared with production throughout the province the apiary shows up very well. The average production for the province being 52 pounds per hive, and for the Kootenays 45 pounds per hive. The honey was of very good quality, and was put up in 4½-pound pails. Return values are figured at 20 cents per pound. In the fall 306 pounds of sugar were fed the bees, valued at $28.30. On figuring the value of increase or decrease during the year $7 is allowed per colony. This is a comparatively low value, as colonies cost from $16 to $25 when purchased in the spring.

RETURNS FROM APIARY

Year	Colonies to go into winter the previous fall	Colonies died in winter or united in spring	Colonies—spring count	Increase in colonies during season	Colonies to go into winter	Value increase or decrease compared with previous fall		Total honey produced	Average weight of honey per hive—Spring count	Highest yield from one colony	Selling price per pound	Total value of honey	Value of sugar fed during season	Net production value	
						Inc.	Dec.							Per Apiary	Per Hive
	No.	No.	No.	No.	No.	$	$	lb.	lb.	lb.	cts.	$	$	$	$
1917	12	.....	12	2	14	10	.....	975	81·25	120·0	17	165 75	38 25	137 50	11 45
1918	14	4	10	.....	10	.....	20	1,189	118·9	192·0	28	332 92	22 00	290 92	29 09
1919	10	3	7	4	11	7	.....	885	126·4	234·0	33	292 05	23 40	276 65	39 52
1920	11	2	9	1	10	.....	7	810	90·0	199·0	47	380 70	46 00	327 70	36 41
1921	10	2	8	3	11	7	.....	322	40·3	79·5	35	112 70	26 50	93 20	11 65
1922	11	6	5	4	9	.....	14	465	93·0	146·0	25	116 25	16 80	85 45	17 09
1923	9	3	6	6	12	221	.....	502	83·7	110·0	25	125 50	19 50	127 00	21 16
1924	12	.....	12	.....	12	.....	.....	1,370	114·1	150·0	25	342 50	32 02	310 48	25 87
1925	12	4	8	.....	8	.....	28	1,088	136·0	203·0	20	217 60	6 30	183 30	22 91
1926	8	1	7	2	9	7	.....	522	74·6	171·0	25	130 50	11 63	125 87	17 98
1927	9	2	7	13	20	77	.....	1,742	*	174·5	20	348 40	28 30	397 10	19 85

*This item is left out this year on account of the large number of purchased nuclei and package bees. Average production of over-wintered colonies—143·6; and of all colonies, 87·1 lbs.

NOTE.—The increase shown for 1927 was made from purchased bees.

CONTROL OF SWARMING

The method adopted at the station is to go through the brood-chambers every week or ten days and remove queen cells if present, and increase the working room of the bees. This can be done by moving or transferring frames of brood from the brood-chamber to the super or supers above. Some advocate the jumbo frame for the brood-chamber, but better results have been obtained by using a shallow super over the ordinary brood-chamber of Langstroth frames, and giving the queen the run of this. If queen cells are formed they will nearly always be at the bottom of the shallow frames and can be readily detected by raising one end of the super and glancing along the lower side of the frame. It will be found that the addition of the shallow frame will do away to a large extent with the individual examination of the frames in the lower brood-chamber. This last season the colonies were all re-queened, and with careful watching and practising the above details, swarming was controlled.

FEEDING

The Miller feeder has been used exclusively in the fall with good results. For spring feeding an ordinary honey pail with the lid punched with holes has been used with satisfactory results. The past season 306 pounds of sugar, valued at $28.30, were fed to twenty hives. This is an average of 15·3 pounds per hive, valued at $1.42 per colony. The syrup is made in the proportion of two of sugar to one of water. Good results have been obtained without using tartaric acid. The following table summarizes the results for the past eleven years:—

QUANTITY AND COST OF SUGAR FED 1917–1927

Year	No. of hives fall count	Weight of sugar fed	Average weight of sugar per colony	Total value of sugar	Value of sugar per colony
		lb.	lb.	$	$
1917	14	340	24·3	38 25	2 73
1918	10	160	16·0	22 00	2 20
1919	11	180	16·4	23 40	2 13
1920	10	200	20·0	46 00	4 60
1921	11	200	18·18	26 50	2 41
1922	9	160	17·7	16 80	1 87
1923	9	176	19·6	19 50	2 17
1924	12	296	24·8	32 02	2 67
1925	8	70	8·75	6 30	79
1926	9	148	16·44	11 63	1 29
1927	20	306	15·3	28 30	1 42
Average 11 years	.....	.....	17·95	.....	.....

GENERAL NOTES

An exhibit from the station was shown at the local fair. This consisted of background depicting various station activities, with appropriate descriptions, with models of buildings and implements; and a display of grains, vegetables and flowers. Various Dominion, Provincial and local conventions were attended, notably the World's Poultry Congress, Ottawa; Superintendents' Conference, Ottawa; Canadian Seed Growers' Convention, Victoria; the Canadian Society of Technical Agriculturists, Vancouver; the Vancouver Winter Fair and the Potato Show.

A Field Day for the Farmers' Institutes was held in August, but was not as well attended as in former years.

Articles for the press and "Seasonable Hints" have been sent out from time to time on various phases of agricultural work.

Correspondence with farmers is on the increase, and considerable literature has been distributed.

The distribution of samples has been largely confined to peas and potatoes, and a nominal mailing charge is made for this service.

During the year considerable new work was undertaken on the new area at Windermere. Six rotations under the Field Husbandry Division were got under way; while cereal and fertilizer experiments were started.

Some thousands of trees, hedges and fruit trees were set out and made good growth during the season.

New buildings included an implement shed; while the Superintendent's residence was well under way. The water mains were connected to the various buildings, and hydrants installed for fire protection.

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