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 1923

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DOMINION EXPERIMENTAL STATION, INVERMERE, B.C.

1923 REPORT OF THE SUPERINTENDENT, R. G. NEWTON, B.S.A.

SEASONAL NOTES

Meteorological records have been kept at the Station for ten years, and the following remarks as to averages relate to data obtained during those ten years. January and February were about normal months, with precipitation a little below the average. March and April were fairly normal, and although precipitation was not up to the mark, the ground was in good shape after the winter's snow. With the advent of May the rainfall increased to almost an inch above normal, and everything promised well for good crops. In June the rainfall was more than an inch above the average, and very little irrigation was necessary during that month. The weather also was warmer than usual. By the end of the month crops were in excellent condition, and the first hay crop was being harvested. During July vegetation was kept growing fairly well, and everything pointed to an exceptionally fruitful year. August and September were drier than usual, but good average yields of all cereals were obtained. October was fine and dry and root crops were gathered in under ideal conditions. November also was mild and dry. The first snowfall, a light one, did not come until the end of the month. In December the snowfall did not quite reach the average, and mild temperatures prevailed until the last day, when a sudden drop to 30 degrees below zero occurred.

METEOROLOGICAL RECORDS

Month	Temperatures F.			Precipitation				Total hours sunshine
	Mean	Highest	Lowest	Rain	Snow	Total	Average per month for past 10 years	
	°	°	°	inches	inches	inches	inches	
1923								
January	17·04	44	−19	0·21	6·8	0·89	1·10	63·1
February	13·51	48	−38	.....	6·5	0·65	0·61	129·2
March	29·52	62	4	.....	0·3	0·03	0·36	184·1
April	41·89	75	16	0·21	2·0	0·41	0·68	235·8
May	50·30	78	23	2·15	.....	2·15	1·41	214·8
June	58·54	85	35	3·03	.....	3·03	1·62	212·1
July	63·86	91	40	1·05	.....	1·05	1·28	313·3
August	60·08	91	35	0·79	.....	0·79	1·43	270·1
September	53·03	84	25	0·37	.....	0·37	1·19	246·5
October	41·33	74	9	0·60	0·5	0·65	0·71	182·9
November	27·53	47	10	0·14	1·3	0·27	0·62	28·8
December	19·93	43	−34	.....	9·6	0·96	1·00	67·5
Totals	.....	.....	.....	8·55	27·0	11·25	12·01	2,148·2

Precipitation for the six growing months, April to September, 1923, 7·8 inches.
Average precipitation for the six growing months for the past ten years, 7·51 inches.
Highest temperature recorded at the Station, 95 degrees on July 31 and August 1, 1914.
Lowest temperature recorded at the Station, −38 degrees on December 15, 1922.

ANIMAL HUSBANDRY

Practically no experimental work has been undertaken in the past with live stock, due to limitation in land and equipment. This past year two Clydesdale mares and a yearling were purchased, also four Ayrshire cows and a yearling bull. The following is a summary of the live stock at the close of the year:—

HORSES

There are eight horses on the Station, made up of the following: 1 Clydesdale Stallion rising 5 years old. This fine animal is available to breeders throughout the district; 2 Clydesdale mares; 1 yearling Clyde colt; 1 Clyde filly foal; 1 old work team; 1 single horse and driver.

The start of an Ayrshire herd at Invermere. Animals obtained in 1923.

CATTLE

A nucleus of an Ayrshire herd was obtained last summer, four pure-bred Ayrshire cows being purchased at a public auction sale, and a yearling bull privately. They are a fairly representative lot, made up as follows:—

Evergreen Maid's Belle, 54140, rising 8 years old. R.O.P. Honour Roll Record of 9,964 pounds milk, 408 pounds fat on twice a day milking. Unfortunately this animal died during the late summer.

Lassie's Pan, 61709, rising 7 years old, having R.O.P. records two years. 9,198 pounds milk, 368 pounds fat; four years, 12,649 pounds milk, 544 pounds fat, twice a day milking.

Lady Nancy of Eden 4th, 54139, rising 8 years old. Record of 9,502 pounds milk, 372 pounds fat.

Lady Nancy's Skylark, 76693, rising three years old. Freshened in August, dropping a nice heifer calf.

Invermere Skylark, 86909, heifer calf dropped August 17, 1923.

Rena's Laddie of Edenbank 13th, 84750, Male, purchased at 14 months. This young bull is by Rena's Laddie of Elkhorn, 66360, whose dam Rena Ross 3rd is considered the best member of the Rena Ross family, having a jr. 3 years old record of 13,710 pounds milk, 659 pounds fat, testing 4.03 per cent; jr. 4 years test of 16,114 pounds milk, 683.31 pounds fat, testing 4.24 per cent. She is a full sister of the World's champion 2 year-old, with a record of 17,974 pounds milk and 738.32 pounds fat.

The bull's dam, Bonalees Plum, is a large, square, deep-built Robin Hood heifer, having R.O.P. Honour Roll record of 6,925 pounds milk, 341 pounds fat, testing 4.92 per cent as a 2 year-old on twice a day milking. His grand-dam was an exhibition cow, as well as being qualified in the R.O.P.

SWINE

A Yorkshire hog and six brood sows comprise the breeding stock at the Station. They are very fine specimens of the breed. The progeny is sold for breeding throughout the district.

BUTTERMILK VS. TANKAGE AND WATER

A feeding experiment with two lots of five pigs each, all litter mates, on a ration of buttermilk vs. tankage and water, was conducted from October 6, when the pigs were taken from alfalfa pasture, until December 5, at which time the pigs were ready for market. The pens received the same grain ration, so that the difference in the results is largely due to the value of buttermilk. The following table summarizes the results of the experiment, and shows quite clearly that the lot fed buttermilk made the largest and the most economical gains, and that buttermilk at 2½ cents a gallon can be advantageously used to raise hogs.

BUTTERMILK FOR GROWING PIGS

——		Buttermilk	Tankage and water
Number of pigs in lot		5	5
Initial weight on Oct. 6, 1923	lbs.	502	586
Initial average weight	"	100·4	117·2
Final weight on Dec. 5, 1923	"	925	922
Final average weight	"	185	184·4
Number of days in experiment	days	52	52
Total gain for period	lbs.	423	336
Average gain per pig	"	84·6	67·2
Average daily gain per lot	"	8·1	6·4
" pig	"	1·6	1·3
Pounds of grain consumed	"	1,348	1,348
Value of grain	$	23·44	23·44
Gallons of buttermilk—Lot 1	gals.	416	.....
Value of buttermilk at 2½c. per gal	$	10·40	.....
Tankage fed—Lot 2	lbs.	.....	150
Value of tankage	$	.....	3·75
Total cost of feed per group	$	33·84	27·19
Amount of meal for one pound gain	lbs.	3·16	4·0
Feed cost to produce one pound gain	cts.	8·0	8·1

FIELD HUSBANDRY

Under the field husbandry division four rotations are carried on. On account of changing the length of the irrigation runs the plots were re-arranged last season. A three-year, a four-year, and two six-year rotations are practised. Potatoes and peas as cash crops have been introduced into the various rotations. However, on a large area this could be changed to hoed crops; and corn, sunflowers, mangels or turnips be grown. In basing the calculations the following values were used:—

COST VALUES

Rent of land	$ 9 75 per acre.
Manure	1 00 per ton per acre.
Manual labour	0 30 per hour.
Teamster	0 35 "
Horse labour	0 19 per hour per horse.
Machinery	3 00 per acre.
Twine	0 25 per lb.
Seeds	At cost.
Threshing—Wheat and peas	0 15 per bushel.
Oats	0 10 "

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RETURN VALUES

Hay	$ 20 00 per ton.
Wheat	1 25 per bushel.
" straw	00 per ton.
Oat	0 50 per bushel.
" straw	8 00 per ton.
Peas	00 per bushel.
" straw	00 per ton.
Potatoes	25 00 per ton.
Sunflowers	4 00 per ton.

ROTATIONS

The following summarizes the results for the various rotations:—

SUMMARIES OF YIELDS, VALUE, PROFIT AND LOSS PER ACRE

ROTATION A.—(FOUR-YEAR)

Crop	Yields in 1923	Value	Cost of production	Profit or loss (−)
		$ cts.	$ cts.	$ cts.
Alfalfa	3·65 tons	73 00	24 97	48 03
Wheat	23·3 bush.	39 62	38 04	1 58
Peas	32·4 bush.	104 76	42 59	62 17
Potatoes	16·38 tons	409 50	209 06	200 44
Average per acre		156 72	78 66	78 05

ROTATION B.—(SIX-YEAR)

Potatoes	12·43 tons	310 75	200 55	110 40
Oats	70 bush.	47 00	40 54	6 46
Wheat	34·9 "	55 62	37 10	18 52
Peas	39·5 "	127 70	43 05	84 65
Clover and grasses	2·1 tons	42 00	30 66	11 34
Clover and grasses	2·1 "	42 00	30 06	11 94
Average per acre		104·18	63 62	40 56

ROTATION D.—(SIX-YEAR)

Peas	45·3 bush.	146 30	49 22	97 08
Potatoes	12·58 tons	314 50	204 36	110 14
Oats	67·6 bush.	51 84	45 79	6 05
Sunflowers	29·09 tons	116 36	50 18	66 18
Alfalfa (First year's seeding, without nurse crop. No crop harvested)			25 12	−25 12
Alfalfa			25 12	−25 12
Average per acre		104 83	66 63	38 20

ROTATION J.—(THREE-YEAR)

Oats, seeded to clover	59·9 bush.	45 95	42 58	3 37
Clover			37 26	−37 26
Potatoes	14·36 tons	359 00	202 34	156 66
Average per acre		134 98	94 06	40 92

HORTICULTURE

VEGETABLES

The work with vegetables consists mainly in testing varieties, comparing cultural methods, originating and selecting new strains or varieties. Particular attention has been given during the past season to potatoes and garden peas.

The accompanying table, comprising most of the common vegetables, shows the amount of seed, time to plant, when to transplant in open, when ready for use, and the recommended varieties for Eastern B.C.:—

PEAS—BREEDING WORK

In 1920 fifteen selections were made from some seedling peas. These have been carefully tested against standard varieties since 1920, and five, namely, Invermere No. 1, No. 2, No. 3, No. 6 and No. 8, are now being sent to other Stations for testing. These selections this season out-yielded standard varieties, No. 8 being the highest yielder, going up to 29¼ pounds per 30-foot row.

Selection was made this year of a number of seedlings from crosses made in 1921. The following were the crosses made:—

Pioneer x Thos. Laxton.
Pioneer x Lincoln.
Reliance x Lincoln.
Reliance x Thos. Laxton.
Lincoln x Arthur.

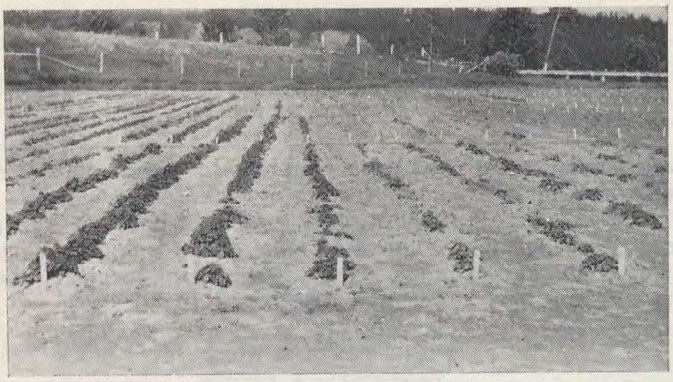
POTATOES

The importance of this crop and its adaptability and response under prevailing soil and climatic conditions have forced the Station to give it considerable time and attention. The Station has fostered a potato association in its immediate territory, and the Windermere Potato Growers' Association has received a fair share of the awards at the past three Provincial Potato shows. This publicity has considerably advertised the district.

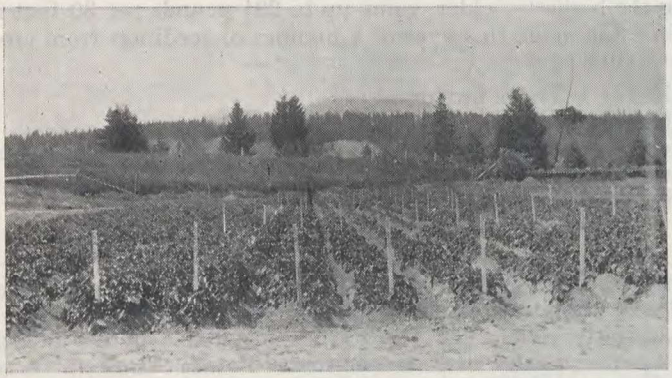
From past experiments conducted at the Station the following may safely be deduced: (1) From the middle to the end of May is the best time to plant; (2) A two-ounce set planted a foot apart in the row, and rows 2½ feet apart, has given the best results; (3) Home-grown seed has proved more vigorous and disease free than potatoes from other districts.

POTATOES—INDIVIDUAL TUBER SELECTION

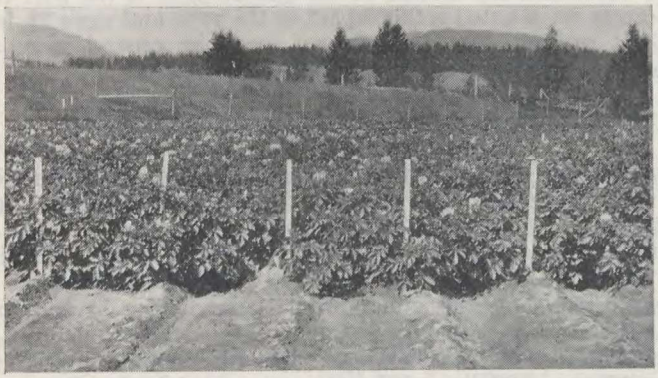
Four years ago, hill selection having failed to give the desired result, individual tuber selection was adopted. Results have been so marked that a brief description of the methods used should prove timely. The potatoes are brought out to the light about three or four weeks before planting time and allowed to sprout. Only tubers showing strong, vigorous sprouts are selected. All varieties do not show the same sprouting tendencies or characteristics, but the grower will readily learn to distinguish the strong, vigorous tubers, and to reject the weak ones. The average yield of seventeen varieties from 1916 to 1919 was 12 tons 602 lbs, while the average yield for the succeeding four years was 28 tons 175 lbs, or an increase of 124 per cent. Not only were the yields increased, but disease was eradicated or held in check.



Variety tests of potatoes. Photo taken June 16. Note the difference in vigour of the various stocks of Gold Coin in the immediate foreground.



Same as above but taken on June 29.



Same as above but taken on July 23. Note the rapid growth, and vigorous and healthy appearance of the vines.

POTATOES—VARIETY EXPERIMENT

Seventy varieties and stocks of seed were planted on May 18, a foot apart in the rows and the rows 30 inches apart. Two to three ounce sets were planted about 5 inches in depth. Disease was present to some extent, especially in certain varieties. Leaf Roll was present in some of the new introductions, but practically absent in the older varieties. Scab and rhizoctonia were present, and reduced the yields to some extent. The crop was harvested on October 1. There is often as much variation between stocks of the same variety from different sources as between different varieties. From this it would appear that more attention should be given in searching out high productive stocks of the varieties for dissemination to the growers. Up-to-date (Invermere) was the highest yielding variety this season, going up to 41 tons 1,664 pounds to the acre. Members of the Green Mountain group stood high as regards yield, but are liable to scab badly. Cambridge Russet, or Netted Gem, while not so high in yield, produces a good, clean crop of potatoes that are readily marketed. Rural Russet, a russet type of Sir Walter Raleigh, gives promise of being a valuable variety for the district.

POTATOES—COST OF PRODUCING AN ACRE

The cost of producing an acre of potatoes, as shown by results obtained in our rotation plots, is as follows:—

—	Rotations			
	A	B	D	J
	$ cts.	$ cts.	$ cts.	$ cts.
Rent of Land	9 75	9 75	9 75	9 75
Manure	8 00	0 60	4 80	2 40
Fertilizer	69 50	69 50	69 50	69 50
Seed	42 50	50 00	50 08	48 96
Manual Labour	62 80	56 00	55 45	56 95
Horse Labour	13 49	11 50	11 78	11 78
Machinery	3 00	3 00	3 00	3 00
Total cost	209 06	200 35	204 36	202 34
	Tons	Tons	Tons	Tons
Yields of Potato crops	16·38	12·43	12·58	14·36
	$ cts.	$ cts.	$ cts.	$ cts.
Value	409 50	310 75	314 50	359 00
Profit per acre	200 44	110 40	110 14	156 66

POTATOES—TREATING THE SOIL WITH CHEMICALS TO COMBAT SCAB AND RHIZOCTONIA

It is now being realized generally that treating the seed tubers with formalin or corrosive sublimate is no insurance against scab or rhizoctonia, as these organisms are present in the soil. The obvious method is therefore to treat the soil with applications of toxic physical or chemical agents. It is necessary not to disturb the delicate balance in the soil and make it unfit for plant growth. For the past three years tests have been made with certain volatile chemicals in sterilizing or fumigating the soil. Results to date, while suggestive, are not by any means conclusive, and further work is planned. This past season crude carbolic acid and pacolin in various strengths, applied at planting and also at hilling up, were tried out. The effect of air-slaked lime on these organisms was also undertaken.

POTATOES—BREEDING WORK

The seedlings retained from last year were tried out, and many were discarded. One of the seedlings is very promising. It is a shallow-eyed oval variety with finely russeted skin. The haulm is semi-dwarf in character; flowers white in colour, many double or semi-double.

About a thousand fresh seedlings were raised this year, largely from self-fertilized Cambridge Russet. At harvest time some of these yielded over 6 pounds of tubers per hill, and the largest tubers were over a pound in weight. Many of these were retained for testing.

This year a successful cross was made with one of the promising seedlings and the Rural Russet.

LIST OF VEGETABLES RECOMMENDED FOR THE EAST KOOTENAY DISTRICT

Vegetable	Seed required	When to plant or sow	No. of days germinating	When to plant in open	When ready for use	Varieties recommended
Beet	1 oz. per 50' of row.	At intervals of two weeks from May 15 to June 25.	15		End of July.	Detroit Dark Red, Crosbye Egyptian, Eclipse, and Cardinal Globe.
Beans (Dwarf and Scarlet Runner).	1 lb. per 75' of row.	June 1	12		Aug. 1	Masterpiece, Davis Wax, Pencil Pod Black Wax, Bountiful, Plentiful French Scarlet Runner.
Beans (Broad or Windsor).	1 lb. per 40' of row.	May 15	14		July 15	Seville Long Pod, Green Windsor, Harlington.
Cabbage (Early)	1 oz. per 200' of row, to stand where sown.	May 15	10		Aug. 5	Copenhagen Market and Early Jersey Wakefield.
Cabbage for winter storing.	" "	May 15	10		End of Sept. and on.	Amager Danish Ballhead.
		June 2 and June 12.	7		End of Sept. and on.	Copenhagen Market.
Cauliflower	1 oz. per 200' row	May 15 and June 1.	10		Early August to end of season.	Early Dwarf Erfurt and Snowball.
Cucumber		May 15 in hot bed.	5	June 15	Middle of Aug.	Early Russian, Davis Perfect.
		June 1 in open	10 to 15		End of Aug.	
Corn	1 lb. per 120' of row.	June 1	10 to 12		Middle to end of August.	Picaninny, Sweet Squaw, Kloochman, Malakoff.
Carrot	1 oz. per 100' of row.	May 15 to June 1	12 to 14		Middle of July and on.	Early Horn, Chantenay, Garden Gem.
Celery	1 oz. to raise 2,500 plants.	April 1 in hot-bed.	14	June 10	End of August	White Plume, Golden Self Blanching, Easy Blanching, Evans Triumph.
Lettuce	1 oz. per 150' of row.	May 1 to July 1.	5 to 12		End of June and on.	Grand Rapids, Simpson, Cos, Hanson, Earliest Wayahead, Giant Crystal Head.
Onion	1 oz. per 50' of row.	May 15	16			White Barletta (for pickling) White Welsh (for green onions); (Onions on the whole unsatisfactory).
Peas	1 lb. per 150' of row.	May 8 to June 5.	8 to 14		Mid- July to end of season.	Gregory's Surprise; Thos Laxton; American Wonder The Lincoln; English Wonder; McLean Advancer; Stratagem.
Parsnip	1 oz. per 150' row	May 8	14		End of Sept.	Hollow Crown; Cooper Champion.
Parsley	1 oz. per 90' of row.	May 8	21 to 30		July	Champion Moss Curled; Triple Curled.
Potatoes	1,400 to 2,200 lbs. per acre.	May 10 to 25	3 weeks		From Aug, 10.	*Early*—Early Ohio: Early Rose: Early Norther: Irish Cobbler; Jersey Royal. *Main Crop*—Wee McGregor; Gold Coin: Sir W. Raleigh; Rural Russet; Green Mountain; Cambridge Russet (Netted Gem).
Pumpkin	1 oz. per 30 hills	June 1	10		September	*Small Sugar*: Connecticut Field; Mammoth.
Radish	1 oz. per 90' of row.	At intervals from May 8.	6 to 12		From Early June.	Scarlet Oval; Scarlet White Tip; Icicle.
Spinach (Smooth seeded).	1 oz. per 60' of row.	As soon as ground permits, and at intervals.	7 to 14		Middle of June and on.	Victoria Brown Leaf Flanders.

LIST OF VEGETABLES RECOMMENDED FOR THE EAST KOOTENAY DISTRICT—*Continued.*

Vegetable	Seed required	When to plant or sow	No. of days germinating	When to plant in open	When ready for use	Varieties recommended
Spinach Prickly)..	1 oz. per 30′ of row..	May 8.....	14 to 21...	.....	July to end of season.	New Zealand.
Squash and Vegetable Marrow.	1 oz. per 30 hills.....	June 1.....	10 to 14...	.....	Mid-August and on.	Long White and Long Green Marrows; Hubbard; Golden Hubbard and Scallop Squash.
Tomato.....	1 oz. per 1,200 plants	April 1 (hotbed)	7 to 12....	June 15....	Early August until frost.	Alacrity; Earliana; Chalks Jewel; Bonny Best; Danish Export.
Turnip (Garden)..	1 oz. per 150′ of row.	May 8 and at intervals.	6 to 12....	.....	From early July.	Red Top Strap Leaf; Ex. Early White Milan; Early Snowball; Golden Ball.

FLOWERS, TREES AND SHRUBS

FLOWERS (ANNUALS)

A great many varieties and strains of annuals are tried out each season. Most of them are started under glass and set out early in June. There is a good profusion of bloom until the flowers are cut by autumn frosts. The following are some of the most satisfactory:—Asters, Antirrhinum, Clarkia, Cosmea, Datura, Lobelia, Linaria, Marigold, Nasturtium, Petunia, Phlox, Poppy, Portulaca, Salpiglossis, Stocks, Sweet Peas, Tagetes, Zinnia and Pansy.

HERBACEOUS PERENNIALS

Perennials are being used more and more in home and garden decorations, as less time and labour are needed than with annuals. The following have been thoroughly tested and are able to withstand the severe winters. This past year they made a very fine showing, there being a succession of bloom from May to freeze-up:—Perennial Asters, Aquilegias, Campanulas, Delphiniums, German Iris, Gypsophila, Iceland Poppy, Paeonies, Phlox, Pinks, Sweet William, Rudbeckia and Shasta Daisy.

HYACINTHS

Four varieties—Robt. Steiger, King of the Blues, Queen of the Pinks and Rousseau—were tried during the last season, but were poor in quality.

NARCISSUS

The following varieties were planted in the fall of 1922 in the shrubbery border, and gave a succession of bloom through May and June:—Emperor, Empress, Golden Spur, Sir Watkin, Madam de Graaff, Barri Conspicuous, Poeticus Ornatus, Van Sion, Grand Monarque, Soleil d'Or, Grand Primo and The Pearl.

TULIPS

Twenty-one varieties of tulips from Holland, and from the Experimental Station, Sidney, B.C. were tested last year. The varieties from the Sidney Station were equal to the Holland-grown bulbs in quantity and quality of bloom. The bloom was exceptionally fine this season, lasting throughout May and June. The following varieties were tested: La Merveille, Picotte, Inglescombe Yellow, Isabella, Gesneriana Spathulata, La Candeur, Golden Crown, Bouton d'Or, Mrs. Moon, Fulgns, Orange King, Fairy Queen, Moonlight, John Ruskin, Caledonia, The Fawn, Gesneriana Lutea, Hobbema, Macrospeila, Rose Pompom and Sunset.

HEDGES

A number of hedges have been tested during the past few years, particular attention being given to the native material. The spruce, juniper and Douglas fir hedges are good, but grow slowly. Of the deciduous hedges that mature more quickly the following are recommended: Laurel Leaved willow, Common Lilac, Dogwood and Caragana.

TREES AND ORNAMENTAL SHRUBS

The district is largely coniferous, but Willow, Poplar, Cottonwood, Ash and Manitoba Maple will make quick growth. Among the flowering shrubs, Syringa vulgaris in its named varieties, Syringa villosa and Syringa amurensis do exceptionally well. Of the spireas, Arguta possibly makes the best showing, but Van Houttii and Intermedia are to be depended upon. Other shrubs that have done well are Lonicera tatarica, Caragana arborescens, Caragana pygmæ aurantiac and Clematis graveolens. Some of the hardier roses do very well and make a very bright showing. Capt. Hayward does exceptionally well.

CEREALS

The season of 1923 on the whole was quite favourable for cereals. The months of May and June had about twice the usual rainfall, which helped out considerably with the irrigation. The months of July, August and September were below the average in rainfall. Variety tests were continued with wheat, oats, barley and peas. The yields from field peas this year were somewhat lower than usual. This crop however is a promising one for the district.

SPRING WHEAT—VARIETY EXPERIMENT

Huron, Marquis and Ruby wheat were tested the past season. Huron proved the highest yielding variety. It is however not as good a milling wheat as either Marquis or Ruby. Marquis fell down in yield this season for some unknown reason. Ruby is similar to Marquis, but is from a week to ten days earlier. Districts that are subject to early frosts would be well advised to give this variety a trial. The plots were sown on April 30:—

SPRING WHEAT

Variety	Date ripening	Number of days maturing	Average length of straw	Strength of straw scale of 10 points	Yield of grain per acre
			inches		lbs.
Huron Ottawa 3	Aug. 26	118	48	10	2,900
Ruby Ottawa 623	" 18	110	43	9	2,680
Marquis Ottawa 15	" 26	118	43	10	2,560

OATS—VARIETY EXPERIMENT

Four varieties of oats were tried out the past season. Banner, a main crop oat, again had the highest yield. Alaska and Iowa, two early oats, ripened at the same time, the former out-yielding the latter. Liberty, the hulless oat, produced a very good crop this year. The plots were sown on May 5. The following summarizes the results:—

OATS—VARIETIES

Variety	Date ripe	Number of days maturing	Average length straw	Strength of straw scale of 10 points	Yield of grain per acre
			inches		lbs.
Banner Ottawa 49	Aug. 20	107	48	10	4,000
Alaska	" 12	99	40	8	2,960
Iowa (U.B.C.)	" 12	99	37	8	2,740
Liberty Ottawa 480	" 26	115	40	8	2,080

BARLEY—VARIETY EXPERIMENT

Four varieties were grown the past season. Chinese Ottawa-60 is replacing Ottawa 50. Himalayan is a black hulless barley, giving very good yields, and should make an excellent feed barley. Success is a beardless barley. It does not yield as high as some of the varieties and has a tendency to break off at head and shatter. It is better however in this respect than Gold.

BARLEY—VARIETIES

Variety	Date ripe	Number of days maturing	Average length of straw	Strength of straw scale of 10 points	Yield of grain per acre
			inches		lbs.
Chinese Ottawa 60	Aug. 15	104	43	10	3,400
Himalayan Ottawa 59	" 14	103	28	8	2,960
Gold Ottawa 2	" 20	109	33	8	2,500
Success Ottawa 6	" 14	103	40	8	2,480

FIELD PEAS—VARIETY EXPERIMENT

Field peas are one of the outstanding crops for the district. The crop will give excellent returns as a grain, as a green feed, or as a soiling crop, either alone or with oats. As a silage crop, alone or with oats, or with oats and vetch, it gives good returns. Lastly, it is a legume, and ideal for ploughing under and adding humus to the soil. The yields this year are lower than usual. The plots were sown on May 1. The following table summarizes the results:—

PEAS—VARIETIES

Variety	Date cut	Average length of straw	Yield of grain per acre
		inches	lbs.
Prussian Blue	Sept. 3	72	3,400
Mackay	" 3	66	3,400
Chancellor	" 3	77	2,920
Maple	" 3	70	2,640
Solo	" 3	78	2,520
Arthur	" 3	72	2,520

FORAGE CROPS

The season was very favourable for forage crops. May and June were comparatively wet months, and practically no irrigation was required until the

latter part of June. The hay crop was above the average this season. Alfalfa as a permanent crop is being increased throughout the district. It should be sown at the rate of 12 to 15 pounds to the acre, preferably without a nurse crop. It is usually well established the first season, and the following year two or three cuttings may be obtained. The third cutting in some cases is difficult to cure and might be ensiled where a silo is available. From past experience red clover is not hardy, possibly due to going into the winter with the soil too dry. This has been overcome to some extent by arranging to have irrigation water a month later in the fall. Alsike clover seems to be hardier than the red. A mixture of red clover, 10 pounds, western rye grass, 4 pounds, orchard grass 4 pounds, and meadow fescue 4 pounds, is giving excellent results in the rotations. Hubam, the annual sweet clover, has been grown for three years. This season it was sown when the red clover had winter-killed, and later ploughed under as a green manure. An excellent growth was made.

INDIAN CORN—VARIETY TEST

Seventeen varieties were planted on May 29, and harvested on September 19. The corn was in rows 2½ feet apart, and was cultivated and irrigated as required during the season. Quebec 28 was the highest yielder this season, going up to 25 tons to the acre. The following varieties are recommended: Longfellow; Leaming; North Western Dent; Wisconsin No. 7; Compton's Early; Quebec 28; and Yellow Flint Maine.

MANGELS—VARIETY TEST FOR YIELD AND PURITY

Nineteen varieties or stocks were sown on May 12. For some unknown reason the stand this season was very patchy, and the results entirely unreliable for experimental work. Germination seemed to be satisfactory, but certain portions of the row came to a standstill, making no growth for five or six weeks. Irrigation seemed to have no effect on the growth. Sugar beets, turnips and carrots on the same ground, and accorded similar treatment, progressed satisfactorily.

MANGELS—SEED TREATMENT TO INCREASE GERMINATION

Soaking the seed this year appeared to have no noticeable effect on germination, and made sowing more difficult.

CARROTS—VARIETY TEST FOR YIELD AND PURITY

Seventeen varieties or stocks of carrots were tried the past season, being sown on May 14, and harvested on October 17. They were thinned on June 29 to three inches apart in the rows, and cultivated and irrigated as required during the season. Ewing's Sugar Intermediate White was the highest yielding variety this season, closely followed by White Belgian, White Vosges, Long Red Surrey, and Danish Champion.

SWEDES—VARIETY TEST FOR YIELD AND PURITY

Thirteen varieties from various sources were sown on May 14, and harvested on October 20. On June 30 they were thinned to 8 inches apart. They made good growth throughout the season, and were harvested in good condition. Hartley's Bronze Top, (Bruce), gave the highest yield, going over 35 tons to the acre. It was closely followed by Magnum Bonum, Good Luck, Jumbo and Canadian Gem.

SUGAR BEETS—VARIETY EXPERIMENT

Seed from four sources was sown on May 12, and harvested on October 16. The plants were thinned to six inches apart late in June and received irrigation

as required. The Chatham strain proved the best yielder, and the highest in the percentage of sugar in juice. It yielded at the rate of 26½ tons to the acre, and the juice tested 20·32 per cent sugar. It was followed by Henning and Harving, Kitchener and Sluice Bros. The latter only yielded 12¾ tons to the acre. The average percentage of sugar in juice of all varieties for the past nine years being 18.01 per cent.

SUNFLOWERS—VARIETY TEST FOR YIELD AND PURITY

Eight varieties of sunflowers were sown on May 27, and harvested in early September. They were planted in rows three feet apart, and cultivated and irrigated as required during the season. Mammoth Russian (McDonald) was the highest yielder, going up to 32 tons to the acre. It was closely followed by Ottawa 76, and Giant Russian.

SOY BEANS—BREEDING DESIRABLE STRAINS

A selection was made three years ago of a number of soy bean plants from seed that had been obtained from Russia. One selection, a black-seeded variety, has ripened seed here the past two years. Increase plots will be started next season, and the selection then tried out against commercial stock.

TIMOTHY—VARIETY TEST FOR YIELD AND PURITY

Eight strains of timothy were planted in plots on May 16, 1923. These made excellent growth during the season, all plots having 100 per cent stand. Next season these will be closely observed, and data collected regarding them.

WESTERN RYE GRASS—TEST FOR YIELD AND PURITY

Fifteen selections of western rye grass from Ottawa were sown on May 18, 1923. They made good growth during the season, and next season complete details regarding them will be gathered.

ANNUAL HAY CROPS

A mixture of oats, peas and vetch was tried out against a mixture of oats and peas. The former outyielded the latter. They were sown on May 7 and cut on August 2. Both the green and the dried weights were taken. The following summarizes the results:—

Mixture	Rate of sowing	Yield per Acre			
		Green		Dry	
	lbs.	Tons	lbs.	Tons	lbs.
Oats—Peas—Vetch	60, 30, 15	15	850	7	35
Oats—Peas	60, 45	13	847	5	927

POULTRY

Two breeds, namely, White Wyandottes and Single Comb White Leghorns, are kept. Trap-nesting and pedigree breeding are followed, and necessarily involve considerable detail and work. It is felt that the best way for the Station to help build up the average flock is by supplying good males backed with records of high egg production for a number of generations. It would be to the advantage of intending purchasers to place their orders early in the fall, so as to avoid being disappointed at breeding season.

HATCHING

The results this season again confirm previous experience. Early hatching, especially of the Wyandottes, is essential if the birds are to commence laying in late October or early November. The long period of confinement during the winter months has a great influence on the vitality of the germ and the viability of the chick. In June, 93 per cent of the eggs were fertile, and over 70 per cent hatched. In April, 79 per cent of the eggs were fertile, but very poor hatches were obtained.

INCUBATORS

Three makes of incubators were tested, namely, Buckeye, Prairie State and Cyphers. The Buckeye gave the best results, and the Cyphers slightly better results than the Prairie State. The Buckeye is a 600-egg machine and consumes 1½ quarts of kerosene daily. The Prairie State and the Cyphers, having capacities of 200 and 150 eggs respectively, each consume a quart of kerosene daily. The Buckeye gave better hatches and at a lower unit cost.

BROODING

Oil-burning brooders were used exclusively last season, and gave satisfactory results. Comparing them with the small coal brooders under local conditions, a more satisfactory temperature can be maintained with the oil burners. One of the great difficulties with the small coal brooder is to obtain satisfactory fuel, although where good anthracite coal is available they should give satisfactory results.

HOUSING

The poultry houses consist of two laying houses, five breeding houses and one brooder house, also two colony houses and an administration building. The laying houses are 16 feet by 32 feet, and 16 feet by 48 feet, and are divided into two and three pens respectively, each pen holding 50 mature birds. These are known as "Farmers' poultry houses," and are built according to plans in Bulletin 87 on Poultry House Construction. The front is one-third boards, one-third glass and one-third cotton. A big feature is the straw loft with slatted ceiling. This affords good ventilation and also absorbs moisture. These houses are giving satisfaction and are highly recommended. The breeding and colony houses are of various sizes and have a shanty roof. Later in the season the breeding houses are used to divide pullets from cockerels. The administration building is a log and frame structure, the upper portion being used as poultryman's quarters, and the basement as feed and incubation room.

TURKEYS

The few turkeys kept last year made a good showing. Over 100 poults were hatched, and there were 83 nice birds in October. Quite a few of these were sent to other farms, and the balance were fed and sold for the Christmas and New Year's trade.

BEES

The past year was on the whole unfavourable for the beekeepers throughout the province. This is manifest by the returns from the various districts. While the Station results are not quite up to normal, they are considerably ahead of many districts this season. The winter of 1922-23 was extremely cold, and the lowest temperatures ever recorded at the Station were registered, the thermometer going down to 38 degrees below zero. This prolonged cold snap was undoubtedly a hard one on the bees, and three colonies out of nine

were lost. May and June were very wet months and the bees did not make much headway until July. During July and August it was extremely dry, so that the honey flow was comparatively short.

RETURNS FROM APIARY

From six colonies, spring count, 502 pounds of honey were taken, an average of 83·7 pounds. The greatest yield from one colony was 110 pounds. The honey was put up in 5-pound containers, and was sold at 25 cents per pound, netting $125.50. Sugar weighing 176 pounds was fed, valued at $19.50. There was no increase or decrease from the previous fall. Thus the net returns from the apiary are: $125.50 proceeds from honey, less $19.50 the value of the sugar fed, giving $106 as the net production of the apiary, or $17.66 profit per colony. The following table summarizes the results for the past seven years:—

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 of 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.	$	$	lbs.	lbs.	lbs.	cts.	$ cts.	$ cts.	$ cts.	$ cts.
1917..	12	.....	12	2	14	10	.....	908	81·25	120·0	17	192 00	38 25	163 57	13 63
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 38
1920..	11	2	9	1	10	.....	7	810	90·0	199·0	47	380 70	46 00	326 70	36 41
1921..	10	2	8	3	11	7	.....	332	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	3	9	.....	.....	502	83·7	110·0	25	125 50	19 50	106 00	17 66
1924..	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

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 past season the colonies were all re-queened, and with careful watching and by practising the above details, swarming was absolutely controlled.

WINTER PROTECTION

Nine colonies were placed into winter protection in Kootenay hive cases. Careful attention was given to the packing, and good strong colonies with plenty of feed were put away. The winter was very severe. Six of the nine colonies came through the winter in good shape, and on the first spring examination on April 23 they had an average of six frames covered with bees. On a casual examination on March 5 all the colonies were alive, and lack of stores was responsible for at least two of the losses.

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 full of holes has been used with satisfactory results. This past season 176 pounds of granulated sugar, valued at $19.50, were fed to nine hives. This was an average of 19.5 pounds, valued at 2.17 cents per hive. The syrup is made in the proportion of two of sugar to one of water. The following table summarizes the feeding data for the past seven years:—

AMOUNT AND COST OF SUGAR FED—1917-1923

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
		lbs.	lbs.	$ cts.	$ cts.
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

COMBLESS PACKAGES

Three 3-pound packages of bees with queens were purchased from California, and arrived at the Station on May 11, 1923. While the season was not as favourable as usual, these packages developed into strong colonies during the season and produced an average of 61 pounds of surplus honey per hive. In the fall these colonies were fed an average of 15⅔ pounds of sugar. The initial cost of the bees per package, with queen, was $6.75 plus the sugar fed, valued at $1.88, giving an outlay of $8.63. The return value of surplus honey at 25 cents per pound amounted to $15.25, showing a profit per hive of $6.62.

GENERAL NOTES

The Station exhibit was able to take in five fairs throughout the district the past season. It was staged at the following points: Malakwa, Trail, Fruitvale, Nelson and Creston. It was the first time the exhibit had been shown at Malakwa and Fruitvale. In all places considerable interest was manifest in the display. Many new names were added to the mailing list, and a great deal of literature was distributed. A feature of the exhibition work is the personal contact and service that the Station is endeavouring to render throughout the district.

At the local Windermere District fair, a display of farm stock, comprising Clydesdale horses, Ayrshire cattle and Yorkshire swine was made.

Material from the Station was forwarded to the Experimental Farms exhibit at the Provincial Fair, Vancouver.

At the Provincial Potato Show at Victoria an attractive potato display from the Station was arranged. In this connection the Station has given considerable assistance to the local Potato Growers' organization.

Many conventions, and local meetings of the Agricultural Association, Farmers' Institute, and Potato Growers' organization were attended by the Superintendent.

Various articles of timely importance were contributed to the Press, and the departmental publication "Seasonable Hints."

A small stereoscopic lantern has been added to the Station equipment, also a fine set of slides depicting the work carried on. This has been found an excellent way of presenting our work in an interesting way to the public.

The Station is attracting an increasing number of visitors from year to year, and the outside correspondence is increasing. Many hundred reports, bulletins, circulars, etc., are distributed through the mail each season.

The sending out of samples is confined largely to varieties of potatoes. A charge of 50 cents per sample is made to cover the cost of the parcel postage. This is an excellent way for the farmer to get a small stock of seed true to name and variety, and as disease-free as possible.

EXPERIMENTAL PROJECTS UNDERWAY AT THE EXPERIMENTAL STATION AT INVERMERE, B.C.

ANIMAL HUSBANDRY

PROJECT NO.	TITLE
A. 194.	Economy of steer feeding.
A. 216.	Establishing a herd of dairy cattle.
A. 160.	Cost of rearing pigs to weaning.

FIELD HUSBANDRY

F. 4.	Three-year rotation—Potatoes; oats; clover.
F. 19.	Four-year rotation—Potatoes; wheat; peas; alfalfa.
F. 43.	Six-year rotation—Sunflowers; peas; alfalfa; alfalfa; potatoes; oats.
F. 44.	Six-year rotation—Peas; potatoes; oats; wheat; hay; hay.
F. 75.	Irrigation of farm crops.
F. 91.	Cost of producing farm crops.

HORTICULTURE

SMALL FRUITS

H. 2.	Blackberry, variety experiment.
H. 4.	Currant, variety experiment.
H. 6.	Gooseberry, variety experiment.
H. 11.	Raspberry, variety experiment.
H. 21.	Strawberry, variety experiment.
H. 33.	Apple, variety experiment.

VEGETABLE GARDENING

H. 54.	Asparagus, variety experiment.
H. 60.	Bean, broad, variety experiment.
H. 61.	Bean, bush, variety experiment.
H. 65.	Beet, different dates of sowing.
H. 68.	Beet, variety experiment.
H. 69.	Borecole, variety experiment.
H. 70.	Brussels sprouts, variety experiment.
H. 72.	Cabbage, different dates of sowing.
H. 77.	Cabbage, variety experiment.
H. 83.	Carrot, variety experiment.
H. 312.	Cauliflower, different dates of sowing.
H. 88.	Cauliflower, variety experiment.
H. 90.	Celery, blanching experiment.
H. 94.	Celery, variety experiment.
H. 313.	Chicory, variety experiment.
H. 102.	Corn, variety experiment.
H. 106.	Cucumber, variety experiment.
H. 107.	Egg Plant, variety experiment.
H. 314.	Endive, variety experiment.
H. 110.	Kohl Rabi, variety experiment.
H. 112.	Leek, variety experiment.
H. 116.	Lettuce, variety experiment.
H. 122.	Melon, musk, variety experiment.
H. 125.	Melon, water, variety experiment.
H. 127.	Onion, autumn versus spring sowing.
H. 132.	Onion, method of controlling maggot.
H. 138.	Onion, variety experiment.
H. 140.	Parsley, variety experiment.
H. 145.	Parsnip, variety experiment.

PROJECT NO.	TITLE
H. 315.	Pea, breeding for new varieties.
H. 147.	Pea, breeding for yield.
H. 316.	Pea, rate of seeding.
H. 153.	Pea, variety experiment.
H. 157.	Pepper, variety experiment.
H. 164.	Potato, different sizes of sets.
H. 165.	Potato, distances of planting.
H. 174.	Potato, home-grown vs. northern or eastern-grown seed.
H. 317.	Potato, seed end vs. stem end for seed.
H. 179.	Potato, seed treated chemically vs. not treated.
H. 318.	Potato, uniform vs. rough for seed.
H. 186.	Potato variety experiment.
H. 192.	Radish, variety experiment.
H. 194.	Rhubarb, forcing.
H. 195.	Rhubarb, variety experiment.
H. 197.	Salsify, variety experiment.
H. 319.	Sea Kale, forcing.
H. 199.	Spinach, variety experiment.
H. 201.	Squash, variety experiment.
H. 203.	Swiss Chard, variety experiment.
H. 207.	Tomato, methods of training.
H. 211.	Tomato, variety experiment.
H. 214.	Tomato, variety experiment.

ORNAMENTAL GARDENING

H. 261.	Annual flowers, variety experiment.
H. 274.	Herbaceous perennial, variety experiment.
H. 275.	Hyacinth, variety experiment.
H. 278.	Narcissus, variety experiment.
H. 290.	Tulip, variety experiment.
H. 298.	Hedges, variety experiment.
H. 307.	Trees and Shrubs, ornamental and shelter, variety experiment.

CEREALS

Ce. 1.	Common spring wheat, test of varieties or strains.
Ce. 5.	Oats, Test of varieties or strains.
Ce. 6.	Barley, test of varieties or strains.
Ce. 7.	Field Peas, test of varieties or strains.
Ce. 94.	Barley, test of varieties for hay and grass.

FORAGE PLANTS

Ag. 1.	Indian corn, variety tests for ensilage purposes.
Ag. 16.	Mangels, variety tests for yield and purity.
Ag. 18.	Mangels, seed treatment to increase germination.
Ag. 36.	Carrots, variety tests for yield and purity.
Ag. 51.	Swedes, variety tests for yield and purity.
Ag. 76.	Sunflowers, variety tests for yield and purity.
Ag. 117.	Soybeans, breeding improved strains.
Ag. 201.	Timothy, variety tests for yield and purity.
Ag. 241.	Annual hay crops, variety tests for yield and suitability.
	(*d*) Mixtures, variety tests for yield and suitability.

CHEMISTRY

C. 10.	Sugar beet investigation.
C. 11.	Agricultural meteorology.

POULTRY

P. 1.	Best make of incubator. (Tamlin, Prairie State and Cyphers).
P. 3.	Best date for incubation.
P. 12.	Hatching results by breeds. (W.L., B.R. & W.W.)
P. 13.	Hatching eggs vs. day old chicks.
P. 18.	Best type of brooder.
P. 22.	Brooding costs, Exp. (A) Feed costs.
P. 31.	Rearing costs.

PROJECT NO.	TITLE
P. 41.	Comparison of breeds for roasters (B.R., W.W. & W.L.).
P. 42.	Methods and rations for fattening and finishing roasters.
P. 56.	Pedigree breeding for egg production.
P. 111.	Breeding for fertility, hatchability and livability. Exp. (*a*) Hens vs. pullets.
P. 119.	Breeding value of 325-egg hen.
P. 121.	Climate suitable for turkeys.
P. 122.	Open shelters for turkeys on range.
P. 124.	Fertility and hatchability of turkey eggs.
P. 125.	Mortality of turkeys.
P. 126.	Cost of fattening turkeys.
P. 148.	Profits from poultry flocks.

APIARY

Ap. 3.	Control of swarming by periodic destruction of queen cells.
Ap. 8.	Wintering in 4-colony cases.
Ap. 10.	Wintering in single colony cases.
Ap. 11.	Comparison of different stores for wintering.
Ap. 20.	Returns from apiaries.
Ap. 28.	Study of honey flows.

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