DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

SUMMERLAND, B.C.

REPORT OF THE SUPERINTENDENT

R. H. HELMER

FOR THE YEAR 1921

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1922

EXPERIMENTAL STATION, SUMMERLAND, B.C

REPORT OF THE SUPERINTENDENT, R. H. HELMER

THE SEASON

The season of 1921 opened with a fairly early spring following an exceedingly mild winter. The soil was well supplied with natural moisture and during the second half of April there were frequent showers which gave seeds a good start. To take full advantage of this favourable condition seeding was started early, and all small seeds germinated well. Showers continued throughout June and irrigation water was plentiful. July, although not excessively hot, was very dry, no rain falling during the month except on July 25, .12 inch, and on July 26, .22 inch. This came in the shape of violent hail storms lasting but a short time and was useless to growing crops, doing much more harm than good. The supply of irrigation water at this time was very irregular and it became necessary to exercise extreme conservation, applying the water only where most needed, and some crops had to suffer. It was not until August 17 that a rain occurred which was of real value. On that date .56 inch fell, but the damage had been done. Irrigation water grew less and less, our last supply being on August 29. September and October were very dry, precipitation amounting to .39 inch and .25 inch respectively, all coming in small showers. Heavy frost came by the middle of November, the mercury going as low on the 19th as 2 degrees above zero. This was hard on trees, there being no snow on the ground. Snow fell on November 21, but this did not lie long, and during the greater part of the winter, in which has occurred the longest and steadiest cold on record, at no time has there been any depth of snow. The frost penetrated the ground to a greater depth than has ever been known before in this district. A large proportion of the domestic water system of the municipality was frozen, and for many weeks on this Station we were hauling water for all purposes.

A summary of the meterological records for this Station for the year 1921 follows:

METEOROLOGICAL RECORDS FOR SUMMERLAND, 1921

Month	Temperature F.			Precipitation			Average per month for past five years	Total Sunshine
	Mean	Highest	Lowest	Rainfall	Snowfall	Total		
	°	°	°	Inches	Inches	Inches	Inches	Hours
January	29·05	54·0	12·0	0·05	9·6	1·01	0·98	68·2
February	21·14	50·0	10·0	0·03	0·8	0·11	0·47	79·6
March	38·97	62·0	19·0	0·21	5·4	0·75	0·55	157·4
April	44·85	69·0	26·0	1·13	–	1·13	0·87	175·9
May	56·15	82·0	34·0	1·30	–	1·30	0·84	294·0
June	63·60	86·0	43·0	1·90	–	1·90	0·98	225·1
July	68·45	90·0	47·0	0·34	–	0·34	0·60	342·1
August	67·92	92·0	47·0	0·98	–	0·98	0·66	284·0
September	55·21	72·0	37·0	0·39	–	0·39	0·80	170·2
October	48·95	70·0	26·0	0·25	–	0·25	0·72	153·1
November	34·865	55·0	2·0	0·56	10·5	1·61	1·101	63·5
December	24·21	49·0	-3·0	1·37	1·4	1·51	1·209	56·1
Total for year	–	–	–	8·51	27·7	11·28	–	2,069·2
Average for 5 years	–	–	–	6·67	31·1	9·78	–	1,998·7

ANIMAL HUSBANDRY

STEER FEEDING EXPERIMENTS

Projects 1 to 8.—This work is of considerable importance to cattlemen. In our other work we are testing out the dry matter and powers of drought resistance of corn and sunflowers, and this is the second year in which we have included sunflowers as a comparison against corn in cattle feeding experiments. There are many districts where spring frosts and dry farming methods have to be considered and it is of special value to these districts to know whether sunflowers compare favourably with corn in feeding value. We find sunflower silage is not as palatable to the stock as corn, although, when fed to the individual pens, the cattle clean it up as readily as they do corn silage. Roots again gave us the cheapest gains.

CATTLE FEEDING EXPERIMENT

Winter 1921-22

EXPERIMENT EXTENDING OVER A PERIOD OF 111 DAYS, NOVEMBER 25 TO MARCH 15

A total of 41 head of cattle, in four pens as follows—

Pen No. 1—No shelter. Fed sunflower silage to February 6th, and afterwards corn silage; chopped alfalfa and straw; grain 2 to 12 pounds per day.

Pen No. 2—Shelter. Fed same as Pen No. 1.

Pen No. 3—Shelter. Fed roots; chopped alfalfa and straw; grain 2 to 12 pounds per day.

Pen No. 4—Shelter. Fed corn silage; chopped alfalfa and straw; grain 2 to 12 pounds per day.

All pens fed oil cake meal February 10 to finish, ¼ to 1¼ pounds per head per day.

In the computation of the tables below the following prices have been charged: Chopped oats, $30 per ton; oil cake meal, $70; alfalfa and straw, $10; sunflower and corn silage, $8; roots, $4.

	Pen No. 1	Pen No. 2	Pen No. 3	Pen No. 4
No. of steers in pen	11	10	10	10
Weight when experiment was begun—				
Gross lb.	11,635	10,685	10,655	10,995
Average "	1,058	1,068·5	1,065·5	1,099·5
Finished weight, March 15th—				
Gross "	14,080	13,554	13,813	14,085
Average "	1,280	1,355·4	1,381·3	1,408·5
Total gain over period of 111 days "	2,445	2,869	3,158	3,090
Average gain per head "	222·2	286·9	315·8	309·0
Average daily gain per head "	2	2·58	2·85	2·78
Amount of grain eaten by group "	8,624	7,910	7,910	7,910
Amount of chopped alfalfa and straw eaten by group "	19,754	18,209	19,289	18,982
Amount of corn silage eaten by group "	12,940	15,785	.....	43,019
Amount of sunflower silage eaten by group "	32,752	26,502	.....	.....
Amount of roots eaten by group "	.....	.....	38,295	.....
Amount of oil cake meal eaten by group "	288	262	262	262
Amount of feed consumed per pound of gain—				
Grain "	3·52	2·76	2·5	2·56
Alfalfa and straw "	8·08	6·3	6·1	6·1
Silage "	18·7	14·7	.....	13·9
Roots "	.....	.....	12·1	.....
Oil cake "	·012	·009	·008	·008
Total cost of feed $	420·98	388·01	308·29	394·80
Cost of feed per head $	38·27	38·80	30·82	39·48
Cost of feed per head per day $	·344	·349	·2776	·3559
Cost to produce 1 lb. gain $	·1721	·1352	·0976	·1277
Original cost of group at 4·03c. per pound $	468·89	430·61	429·40	443·10
Original cost of group, plus feed $	889·87	818·62	737·69	837·90
Selling price at 7¼c. per lb. (3 steers in pen No. 1 and 2 in pen No. 2, at 6½c.) less 5% shrinkage $	935·87	915·21	951·42	970·12
Net gain per group $	46·00	96·59	213·73	132·22
Profit per steer $	4·18	9·66	21·37	13·23

Conclusions:—

(1) No shelter vs. shelter. Lot 2 fed under shelter made higher and more economical gains than Lot 1 without shelter, and this with the same ration.

(2) Corn silage vs. sunflower silage:—

Corn silage proved better for fattening steers than sunflower silage. Steers fed corn silage made better gains and left a bigger profit. Owing to shortage of sunflower silage it was impossible to continue this test throughout the period. After 74 days sunflower silage had to be replaced by corn silage. At the end of that period the comparative gains were:

Pen No. 1—Sunflower silage	(no shelter)	Average gain per head ..	166.6	pounds
Pen No. 2—Sunflower silage	(shelter)	" " ..	215.5	"
Pen No. 3—Roots	(shelter)	" " ..	223.0	"
Pen No. 4—Corn silage	(shelter)	" " ..	261.0	"

(3) Roots vs. silage:—

Steers fed roots made the highest gains of all groups, and left the largest profits, roots proving to be superior to either corn or sunflower silage for fattening steers.

HORSES

There are 10 horses on this Station, four teams of work horses and one team of drivers. The latter are also used on the farm when needed, especially in single horse work, cultivating in orchards and elsewhere. They range from young teams to teams that were aged when this Station started seven years ago.

No breeding work is being carried on.

SHEEP

The sheep on the Station consist of 11 pure bred Cheviots, 12 grade Oxford ewes and 5 lambs (bred), 2 Cheviot rams; and in July 14 pure bred Suffolk, consisting of 1 ram, 6 ewes, 4 ram lambs and 3 ewe lambs (bred) were purchased. Work with sheep is being greatly hampered for want of range. Ultimately it is hoped to fence in a large tract of range land which will be used for sheep and cattle. Last year the sheep were carried on as long as possible on the pasture near the lake.

GOITRE IN SHEEP

Project 73.—Goitre has caused a considerable amount of trouble in sheep throughout the interior of British Columbia. To combat this we have fed our sheep potassium iodide at the rate of 2 grains per head per day during the gestation period. The procedure was as follows:—

The local drug store made up a tincture of potassium iodide in the proportion of 1 drop equals 1 grain. This was mixed at the rate of two drops per ewe per day in the grain ration and distributed as nearly as possible so that each ewe got an equal share. We feel that this treatment has given us results which would warrant its continuance as a preventative of goitre in sheep and hairlessness in pigs. We understand for range feeding of sheep there is now a salt lick being prepared in the States with the proper amount of potassium iodide incorporated in the brick.

The results for the 1921 season were as follow: Lambs from ewes fed potassium iodide, 30; died of goitre, 2. Lambs from ewes not fed potassium iodide, 10; died of goitre, 5.

In the season of 1922 all our ewes had lambed before the end of March. From the 29 ewes we got the following:—

	Ram Lambs	Ewe Lambs	Total	Per cent
6 Suffolk ewes	7	4	11	183
11 Cheviot ewes	7	9	16	145
12 Grade ewes	4	9	13	108
29	18	22	40	138

There were no lambs from lambs bred first year.

Goitre in 1922.—This year treatment was applied in different ways, with following results.

Lot 1. In pens: 4 ewes were painted with iodine on skin, in the wool, once a week—no loss.

Lot 2. In pens: 4 ewes fed 2 grains potassium iodide per head per day—no loss.

Lot 3. In pens: 4 ewes not treated, as check—one lamb still-born which had a slight goitre, another lamb died just after birth, but no goitre.

Lot 4. On pasture: 25 ewes fed 2 grains potassium iodide per head per day. One lamb died from goitre.

SWINE

The breed of pigs kept on this Station is the Berkshire. In the spring of 1921 all the sows had hairless pigs, as follows:—

1 sow, 5 hairless—all died.
1 sow, 9, 7 hairless and died. 2 lived.
1 sow, 10 hairless and died.
1 sow, 12 hairless and died.

In the fall we had litters as follows:—

1 sow, 2 pigs.
1 sow, 12 pigs, 1 died.
1 sow, 10 pigs, 2 still born, 4 crushed by sow.

There were no signs of hairlessness in the fall litters. Those sows had been on pasture all summer and were not treated.

This spring, as a remedy against hairlessness, we have fed our sows 2 grains potassium iodide per head per day, and, to compel them to exercise, the self feeders were placed a quarter of a mile from the cabins. Out of 5 sows we have had two litters of 9 each, with no signs of hairlessness. The boar is not sure, and it is hoped to get a better one this spring. There would appear to be no doubt that the feeding of iodide has a certain action in controlling goitre in both sheep and pigs.

FIELD HUSBANDRY

Project 19.—Rotation experiment.—Systematic rotations, as undertaken on this station, were probably the first to be practised in the southern interior of British Columbia. Alfalfa, being the most productive crop to grow on our soils under irrigation, covers five of the seven years in the rotation. The rotation is giving very satisfactory results, particularly from the standpoint of assisting in building up the soils. The accompanying tables give the yields of hay and grain, together with the rate, in acre inches, of irrigation water applied.

*A seven-year rotation, consisting of one year in intertilled crops, one year in wheat and five years in alfalfa, is under trial.

YIELDS OF CORN FOR ENSILAGE

Area of Plot, 4¾ acres. Soil, light, gravelly loam. Fertilizer, 15 tons barnyard manure per acre

Variety	Planted	Harvested	Actual Yield in lbs.	Yield per acre in lbs.	Irrigation			
					Rate of application in acre inches			
					June	July	Aug.	Total
North West Dent.....	May 28	Aug. 22	64,435	13,565·26	9·09	6·22	2·67	17·98

REMARKS: Thorough cultivation after each irrigation greatly assisted in conserving the water applied to the soil for the needs of this crop. A soil mulch was maintained between irrigation periods by the timely use of the cultivator. At no time was irrigation considered to take the place of cultivation.

YIELDS OF CORN FOR ENSILAGE

Area of Plot, 2 acres. Soil, gravelly loam. Fertilizer, 15 tons barnyard manure per acre.

Variety	Planted	Harvested	Actual yield in lbs.	Yield per acre in lbs.	Irrigation			
					Rate of application in acre inches			
					May	June	July	Total
North West Dent.....	May 26	Aug. 22	49,410	24,705	3·82	5·27	8·63	17·72

REMARKS: For several years North West Dent has given excellent results as an ensilage crop at this Station. Corn is the first crop in the seven-year rotation. This is followed by spring wheat, then seeded down to alfalfa for five years. The last cutting of alfalfa is ploughed under. The following spring the soil is disced, manured, and ploughed, then packed, disced and harrowed in preparation for corn again. Alfalfa stubble will not rot sufficiently during the winter to allow of fall ploughing only; hence the need to replough again in the spring.

YIELDS OF CORN FOR ENSILAGE

Area of Plot, 1 acre. Soil, light, gravelly loam. Fertilizer, 15 tons barnyard manure per acre.

Variety	Planted	Harvested	Actual yield in lbs.	Yield per acre in lbs.	Irrigation				
					Rate of application in acre inches				
					May	June	July	Aug.	Total
North West Dent.....	May 14	Aug. 18	32,740	32,740	7·33	3·66	33·08	3·55	47·62

REMARKS: A light gravelly soil needs an abundance of water, as is indicated in the above table. A good loam soil would probably have produced the same amount of corn with one-third the amount of water. Plenty of humus-forming material, thoroughly incorporated into a light soil, will help very materially to reduce the amount of water required.

YIELDS OF MARQUIS WHEAT

Area of Plot, 5 acres. Soil, gravelly loam

Date of Seeding	Date of Ripening	No. of days Maturing	Yield of grain per acre in lbs.	Weight per measured bushel af er cleaning in lbs.	No. of bushels per acre	Irrigation			
						Rate of application in acre inches			
						May	June	July	Total
April 1.....	July 22	113	1,550	62	25·83	6·94	7·51	14·59	29·04

REMARKS: The average yield per acre over a period of five years for Marquis on test plots at this Station is 1,412 pounds. Wheat comes in the second year of the seven-year rotation. Next year the land will be seeded to alfalfa for five years. The growth which would make the last cutting of alfalfa is to be ploughed under in preparation for corn.

YIELDS OF ALFALFA HAY

Area of plot	Type of soil	Date of seeding	1921 Hay Cuttings.						Total actual yield	Yield per acre
			1st Cutting		2nd Cutting		3rd Cutting			
			Date	Yield	Date	Yield	Date	Yield		
acres				lbs.		lbs.		lbs.	lbs.	lbs.
2	Gravelly loam	May 10, 1918	June 10..	12,480	July 15...	8,660	Aug. 12....	3,880	25,020	12,510
3¼	" ..	1915	" 18..	18,360	Aug. 1...	10,460	Ploughed under	.....	28,820	7,685·33
2½.....	" ..	1920	" 15..	8,000	July 20...	7,600	Aug. 26....	3,060	18,660	7,464
1½.....	" ..	1915	" 2..	24,090	" 9...	5,630	" 11....	5,590	35,310	23,540
18.....	" ..	1915	" 17..	58,825	" 25...	45,446	" 2....	17,244	121,515	6,750·83

IRRIGATION

Rate of Application in acre inches

April	May	June	July	August	Total
.....	12·87	44·22	.....	10·97	68·06
12·07	7·75	30·02	10·82	2·77	63·43
3·88	27·42	20·44	23·1	0·44	75·28
.....	15·14	57·92	0·96	.....	74·02
1·17	12·86	9·20	5·02	2·55	30·80

REMARKS: The five fields represented in the above list are widely scattered on the Station and, although the soils are all graded "gravelly loam," they, nevertheless, include all the various types of soils from gravel to silt loam. A gravelly loam would probably be the average. The general topography of the land is high, slightly rolling, with all aspects. All fields were seeded to ordinary good, clean commercial seed of no particular variety. The third cutting of alfalfa was the last crop of the fifth year in alfalfa in the seven-year rotation. It will be noted that said crop was ploughed under with the object in view of increasing the humus and nitrogen content of the soil in preparation for corn next year, which is the first crop in this rotation. Under the existing conditions of obtaining manures and fertilizers in the Okanagan valley, this method of growing and ploughing under alfalfa in a rotation affords one of the most economical and practical means of increasing the two most important constituents needed in the semi-arid soils of southern British Columbia—humus and nitrogen. From our experience in growing alfalfa for a number of years at this Station we would recommend the seeding of alfalfa early in the spring, on a firm seed bed without a nurse crop and at the rate of twelve pounds of good clean seed

to the acre. If moisture and soil conditions are favourable, from a ton to a ton and a half of hay can be harvested the first year of sowing. The irrigation figures show the high capacity of alfalfa for water, particularly on light soils. Good crops of alfalfa can be produced, however, with much less water. Our aim is to determine what is the minimum amount of water needed on good average soil commensurate with yields.

RESULTS OF APPLICATIONS OF LIME AND MANURE ON YIELDS OF HAY FROM A PERMANENT MEADOW

Light, shallow soil, low land; sub-soil, gravel. Area of each plot, ¼ acre.

Check Plot	Lime Plot	Manure Plot
Yield of hay in lbs., per acre	Amount of lime applied, 2 tons per acre. Yield of hay in lbs., per acre	Amount of manure applied per acre, 10 tons Yield of hay in lbs., per acre
3,840	4,000	5,580

REMARKS: The above test was conducted on a very uniform plot of soil, and from the one year's results it would seem that light applications of manure would pay on permanent low land meadows.

YIELDS OF HAY

Soil—Black loam to light gravelly loam, bottom land.

9 acres old meadow yielded.....18,580 lbs. hay
4¾ acres oats for hay yielded ..... 12,000 lbs. hay

BANNER OATS AND CANADIAN FIELD PEAS

CUT GREEN FOR HAY

Area of Plot, 3 acres. Soil, gravelly loam.

Variety	Date of Seeding	Date of Cutting	Yield of hay per acre in lbs	Irrigation	
				May	Total
Banner Oats and Field Peas (Canadian).....	April 26	July 20	2,738·33	3·86	3·86

REMARKS: Canadian field peas and Banner oats half and half by weight sown at the rate of 3 bushels of seed per acre.

BURBANK WHEAT

Area of Plot, ¼ acre. Soil, gravelly loam.

Date of Sowing	Date of ripening	No. of days maturing	Yield of grain per acre in lbs.	Weight per measured bushel after cleaning in lbs.	No. of bushels per acre	Irrigation	
						Rate of application in acre inches	
						June	Total
May 10.....	July 20....	72	1,542	65	25·7	8·19	8·19

REMARKS: This wheat is giving very satisfactory results at this Station. Note the heavy weight per measured bushel after cleaning. The date of sowing was altogether too late for best results. Earlier seeding would have given this crop a better start on the natural precipitation stored in the soil and delayed the date of the first irrigation. It is most important in irrigated districts to make as full utilization as possible of the natural moisture stored in the soil over winter; hence the importance of early seeding.

EXPERIMENTS WITH WIZARD DRIED MANURE

Project 74.—There are vast accumulations of stock yard manure at Calgary and other centres which would be of great value to agriculture were it not that the freight rates make the cost of this manure prohibitive except in special cases. At Chicago a process of drying and pulverizing similar manures has long been in operation, and we obtained a car of this "Wizard" dried manure (which comes under the distinctive process names of "Shredded," "Pulverized" and "Phosphated") to test out against barnyard manure. It was the middle of May before the car arrived, so that the results obtained this year were not very satisfactory or conclusive. This was further contributed to by the extreme shortage of water.

The results obtained were as follow:—

Corn.—Fairly uniform areas of soil, of one-thirteenth of an acre each, were tested with Wizard dried manure.

Manure	Rate applied per acre	Yield per acre	
		tons	lb.
Barnyard	20 tons	20	1,000
Shredded	600 lb.	14	1,000
Pulverized	600 "	16	500
Phosphated	300 "	9	1,000
Shredded	600 "	9	.....
Pulverized	600 "	10	.....

Carrots· 2 plots, ½ acre each.

Manure	Rate applied per acre	Yield per acre	
		tons	lb.
Barnyard	20 tons	3	1,945
Phosphated	300 lb.	3	287

HORTICULTURE

Following a mild winter with more than average rainfall, the orchards came into the spring of 1921 without any sign of winter injury, and with a good supply of natural moisture in the soil. During the summer and autumn months, however, there was a prolonged dry spell, coupled with an acute shortage of irrigation water. Owing to this combination of factors it was not possible to apply water more frequently, or in greater amounts, than was barely sufficient to prevent the trees from actually suffering from lack of moisture. Consequently, conditions for growth were not as favourable during 1921 as has been the case in some previous years. Notwithstanding this fact, the average growth of trees throughout the orchard was very satisfactory. Owing to the fact that permanent alfalfa sod mulch, as a method of orchard culture, is receiving serious consideration from a large number of growers in the valley it was decided to carry out more extensive experiments with this method of orchard operation. Accordingly, in the spring of 1921 two more orchards, one of apples and one of stone fruits, were seeded down to alfalfa. Adjacent orchards are being carried on under a system of vetch cover-cropping to determine the comparative water and labour requirement of these two methods of orchard operation, as well as their effect on soil fertility and the health of the trees.

The cultural orchards are still too young to permit of any very definite statement as to the relative merits of the various systems of orchard management under test, but a comparison of the yield, growth, soil condition, water requirements, and

cost of operation to date, under the several methods of culture, is given in this report. A number of the varieties of apples and stone fruits gave a considerable yield this year, and the results are tabulated below.

No definite information can yet be given as to the comparative merits of the various systems of pruning under test, but a preliminary survey of the thinning experiments under way is included in this report.

Accurate records of the amount of irrigation water required to provide moisture conditions necessary for good growth and fruitfulness in the various orchards were kept again this year and the results are shown in tabular form. The amount of water required was greater in 1921 than in previous years, due no doubt to the increased size of the trees, but in only one case, that of No. 2 orchard, under permanent alfalfa, has water been applied in greater amount than the Government standard of two and a half acre-feet.

CULTURAL APPLE ORCHARDS

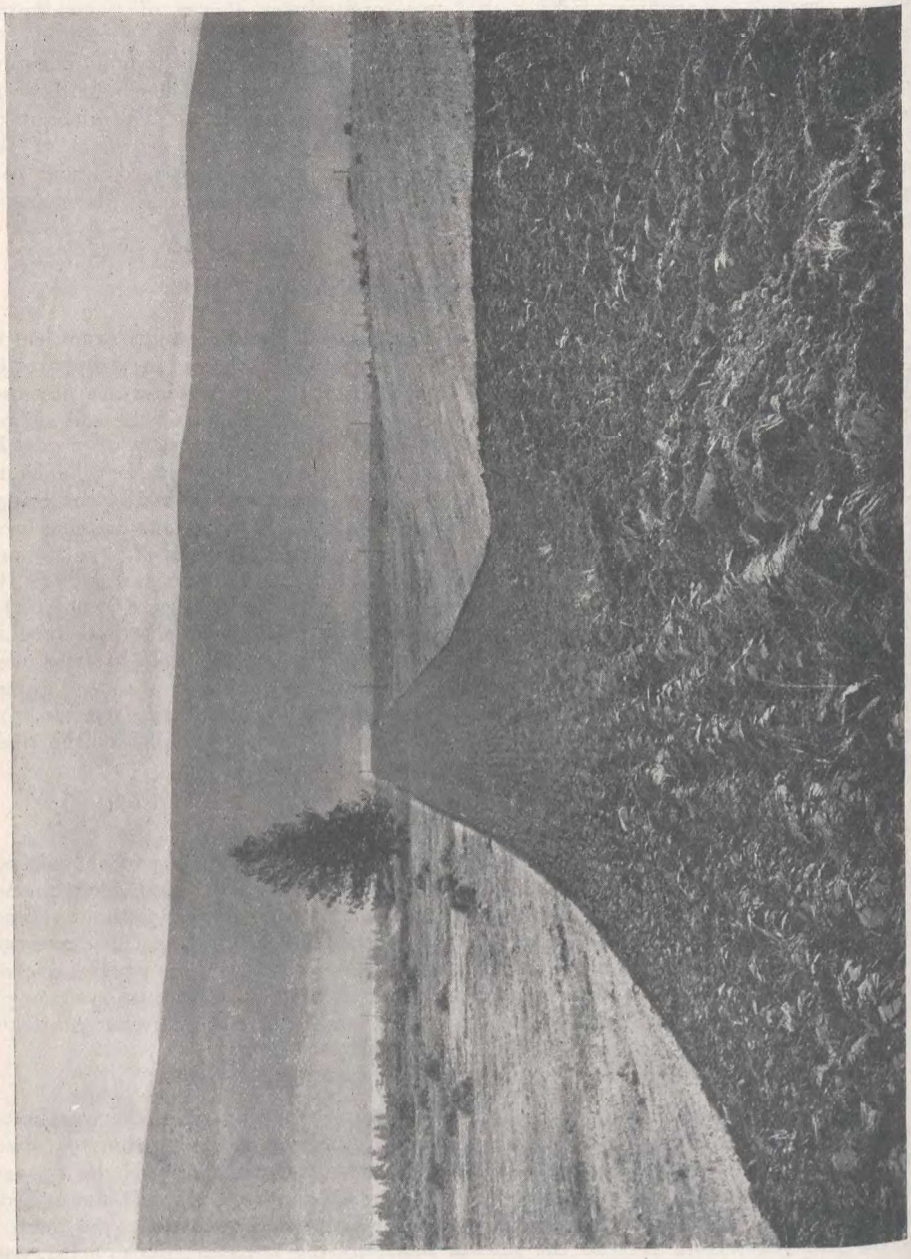
The six orchards included in this experiment are all located on the same bench. Each orchard is two acres in area. There is considerable variation in the character of the soil and subsoil on different parts of the bench, but in no case has any one orchard a monopoly of either the good or bad soil. The character of the soil ranges from a sandy loam underlain with coarse gravel to a fine silt having a clay subsoil. Such soil formations are typical of much of the bench land in the southern Okanagan. The object of this experiment is to determine the most *economical* method of bringing up a young orchard, and of maintaining it when it reaches the bearing age. The orchards are also laid out to serve as a test of varieties, systems of pruning and methods of thinning. These orchards were planted in 1916. Observations as to growth and condition of trees have been made each year, and a record kept of the yield of each tree. The results of measurements taken in 1921 are shown in tabular form in this report. Tables have also been prepared showing the yield of fruit produced under the various systems of culture. In order to facilitate a correct interpretation of these data a short account of the cultural treatment received by each orchard since date of planting, and notes as to the general performance of the trees in each orchard to date are given below.

ORCHARD NO. 1—CLEAN CULTIVATION

Project 46.—This orchard has been carried on under continuous clean cultivation since date of planting. To date, the trees in it have made good growth, and have yielded satisfactory crops, but the physical condition of the soil is not as good as where cover crops are in use or manure is being applied to the land. The average water requirement of this orchard over six years has been less than six acre-inches per season. The cost of operation is greater than is the case with the systems of vetch cover cropping and alfalfa sod mulch now in practice on other orchards in this experiment.

ORCHARD NO. 2—ALFALFA SOD MULCH

Project 48.—This orchard has been in alfalfa from the year when the trees were planted out. For the first five years a strip was kept cultivated along the tree rows, but in the spring of 1921 this strip was seeded down. Until 1921 the alfalfa was cut and disced in each time it flowered, but this year the crop was left untouched, and this plan of refraining from cutting the crop will be adhered to in the future. In the five years from 1916-20 the growth made by the trees in this orchard was less than that made by the trees under any other of the six systems of cultural treatment. During the year 1921, however, the trees made a greater growth than those in any other of the cultural orchards—indicating that alfalfa is hard on a



Site of Orchards—1915.

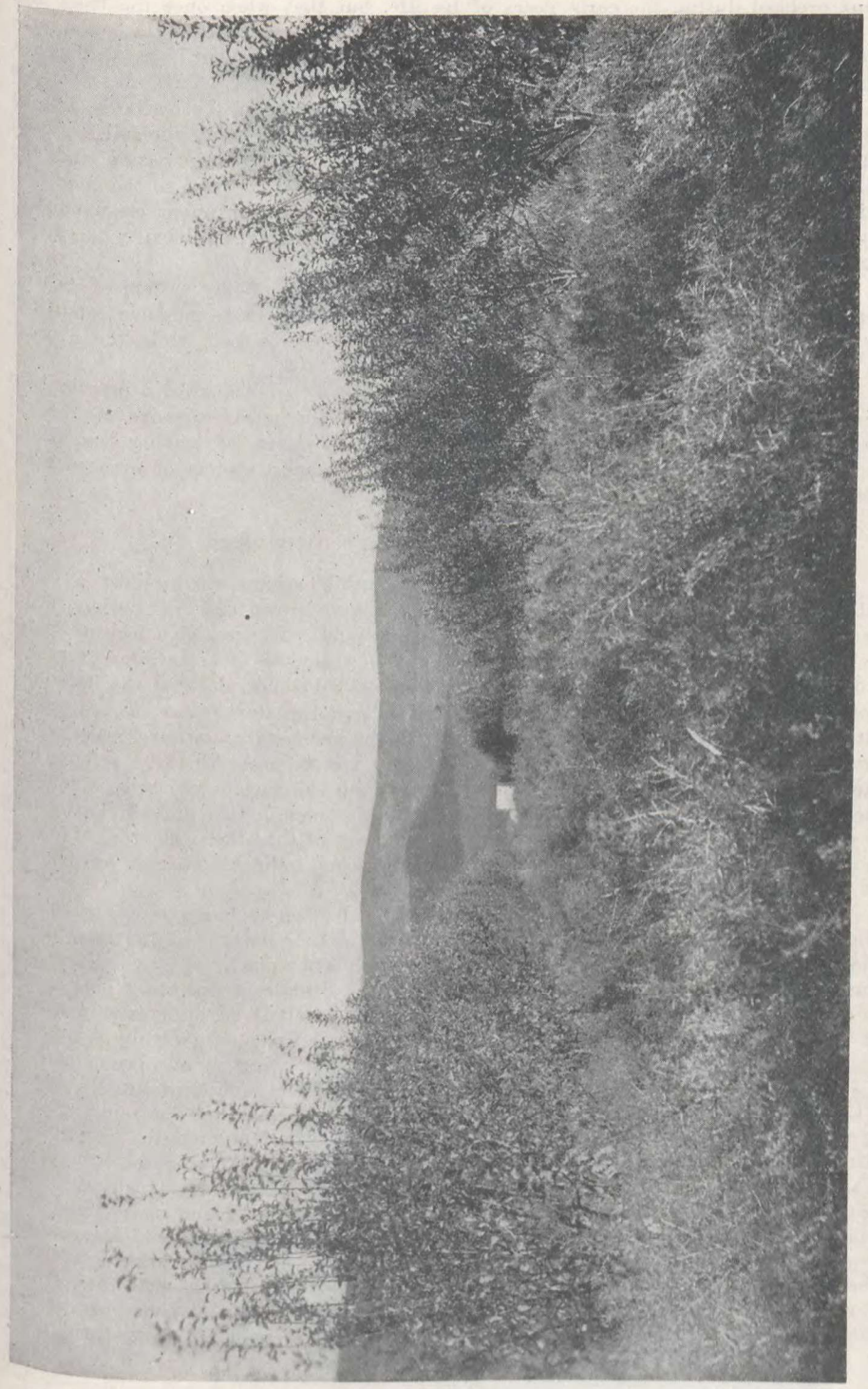


Photo taken in September, 1921, showing alfalfa sod mulch in No. 2 Cultural Apple Orchard. Note that the cover crop is left uncut.

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young orchard during the early years of its life, but that when once the trees and the alfalfa become well established the combination is beneficial to the trees, provided always that there is enough water available for both crops. There was also a marked increase in the yield of fruit from this orchard in 1921. Until this year the average yield of fruit per tree was less than in any other of the orchards, but in 1921 this orchard gave the third largest crop of all. The texture of the soil has been wonderfully improved. The humus content has been greatly increased and the ability of the soil to take up moisture rapidly is in marked contrast to the condition which exists just across the flume in No 1 orchard, where continuous clean cultivation has so injured the physical condition of the soil that great difficulty is experienced in securing a uniform distribution of moisture.

The water requirement of this orchard is the greatest of any system of cultivation under trial here. The amount necessary to provide good moisture conditions for growth and fruitfulness during 1921 was 31·75 acre-inches, while the average for six years is 20·89 acre-inches.

Under the system of frequent cutting and discing of the alfalfa practised in this orchard up to 1921 the cost of operation was the most excessive of the six methods under test. The plan adopted this year, however, of leaving the alfalfa uncut promises to make the alfalfa sod mulch the cheapest system of orchard management practised at this Station.

ORCHARD NO. 3—SOILING CROPS AND HAIRY VETCH

Project 49.—For the first five years of its life this orchard was brought up under soiling crops. Peas and oats or barley and vetch were grown and cut for hay, which was fed to stock and the manure returned to the land. The use of a legume in the soiling crop provided a cheap source of nitrogen, while the fact that, for every two crops of fodder which were removed, one was ploughed under, ensured the incorporation of a large amount of humus in the soil. From the start, these two essentials, nitrogen and humus, have been considered in the methods of culture practised in this orchard. The result has been remarkable, as can be ascertained by reference to the tables showing comparative yields and growth in the various orchards. Measurements of trunk diameter revealed the fact that the trees in this orchard have made to date seven per cent more growth than those in any of the other orchards. Furthermore, a study of crop production over the six years indicates that it has yielded 38 per cent more fruit than any of the others.

In the autumn of 1920 this orchard was seeded down to hairy vetch, which was allowed to go to seed the following summer, and in early August of 1921 was disced thoroughly into the soil. In this way the organic matter produced by the cover crop was incorporated with the soil and the vetch reseeded at least expense. This system of orchard operation will be continued in 1922. It has many advantages as a method of orchard management suitable for our conditions. An adequate supply of nitrogen and humus, the two essentials to soil fertility most lacking in our bench soils, is assured. The labour of frequent tillage involved in clean cultivation is obviated. The cover crop does not interfere with picking operations in the autumn, nor does it make a heavy demand on soil moisture during the hot, dry months of July and August, less irrigation water being required by vetch than is the case with alfalfa. The soil in this orchard is now in excellent physical condition. It absorbs water readily and a uniform distribution of moisture can be secured and maintained more easily than is the case with any of the other orchards. The influence which the soiling crops and vetch have had in improving the texture and moisture holding capacity of the soil was very clearly indicated in 1921, by the behaviour of the first row of trees across the flume in No. 4 orchard. These trees, whose roots extended across into No. 3 orchard, continued to function normally while the remainder of the trees in No. 4 orchard suffered very severely from drought.

Photo taken in September, 1921, showing Hairy Vetch cover crop in No. 3 Cultural Apple Orchard. Note that the soil is protected by a dense mat of vegetation, but that the cover crop does not interfere with picking operations.

The water requirement of this method of culture has been larger than that of any other system except permanent alfalfa, but 1921 is the first year in which more than eighteen acre inches have been applied. Furthermore the actual time required to irrigate this orchard was less than that for any other except the clean cultivated orchard.

As to cost of operation, taking into account the crop produced and growth made, this plan of bringing up a young orchard appears to be the most economical of all the systems tested. During the first five years enough hay was secured from the soiling crops to cover the cost of operation, while the trees are now bearing enough fruit to justify the adoption of a cover crop system under which all the vetch is returned to the soil. The cover crop system as practised in 1922 cuts down the labour of cultivation to a minimum, the horse work consisting merely of discing in the vetch, and ploughing out new irrigation furrows.

ORCHARD NO. 4—RED CLOVER AND ALFALFA SOD MULCH

Project 50.—During the five years from 1916-1920 inclusive three crops of red clover were grown and ploughed into this orchard. This practice had most disappointing results. Difficulty was experienced in establishing and maintaining the clover, and the process was hard on the trees and on the soil. The clover, being a shallow rooted plant, competed with the trees for the moisture supply, while the necessity for frequent reseeding, and the long time which invariably elapsed before the young seedlings covered the ground, was conducive to soil puddling and baking.

The average growth of the trees in this orchard to date, as measured by trunk diameter, is ten per cent less than that of the orchard under soiling crops and vetch to which it is adjacent. Furthermore, a study of the crop returns from these two orchards reveals the fact that to date the clover orchard has produced only a little more than half as much fruit as the orchard under soiling crops and vetch which adjoins it.

In the autumn of 1920 the clover was ploughed under and the land manured in an endeavour to improve the physical condition of the soil. Owing to the fact that the clover appeared to be injuring rather than improving the soil texture, and on account of the great interest being taken by growers throughout the valley in the alfalfa sod mulch system of orchard culture, it was decided in the spring of 1921 to seed this orchard down to permanent alfalfa. A good stand of alfalfa was secured, but on account of the poor physical condition of the soil, it was found impossible, during the hot, dry months of July and August, to get the soil to take up and retain sufficient irrigation water to supply both the trees and the alfalfa. Although special attention was given to this orchard throughout the summer, in that extra irrigation furrows were ploughed out, the old furrows opened up frequently, the water allowed to run in the furrows for a longer period, the orchard receiving a greater number of irrigations than any other, it was found impossible to secure and maintain a uniform distribution of moisture in the soil. Trenches dug across the irrigation furrows to a depth of three feet revealed the fact that after thirty-three hours of irrigation the water had penetrated the soil to a depth of only eight inches immediately below the furrow. After the water had been run for this length of time the furrows became "puddled" and no more water could be induced to go into the soil until the furrows were rebroken with a plough. Thus the water in many cases was used by the dense growth of young alfalfa plants before it had a chance to get down to the level of the tree roots, and the trees suffered. Premature defoliation occurred on some trees, while others failed to mature their buds and the withered foliage remained on them through the winter. In spite of the fact that the final irrigation was delayed until after the middle of August this orchard went into the winter with the soil in a very dry condition.

From these observations it is apparent that any grower contemplating alfalfa in orchards should at the outset assure himself of two conditions: First, that he has a sufficiency of irrigation water available throughout the season; and second, that his soil is in such a condition that it will absorb and retain enough moisture to supply both the trees and the young alfalfa during the critical period when the latter is becoming established. Our experience indicates that this desirable condition of the soil can be secured by cover-cropping with hairy vetch.

The cost of operation while the orchard was under clover, considering the effect on the physical condition of the soil and the yield and growth of the trees, does not compare favourably with the other methods of culture which are being tried out. Consequently, we feel justified in discouraging the growing of clover in orchards, where the soil and climatic conditions are such as prevail in the Southern Okanagan.

NO. 5 ORCHARD. TRUCK GARDEN AND SEED CROPS, MANURED EACH YEAR

Project 51.—Vegetable intercrops, for seed purposes, have been grown in this orchard every year. Manure has been applied during the winter months and ploughed under in the spring. The trees have responded well to this treatment, making good growth every year. The comparatively low yield of fruit harvested from this orchard can be largely accounted for by the fact that it is exposed to southerly gales during the summer months, a considerable portion of the crop being blown off before it reaches maturity. The annual application of barnyard manure has improved the physical condition of the soil, but it does not yet take up water as readily as does the orchard where soiling crops and vetch have been grown.

This method of culture has been most economical of irrigation water, less being required than under any other system of cultivation tested except clean cultivation.

The cost of operation is greater than where cover crops are used, but this is offset by the production of cash crops, which can be made to yield some return from the land before the trees come into bearing.

ORCHARD NO. 6—FARM ROTATION

Project 52.—The method of culture practised in this orchard is adapted to the needs of the farmer who is raising some stock in connection with an orchard. A five year rotation is practised, involving three years of clover, one of mangels, and one of grain. The growth of the trees has been very satisfactory, and the comparatively low yield of fruit is explained by the fact that this orchard, like No. 5, is subjected to the full force of southerly gales, which blow off a good deal of the fruit during the summer months.

The original plan was to leave the clover down for three years, but such difficulty was experienced in establishing this crop, owing to the crowding of the young clover plants with weeds, that the crop has been turned under each year.

This frequent incorporation of a green manure crop, together with the application of barnyard manure in the hoed crop year, has greatly improved the physical condition of the soil. The water requirement of this orchard has been slightly less than where soiling crops and vetch have been grown, but this is largely due to the fact that the clover was ploughed under in June and the land kept clean-cultivated during the heat of summer.

There is more labour required under this system of management than where cover-cropping or clean cultivation is practised, but this is offset by the production of feed for stock.

TWIG LENGTH, INDICATING GROWTH DURING 1921

Average Growth in inches per Terminal Shoot

Variety	Orchard No. 1	Orchard No. 2	Orchard No. 3	Orchard No. 4	Orchard No. 5	Orchard No. 6	Variety average
Delicious	28·6	29·6	32·2	27·8	30·6	30·6	29·9
Grimes Golden	31·2	29·4	28·8	25·6	28·8	30·0	29·0
Cox Orange	31·2	33·2	24·8	27·2	27·6	29·6	28·9
Wagener	29·6	30·0	27·8	23·4	26·8	29·0	27·8
Yellow Transparent	27·5	29·3	27·0	22·3	26·3	31·4	27·3
Newtown	27·0	29·6	26·7	26·4	25·4	27·4	27·1
Jonathan	28·4	31·2	25·4	25·2	24·4	26·4	26·8
McIntosh	27·2	25·2	24·8	23·6	26·6	32·2	26·6
Duchess	26·6	27·3	25·8	21·8	24·8	25·6	25·3
Rome Beauty	26·2	26·2	23·8	23·8	22·6	25·6	24·7
Orchard average	28·35	29·10	26·71	24·71	26·39	28·78	27·34

NOTE.—The average growth of the ten varieties under various methods of culture during 1921, as indicated by the length of the terminal shoots, ranges from two to two and a half feet. The trees in No. 2 have made the greatest growth, and the trees in No. 4 the least, for six individual varieties and for all varieties taken together.

TRUNK DIAMETER, INDICATING GROWTH, 1916–21, INCLUSIVE

Average Diameter in Inches per tree

Variety	Orchard No. 1	Orchard No. 2	Orchard No. 3	Orchard No. 4	Orchard No. 5	Orchard No. 6	Variety average
McIntosh	4·21	4·09	4·60	4·29	4·36	4·54	4·350
Delicious	3·96	3·90	4·39	3·99	4·16	4·04	4·070
Yellow Newtown	4·025	3·60	4·24	4·00	4·05	3·79	3·951
Cox Orange	4·30	3·625	4·025	3·60	3·90	4·05	3·917
Jonathan	3·60	3·475	4·19	3·925	3·89	4·01	3·850
Grimes	3·99	3·71	4·15	3·34	3·81	3·89	3·815
Yellow Transparent	3·54	3·66	4·375	3·54	3·575	3·825	3·752
Duchess	3·60	3·46	3·80	3·19	3·725	3·66	3·573
Wagener	3·45	3·59	3·94	3·44	3·46	3·64	3·587
Rome Beauty	3·275	3·275	3·90	3·50	3·64	3·56	3·525
Orchard average	3·795	3·639	4·161	3·682	3·857	3·901	3·839

NOTE.—Average Diameter of all varieties in No. 3 Orchard is ·32 inches greater than average diameter for all orchards. Average trees of all varieties in all orchards have made an increase in trunk diameter of well over half an inch per year since date of planting.

APPLE YIELDS, 1916–20 INCLUSIVE (5 YEARS)

Average Yield in Pounds per Tree

Variety	Orchard No. 1	Orchard No. 2	Orchard No. 3	Orchard No. 4	Orchard No. 5	Orchard No. 6	Variety average
Jonathan	13·1	15·6	58·2	38·3	33·6	23·6	30·40
Yellow Transparent	25·0	22·0	32·6	27·0	10·9	16·4	22·40
Wagener	11·1	12·0	30·8	21·0	16·8	18·4	18·35
Duchess	20·6	15·3	23·4	14·6	9·7	8·3	15·30
Rome Beauty	3·9	5·7	6·7	7·8	12·0	4·8	6·80
Cox Orange	2·0	1·0	7·0	2·0	2·6	20·0	5·80
McIntosh	2·5	5·1	14·5	5·1	3·5	2·6	5·55
Grimes Golden	6·8	4·2	14·0	3·5	2·4	2·3	5·53
Yellow Newtown	0·1	0·6	1·4	0·5	0·1	0·3	0·50
Delicious	0·1	0·0	0·5	0·2	0·1	0·0	0·15
Orchard average	8·52	8·15	18·91	12·00	9·17	9·67	11·07

APPLE YIELDS, 1921

Average Yield in Pounds per Tree

Variety	Orchard No. 1	Orchard No. 2.	Orchard No. 3	Orchard No. 4	Orchard No. 5	Orchard No. 6	Variety average
Wagener	82·1	56·1	90·1	56·2	53·3	54·2	65·33
McIntosh	41·1	73·4	88·9	38·9	59·1	53·1	59·08
Yellow Transparent	59·1	56·0	68·5	57·3	50·7	42·0	55·60
Duchess	64·6	48·0	63·2	43·2	42·6	45·1	51·12
Jonathan	31·3	42·1	77·1	42·4	43·4	28·9	44·20
Cox Orange	25·6	11·2	49·0	9·8	17·4	7·4	20·07
Rome Beauty	18·3	30·7	23·2	11·5	17·0	10·4	18·52
Grimes Golden	14·6	10·0	34·2	6·1	7·6	14·3	14·50
Yellow Newtown	25·9	1·7	37·0	12·1	3·3	4·4	14·07
Delicious	6·7	4·2	8·1	1·3	1·8	0·2	3·73
Orchard average	36·93	33·34	53·93	27·88	29·62	26·00	34·62

APPLE YIELDS, 1916–1921 INCLUSIVE (6 YEARS)

Average Yield in Pounds per Tree

Variety	Orchard No. 1	Orchard No. 2	Orchard No. 3	Orchard No. 4	Orchard No. 5	Orchard No. 6	Variety average
Wagener	93·2	68·1	120·9	77·2	70·1	72·6	83·68
Yellow Transparent	84·1	78·0	101·1	84·3	61·6	58·4	78·00
Jonathan	44·4	57·7	135·3	80·7	77·0	52·5	74·60
Duchess	85·2	63·3	86·6	57·8	52·3	53·4	66·42
McIntosh	43·6	78·5	103·4	44·0	62·6	55·7	64·63
Cox Orange	27·6	12·2	56·0	11·8	20·0	27·4	25·87
Rome Beauty	22·2	36·4	29·9	19·3	29·0	15·2	25·32
Grimes Golden	21·4	14·2	48·2	9·6	10·0	16·6	20·03
Newtown, Yellow	26·0	2·3	38·4	12·6	3·4	4·7	14·57
Delicious	6·8	4·2	8·6	1·5	1·9	0·2	3·88
Orchard average	45·45	41·49	72·84	39·88	38·79	35·67	45·70

VARIETY APPLE ORCHARD

Project 53.—In this orchard are planted two trees each of the most important varieties grown in the district, the object being to test them for cropping, keeping quality, hardiness, and disease resistance. The experiment has not yet reached the stage where definite information can be given out as to the respective merits of the varieties under test. However, a number of the trees fruited in 1921; the crop was harvested and kept in a storage cellar. The fruit from young trees is usually poor in keeping quality, but observations of the condition of the apples in storage were made from time to time. The following table shows the age of the trees, the average yield in pounds per tree, the date of picking, and the date to which the fruit remained in good condition in storage.

TABLE SHOWING 1921 YIELDS, PICKING DATES, AND STORAGE LIFE OF APPLES FROM VARIETY ORCHARD

Variety	Age of tree in years	Average Yield in lbs. per tree	Picking Date	Storage Life	Remarks
Winter Banana	6	35	Oct. 9	March 15	
Wagener	6	34	Sept 28	Feb. 15	
Stayman Winesap	6	31	Oct. 17	.....	Picked too early.
Grimes Golden	6	27	Oct. 9	Nov. 18	
Opalescent	6	26	Sept. 23	Dec. 12	
Ontario	6	25	Oct. 10	.....	Picked too early.
Yellow Bell Flower	5	25	Sept. 23	Nov. 18	
Waldron Beauty	6	21·5	Oct. 9	Nov. 18	
York Imperial	6	17·5	Sept. 28	Jan. 30	
Winesap	6	16·0	Oct. 15	.....	Picked too early.
Gano	5	16·0	Sept. 12	Jan. 15	
Vanderpool Red	6	15·0	Sept. 23	Dec. 12	
Sweet Bough	5	14·0	Aug. 9	Aug. 30	
McMahon White	5	11·0	Sept. 23	Nov. 18	
R. I. Greening	5	9·0	Sept. 27	Jan. 15	
Jonathan	6	8·0	Oct. 9	Dec. 12	
Cox Orange	6	3·5	Sept. 15	Nov. 18	
Scott Winter	5	3·0	Sept. 27	Nov. 18	
Delicious	6	2·5	Oct. 9	Dec. 30	

The following is the list of varieties of apples recommended for the Okanagan Valley by a committee of fruit growers, commercial men, market commissioners, horticulturists and fruit inspectors which met at Vernon to consider this matter.

DISTRICTS NORTH OF KELOWNA AND INCLUDING KELOWNA:—Duchess, Wealthy, McIntosh, Delicious, Rome Beauty.

(*Salmon Arm:* Duchess, Wealthy, McIntosh).

DISTRICTS SOUTH OF KELOWNA:—Gravenstein, Jonathan, Delicious, Rome Beauty, Staymen, Winesap.

(Jonathan as Filler Trees only).

(Staymen in Penticton, Summerland, and Naramata only).

(Winesap in Osoyoos and Keremeos only).

NEW VARIETIES OF APPLES

The variety orchard includes two trees each of a large number of the varieties of apples originated at the Central Experimental Farm, Ottawa. The varieties are being tested out for yield, quality, hardiness, and disease resistance under Okanagan conditions. It will be some years yet before it can be definitely ascertained whether any of these varieties deserve a place in the commercial plantings of the Okanagan Valley. However, a number of the varieties fruited in 1921. The crop was harvested and placed in a storage cellar along with samples of the Wealthy and McIntosh varieties grown under the same conditions. The following table shows how some of the more promising Ottawa varieties compared with Wealthy and McIntosh as to yield, date of picking, and date to which the fruit remained in good condition in storage.

TABLE SHOWING 1921 YIELDS, PICKING DATES AND STORAGE LIFE OF OTTAWA VARIETIES

Variety	Average yield in lb. per tree	Picking date	Storage life	Remarks
Wealthy	27·3	Sept. 9	Oct. 30	Grown and stored under same conditions as Ottawa varieties.
McIntosh	41·1	Sept. 15	Nov. 30	
Atlas	103·5	Sept. 8	Sept. 30	Large and coarse—acid.
Melba	60·0	Aug. 14	Aug. 30	Excellent dessert quality.
Brisco	48·0	Sept. 9	Oct. 15	Medium size—highly coloured.
Vermac	38·0	Sept. 27	Nov. 30	Small, but highly coloured and good dessert quality.
Danville	23·0	Oct. 12	Nov. 30	Large and well coloured.
Diana	21·0	Sept. 12	Oct. 15	Large and well coloured.
Casco	20·0	Aug. 27	Sept. 30	Small but good dessert quality.
Lobo	18·0	Sept. 9	Oct. 15	Large and highly coloured.
Brock	10·0	Sept. 12	Oct. 15	Good dessert quality.
Valerie	7·5	Aug. 27	Sept. 30	Small, but good dessert quality.

MANURING AND FERTILIZING EXPERIMENTS

FERTILIZER EXPERIMENT WITH WINESAP APPLES

Project 67.—An experiment is being conducted with nineteen trees of the Winesap variety; the object in view being to ascertain whether the size of the apples can be increased by heavy applications of barnyard manure and nitrate of soda, applied either singly or in combination.

The trees are still very young, having been planted in 1916, and have not yet come into full bearing, so that any statement made at this time as to the effect which the fertilizer is having would be premature. However, there was some fruit produced this season, and the following table shows the method of treatment, yield, average size of fruit, trunk diameter, and twig growth as noted in the fall of 1921.

TABLE SHOWING RESULTS OF FERTILIZER EXPERIMENT WITH WINESAP APPLES

Method of Treatment	Tree number	1921 Yield in lb.	Average diameter of Apples in inches	Trunk diameter of tree in inches	1921 Twig growth in inches per twig	Remarks
Manure dug in for ten feet around tree in spring.	352	14	2½	3·5	28·2	Suffered from drought
	353	13	2⅝	4·0	28·5	
	354	10	22¾	4·0	26·0	
Manure in spring; 5 lb. nitrate of soda in fall	348	38	2½	3·3	25·3	Crown gall
	349	.....	.....	4·1	26·3	
	350	4	2½	4·0	26·5	
	351	.....	.....	3·7	29·1	
Manure in spring; 5 lbs. nitrate of soda in spring	201	3	2¾	3·5	24·1	
	202	.....	.....	3·7	31·3	
	203	40	2⅜	3·7	25·3	
	204	7	2½	4·1	25·4	
Manure in spring; 5 lb. nitrate of soda in fall, and 5 lb. nitrate of soda in spring	205	7	2⅝	3·7	24·6	
	206	.....	.....	3·1	27·9	
	207	7	2¼	4·0	26·3	
	208	18	2¼	4·2	25·0	
	209	13	2¼	4·0	25·6	
Check trees. No manure or nitrate of soda	490	1	2¾	3·7	30·8	
	491	2	2⅝	3·4	26·5	
	492	4	2⅝	3·5	29·7	

Wizard Manure Experiment

Project 75.—Thirty apple trees in their seventh season of growth were included in this experiment: fifteen varieties, two trees of each. To one tree of each variety barnyard manure was applied at the rate of forty pounds per tree. Of the remaining trees, five were treated with phosphated, five with pulverized, and five with shredded Wizard brand manure, ten pounds to a tree. The fertilizing element was worked well into the soil to some distance from the trunk of the tree.

Results.—Owing to the fact that the manure was not applied till the end of May, it is probable that the full effect will not be evidenced until the 1922 season of growth. However, measurements of the twigs which developed during 1921 were made in November of this year, and the following growths noted.

Variety	Average Twig Growth	
	Barnyard	Phosphated
	inches	inches
Luke	31·2	26·8
Joyce	27·8	27·1
Rosalie	32·1	21·1
Kildare	20·2	18·7
Niobe	33·6	35·7
Total	144·9	129·4
Average	28·9	25·9
	Barnyard	Pulverized
Carno	30·3	33·7
Melba	34·4	22·6
Danville	27·2	23·1
Atlas	28·7	27·4
Elmer	35·3	34·4
Total	145·9	141·2
Average	29·2	28·24
	Barnyard	Shredded
Mendel	28·1	35·6
Lobo	24·1	34·9
Thurso	20·7	29·7
Jethro	29·7	28·0
Brock	34·9	33·3
Total	137·5	161·5
Average	27·5	32·5

Average twig growth on thirty check trees to which no manure or fertilizer was applied, 23·5 inches.

Average twig growth on thirty trees to which barnyard manure was applied in seep holes, holes two feet deep and one foot square being dug about two feet from the trunk of the tree and filled with manure, 33·2 inches.

The above results would seem to indicate that the phosphated and pulverized induced less, and the shredded more growth, than did the barnyard manure, but on account of possible variations in soil and moisture conditions no finality can be attached to these conclusions.

STONE FRUIT ORCHARDS

Project 66.—There are two orchards in this experiment, each approximately two acres in area. These are planted to the varieties of stone fruits most likely to be of commercial value in this district. The object in view is to determine the most profitable varieties for home use, shipping, and canning, bearing in mind cropping, quality,

disease resistance, and hardiness. In the spring of 1921 the lower stone fruit orchard was seeded down to alfalfa, and is being carried on under the alfalfa sod mulch system of culture, while vetch cover cropping is being practised in the upper orchard. The idea being to test out the relative merits of these two systems of orchard management as regards growth, yield, soil condition, water requirement and cost of operation.

Insufficient data have been accumulated as yet to make possible a definite statement as to the relative commercial value of the varieties under test, but a table showing the average yield per tree in 1921, with notes made at picking time, may be of interest to growers. The trees were planted in 1916.

APRICOTS—1921 YIELDS

Project 60—

Variety	Number of trees	Average yield in lb. per tree	Picking dates	Remarks
Royal	10	67·1	Aug. 3 & 8	Fruit firm, but small where not thinned.
Montgamet	2	61·0	Aug. 3 & 8	Fruit inclined to be soft.
Moorpark	10	48·3	Aug. 8 & 12	Fruit large and firm, tendency to ripen on one side only.
Blenheim	8	45·6	Aug. 5	Fruit firm.
Hemskirke	2	26·0	Aug. 4 & 8	Fruit inclined to be soft.
Peach	2	20·0	Aug. 11 & 17	Fruit large, but bruises easily.
Superb	7	18·6	Aug. 3 & 8	Fruit small and soft.

CHERRIES—1921 YIELDS

Project 59—

Variety	Number of trees	Average yield in lb. per tree	Picking dates	Remarks
Olivet	5	54	July 12	
Lambert	5	30·6	July 24	
Royal Anne	5	24·8	July 16	
Early Richmond	2	16·5	June 29	
Black Tartarian	5	10·4	July 5	
May Duke	5	4·8	June 29	

PEACHES—1921 YIELDS

Project 58—

Variety	Number of trees	Average yield in lb. per tree	Picking dates	Remarks
Triumph	5	96·6	Aug. 9, 16, 21.	
Hale's Early	5	41·0	Aug. 7, 23, 30.	
New Rochester	5	36·8	Aug. 23, 29, and Sept. 6	
Muir	5	30·0	Sept. 24	Fruit failed to mature.
Yellow St. John	5	29·0	Aug. 24, 30.	
Old Mixon Cling	5	19·4	Oct. 12.	Fruit failed to mature.
Early Crawford	5	2·6	Sept. 14.	

PLUMS—1921 YIELDS

Projects 55 and 57—

Variety	Number of trees	Average yield in lb. per tree	Picking dates	Remarks
Duarte	2	111·0	Sept. 1	
Burbank	5	94·0	Sept. 1	Fruit small where not thinned.
Wickson	5	88·0	Aug. 31	
Peach Plum	5	81·4	Aug. 8, 11.	
Climax	2	73·0	Aug. 9	
Columbia	2	70·5	Aug. 30	
Damson	2	70·0	Sept. 20	
Imperial Gage	2	45·0	Aug. 30	
Yellow Egg	5	44·0	Sept. 10	
Pond Seedling	5	42·6	Sept 12	
Red June	2	18·0	Aug. 6	
Santa Rosa	5	16·6	Aug. 8, 13, 17	

PRUNES—1921 YIELDS

Project 56—

Variety	Number of trees	Average yield in lb. per tree	Picking dates	Remarks
Tragedy	2	109·0	Aug. 26	
Silver	5	92·5	Oct. 3	
Italian	5	45·4	Oct. 3	
Tennant	5	33·2	Aug. 31	
Hungarian	2	30·0	Sept. 21	
Sugar	5	16·0	Sept. 1	

The following are the varieties of stone fruits and pears recommended by the Vernon conference:—

DISTRICTS NORTH OF KELOWNA AND INCLUDING KELOWNA:

Pears—

Flemish Beauty, Anjou, Howell.

Cherries—

Olivet and Morello.

Plums—

Italian Prune.

DISTRICTS SOUTH OF KELOWNA:

Pears—

Flemish, Anjou, Dr. Jules Guyot, Howell, Bosc.

Cherries—

Bing, Lambert, Republican or Tartarian.

Apricots—

Moorpark, Tilton, Blenheim.

Peaches—

Yellow St. John, Early Crawford, Elberta.

Plums—

Peach, Bradshaw, Climax, Tragedy, Green Gage, Damson, Italian Prune.

WALNUTS

In 1917 a number of walnut seedlings, from a cross between the English walnut (Juglans regia) and the Black walnut (*Juglans nigra*) were planted in the stone fruit orchard. These are being grown with the view of isolating a variety possessing the quality of kernel found in the English species combined with the hardiness of the Black walnut. A number of these trees fruited for the first time in 1921. The nuts were very promising, being of good quality with thin shells. It will be necessary, however, to test out the trees for yielding capacity, hardiness, and disease resistance before it can be ascertained whether any of these seedlings compare favourably with the standard varieties now being grown to a very limited extent in the Okanagan valley.

THINNING EXPERIMENTS, 1921

Project 61—

A comprehensive thinning experiment embracing all the trees in the cultural apple orchards was begun this year. The objects in view are, first to determine the effect of various degrees of thinning on the yield and grade of fruit produced during the season when the thinning is done; and second, to determine the effect of various degrees of thinning, practised consistently over a number of years, on the bearing habit of the trees. This experiment will be continued so long as the trees are in existence.

PROCEDURE—

Thirty-six trees of each of the varieties in the cultural orchards are thinned *severely*, thirty-six *moderately*, and thirty-six *lightly*.

Severe thinning consists of the removal of all but one apple to a spur, alternate spurs only being permitted to bear, and the apples being spaced approximately eight inches apart over the tree. This system is practised on every second, fifth and eighth standard and filler from the west end of each orchard.

Moderate thinning involves the removal of all but one apple from each spur, and is practised on every third, sixth and ninth standard and filler from the west end of each orchard.

Light thinning consists of the removal of all but two apples to a spur and is practised on every fourth, seventh, and tenth standard and filler from the west end of each orchard.

Results.—In 1921 it was found impracticable to grade the fruit into 1's, 2's and 3's, but a distinction was made between marketable fruit, culls and windfalls.

The results can in no way be considered as conclusive, since they represent the work of only one year, and apply only to trees six years of age which have made very vigorous growth and are exceptionally well provided with healthy foliage.

Only five varieties yielded a large enough crop in 1921 to give the various systems of thinning a fair test. The yields of these varieties are tabulated below in average production per tree.

SUMMARY OF RESULTS ACHIEVED IN CULTURAL APPLE ORCHARDS IN 1921

With all of the five varieties which yielded a large enough crop to give a fair comparative test of various systems of thinning:—

Heavy thinning gave a lower total yield and a lower yield of marketable fruit than did medium or light thinning. The percentage of culls was considerably reduced, however, by the heavy thinning.

Medium thinning gave a lower total yield and a lower yield of marketable fruit than did light thinning except in the case of McIntosh. The percentage of culls was greater than where heavy thinning was carried out, and less than where light thinning was practised.

THINNING EXPERIMENTS, 1921

TABLE SHOWING AVERAGE YIELD OF APPLES PER TREE WHERE HEAVY, MEDIUM AND LIGHT THINNING WERE PRACTISED

—	—	Average Yield in lb. per Trees		
		Heavy	Medium	Light
Wagner	Marketable	29·2	37·9	42·6
	Culls	5·2	8·0	10·2
	Windfalls	22·5	21·6	20·3
	Total	56·9	67·5	73·1
McIntosh	Marketable	32·5	48·1	41·8
	Culls	2·9	6·3	8·1
	Windfalls	11·6	10·8	11·9
	Total	47·0	65·2	61·8
Yellow Transparent	Marketable	32·7	46·5	52·1
	Culls	3·3	8·6	11·9
	Windfalls	4·7	5·9	3·4
	Total	40·7	61·0	67·4
Duchess	Marketable	34·9	38·1	63·2
	Culls	0·5	0·8	3·1
	Windfalls	3·4	3·9	3·8
	Total	38·8	42·8	70·1
Jonathan	Marketable	25·6	29·6	38·4
	Culls	0·9	1·5	3·1
	Windfalls	11·6	10·4	11·2
	Total	38·1	41·5	52·7
Average of five varieties	Marketable	30·98	40·04	47·62
	Culls	2·56	5·04	7·28
	Windfalls	10·76	10·52	10·12
	Total	44·30	55·60	65·02

Light thinning gave the highest total yield and the highest yield of marketable fruit except in the case of McIntosh. There was, however, the greatest percentage of culls where this method of thinning was adopted.

The method of thinning appeared to have little effect on the quantity of fruit blown off by the wind.

CONCLUSIONS

The results of this year's work indicate that the degree of thinning which will give the greatest financial returns is determined by the condition and general vigour of the tree. Trees which are young and are carrying a large amount of healthy foliage can mature more apples to the foot of branch than can trees which are lacking in vitality or are deficient as regards foliage.

Although the results of our work this year indicate that comparatively light thinning gave a greater yield of marketable fruit than did medium or heavy thinning

it must be borne in mind that our trees are young and very vigorous, so that the results attained can in no sense be taken to apply to older trees in orchards where growth conditions are not so favourable. It must also be borne in mind that a grading of the fruit into 1's, 2's and 3's would probably have shown an advantage in favour of the heavy thinning for the production of extra fancy fruit. Furthermore the effect of the various degres of thinning on the regulation of annual bearing has yet to be determined. With a view to securing definite information as to the effect of heavy thinning in promoting annual bearing a number of spurs on the heavily thinned trees were labelled with metal tags in 1921. This procedure will make it possible to keep a record of the actual performance of individual spurs over a number of years.

EXPERIMENT IN PICKING APPLES

Project 76.—The fact that many car loads of immature apples are sent out of the Okanagan Valley every year is ample proof of the need for more information on the correct time to pick apples so that they may arrive on the market in perfect condition.

With this aim in view an experiment in dates of picking was started in 1920. This experiment has been continued with the 1921 crop. Since the exact date when apples are ready to harvest varies from one year to another according to seasonal weather conditions, no definite calendar date can be laid down as the proper time to harvest any particular variety. However, by carrying the experiment on over a number of years it will be possible to determine approximately the date at which picking can safely be started, and the length of time over which the harvesting of each variety may be extended to ensure the arrival of the apples on the market in prime condition.

In 1921 a box of each variety of apples from each of the cultural orchards was harvested every week during the picking season. This procedure made it possible to test out the keeping quality of apples grown under different systems of culture, as well as the effect on condition due to picking at different dates. The apples were stored in a concrete basement where the temperature ranged from 30 to 40 degrees F., and the relative humidity varied from 70 to 90 per cent. Owing to the fact that the trees on this Station are still very young the keeping quality of the apples was on the whole very poor, and the results cannot be considered to apply to fruit from mature trees. The apples were examined at intervals during the winter, and the following tables show the condition as observed.

YELLOW NEWTOWN

Picking Date	Plot	January 30th		March 3rd	
		*			
Sept. 23	W.F.	B	Immature—shrivelled	B	Flavour not developed.
" 28	W.F.	B	" "	B	" "
Oct. 3	1	M	"	M	" "
" 3	3	M	"	F	" "
" 10	1	F	"	F	" "
" 10	3	F	"	F	" "
" 17	1	M	"	M	" "
" 17	2	F	"	F	" "
" 17	3	F	"	F	" "
" 17	4	B	" shrivelled	B	" "
" 17	5	G	Some of sample matured	F	Good flavour.
" 17	6	M	Immature	M	Flavour not developed.
" 24	3	G	Good maturity	G	Excellent flavour.
" 31	3	G	"	F	Good flavour.

*B—Poor; M—Medium; F—Fair; G—Good condition; W.F.—Windfalls.

DELICIOUS

Picking Date	Plot		December 20th		January 30th		March 3rd
Sept. 22	W.F.	B	Sound but no flavour	B	Internal mould	B	Shrivelled.
" 28	W.F.	B	" "	B	"	B	"
Oct. 3	1	M	Immature	M	No flavour	M	"
" 3	2	G	Well coloured	G	Good flavour	F	Firm.
" 3	3	F	Immature	F	Fair flavour	M	Shrivelled.
" 10	1	M	"	M	Poor flavour	M	Scald.
" 10	2	F	Well coloured	F	Fair flavour	F	Firm.
" 10	3	F	"	F	"	F	"
" 17	1	F	"	M	Poor flavour	M	Poor texture.
" 17	2	F	"	M	No flavour	M	Shrivelled.
" 17	3	F	"	F	Fair flavour	F	Firm.
" 17	5	M	Immature	M	No flavour	M	Shrivelled.
" 24	3	G	Well matured	F	Good flavour	F	Firm.
" 31	3	G	"	F	"	F	"

N.B—Delicious picked on Oct. 3 and 10 in No. 2 orchard from tree suffering from crown gall.

ROME BEAUTY

Picking Date	Plot		December 21st		January 30th		March 3rd
Sept. 22		M	Immature	B	Shrivelled and scald	B	
" 27	1	M	"	M	" "	M	
Oct. 3	1	M	"	M		M	Scald—shrivelled.
" 3	2	F	"	M	Shrivelled	M	
" 3	3	F	"	M	"	M	
" 10	1	F	"	F		F	Scald—shrivelled.
" 10	2	G	Well coloured	G	Good quality	G	Firm.
" 10	3	M	Immature	M	Shrivelled	M	
" 10	4	M	"	M	"	M	
" 10	5	G	Well coloured	F		F	Firm.
" 10	6	G	"	G		F	"
" 17	1	G	"	G		F	"
" 17	2	G	"	G	Good quality	G	"
" 17	3	F	Immature	F	Shrivelled	F	
" 17	5	G	Well coloured	G	Good quality	F	Firm.
" 24	*V.P.	G	"	G	"	G	"
" 31	V.P.	G	"	G	"	G	"

*V.P.—Vegetable plot orchard.

WAGENER

Picking Date	Plot		December 12th		January 30th		March 3rd
Sept. 22		F	Immature	F	Scald	F	Shrivelled.
" 27	1	F	"	F	" and shrivelled	F	
" 27	2	F	"	F	" "	M	
" 27	3	F	"	M	" "	M	
" 27	4	M	"	M	" "	M	
" 27	5	M	"	M	" "	M	
" 27	6	M	"	M	" "	M	
Oct. 3	1	F	"	M	Shrivelled	M	
" 3	2	G	"	G	Scald—poor quality	F	
" 3	3	F	"	F	Shrivelled—one cork	M	Scald.
" 3	4	F	"	F	Shrivelled—poor sample.	M	"
" 10	1	G	Crisp and firm	G	Scald—good flavour	G	Firm.
" 10	2	G		G		F	"
" 10	4	M	Immature	M	Shrivelled—poor flavour.	M	
" 17	1	G		G	Good flavour	G	Firm.
" 17	2	F		F		F	Scald.
" 17	3	G	Dull in colour	G	Fair flavour	G	Firm.
" 17	4	M	Immature	M	Shrivelled—poor flavour.	M	
" 17	5	F	Poor sample	F		F	Shrivelled.
" 24	1	G	Lacking in firmness	G	Fair flavour	F	Firm.
" 24	V.P.	G	Good colour and maturity.	G	Good flavour	G	"
" 31	1	G	" "	G	"	G	"
" 31	V.P.	G	" "	G	Excellent flavour	G	"

JONATHAN

Picking Date	Plot		November 20th		December 20th		January 30th
Sept. 22		F	Immature	M	Shrivelled	M	Jonathan spot.
" 27	1	F	"	M	Jonathan spot	M	
" 27	2	M	"	M	"	M	
" 27	3	F	"	M	Shrivelled, Jonathan spot.	M	
" 27	4	G	"	F	Jonathan spot	M	
" 27	5	G	"	F	Shrivelled, scald	M	
" 27	6	M	"	M	Shrivelled, Jonathan spot.	M	
Oct. 3	1	G	Well coloured	F	Jonathan spot severe	F	
" 3	2	M	Poor sample	M	Shrivelled	M	Jonathan spot.
" 3	4	F	Immature	F	Jonathan spot slight	F	Shrivelled.
" 10	1	M	Poor sample	M		M	"
" 10	2	G	Well coloured	G	Jonathan spot slight flavour good.	G	Internal break down. 9 out of box.
" 10	3	F	"	F	Good flavour	F	Jonathan spot slight—firm.
" 17	V.P.	G	"	G	Jonathan spot—good flavour.	G	Firm.
" 24	V.P.	G	"	G	Jonathan spot slight	G	"
" 31	V.P.	G	"	G	Jonathan spot—good flavour.	G	"

GRIMES GOLDEN

Picking Date	Plot		November 20th		December 20th		January 30th
Sept. 22		F	Immature	M	*Scald (2) Shrivelled	M	Flavour not developed
" 27	1	F	"	M	" (2) "	M	" "
" 27	2	F	"	M	" (3) "	M	" "
" 27	3	F	"	M	" (2) "	M	" "
" 27	4	M	"	M	" (2) "	M	" "
" 27	5	F	"	M	" (3) "	M	" "
" 27	6	M	"	M	" (2) "	M	" "
Oct. 3	1	G	Good maturity	F	" (2)	F	Good flavour.
" 3	2	G	"	F	" (1)	F	"
" 3	3	F	Immature	F	" (1) Shrivelled	F	Poor flavour.
" 10	2	G	Good maturity	G	" (1)	G	Good flavour.
" 10	3	G	"	G	" (1) Shrivelled	F	Fair flavour.
" 10	5	G	"	G		M	"
" 10	6	F	Immature	M	Scald (1) Shrivelled	M	"
" 17	1	G	Over mature	F	Several broken down	M	"
" 17	2	G	Good maturity	G		G	Good flavour.
" 17	3	F	Over mature	F	Several broken down	F	"

*Degrees of Scald—(1) Slight; (2) Medium; (3) Severe.

McINTOSH RED

Picking Date	Plot		November 20th		December 20th		January 30th
Sept. 12		M	*Shrivelled (3)	M	Poor flavour	M	
" 15		F	" (1)	F	Good flavour	M	
" 22		F	" (1)	F	Fair flavour	M	Internal browning.
" 27	1	M	" (3)	M	Flavour and texture poor.	M	" "
" 27	2	M	" (3)	M	" "	M	
" 27	3	M	" (2)	M	" "	M	Internal browning.
" 27	4	M	" (2)	M	" "	M	" "
" 27	5	M	" (2)	M	" "	M	" "
" 27	6	M	" (3)	M	" "	M	" "
Oct. 3	1	M	" (3)	M	" "	M	" "
" 3	2	M	" (2)	M	" "	M	
" 3	3	M	" (2)	M	" "	M	Internal browning.
" 3	6	M	" (2)	M	" "	M	" "
" 10	1	M	" (2)	M	" "	M	" "
" 10	2	M	" (2)	M	" "	M	
" 10	3	M	" (2)	M	" "	M	

*Degrees of Shrivelling—(1) Slight; (2) Medium; (3) Severe.

GROWTH OF APPLES DURING PICKING SEASON

In an endeavour to determine the increase in size made by apples during the normal picking season careful measurements were made of a number of apples this year. Ten apples of each of six varieties were measured on September 12 and again on October 2. The following table shows the average increase in diameter in thirty-seconds of an inch per apple.

TABLE SHOWING INCREASE IN SIZE MADE BY APPLES BETWEEN SEPT. 12th AND OCT. 2ND

Variety	Average diameter Sept. 12th	Average diameter Oct. 2nd	Average increase in diameter
	inches	inches	inches
Grimes Golden	3 1/32	3 6/32	5/32
McIntosh	2 24/32	2 28/32	4/32
Wagener	2 22/32	2 26/32	4/32
Yellow Newtown	2 24/32	2 28/32	4/32
Delicious	2 21/32	2 24/32	3/32
Rome Beauty	2 13/32	2 15/32	2/32

EXPERIMENT IN PICKING BARTLETT PEARS

An experiment was conducted this season to ascertain the approximate date when Bartlett pears should be picked in order to develop full flavour and keeping quality. As with apples, the exact calendar date when pears should be harvested varies with seasonal conditions, but by carrying on an experiment over a number of years it is possible to determine the approximate date at which the fruit reaches the best state of maturity for harvesting, and the length of time over which the picking may be extended without injury to the flavour and keeping quality of the fruit. Every day from August 12 to September 9 twelve pears were picked, wrapped, and stored in a concrete basement, where the temperature was between 40 and 50 degrees F. and the relative humidity varied from 70 to 90 per cent.

The following table shows the date at which the fruit reached edible condition and includes notes as to condition and flavour.

TABLE SHOWING RESULTS OF PICKING EXPERIMENT WITH BARTLETT PEARS

Date Picked	Date Ripe	Condition	Remarks
Aug. 12	.....	Badly shrivelled	Unedible
" 13	.....	" "	"
" 14	.....	" "	"
" 15	.....	" "	"
" 16	.....	.....	
" 17	Sept. 7	Shrivelled	No. flavour
" 18	" 8	"	3 unedible—No flavour.
" 19	" 8	2 badly shrivelled	Lacking in flavour.
" 20	" 9	3 "	" "
" 21	" 9	1 centre rot	Fair flavour
" 22	" 9	Firm	"
" 23	" 9	2 centre rot	"
" 24	" 9	Firm	"
" 25	" 9	"	"
" 26	" 9	"	"
" 27	" 12	2 wrinkled	"
" 28	" 13	Firm	"
" 29	" 13	"	"
" 30	" 13	"	"
" 31	" 14	wrinkled	"
Sept. 1	" 16	Firm	"
" 2	" 16	"	"
" 3	" 18	"	"
" 4	" 18	"	"
" 5	" 18	"	"
" 6	" 18	"	"
" 7	" 20	"	"
" 8	" 20	"	"
" 9	" 22	"	"

Project 65.—The above table shows the water applied during each ten day period throughout the irrigation season, which in 1921, extended from the beginning of May till the end of August. During May, only one application was made to each orchard, but in the case of the cultural apple orchards this irrigation was split up—half of each orchard being irrigated early in the month and half near the close. This plan was instituted in an endeavour to determine what influence, if any, irrigating before, during, and after the blossoming period had on the setting of fruit. During 1921 no injurious effect, due to irrigating at any of these stages of bloom, was noted. Our observations extend over one season only, however, so that no definite statement can yet be made concerning the advisability of applying irrigation water during the blossoming period. The condition essential to the setting of fruit appears to be the maintenance of a uniform moisture supply in the soil. If such a condition can be maintained without irrigation during the blossoming period it is probably safer to refrain from applying water at this time, but where there is danger of the soil drying out before the fruit is set it would seem to be preferable to apply the water regardless of the stage of bloom.

The most critical period of the irrigation season of 1921 occurred during the second and third week of July. A sudden heat wave, coupled with an acute shortage of irrigation water occurred at this time. Every effort was made to keep sufficient moisture in the soil to maintain the strong growth which the trees were making, and, as can be seen by reference to the chart, more water was applied during July than during any other month. Notwithstanding this fact there was not sufficient moisture available to the trees to prevent them from ripening their wood prematurely. Upon subsequent irrigation a second growth started on many trees, and this did not mature properly before winter set in. The condition was accentuated owing to the fact that the water shortage continued on into August, making it necessary to delay the final irrigation of some of the orchards until the end of that month. In No. 1 orchard, where clean cultivation is carried on, the effect of this delay was especially noticeable. The irrigation and subsequent cultivation late in August tended to keep the trees in a growing condition, so that defoliation was incomplete when zero weather occurred in November.

A comparison of the water requirements of the various orchards to date indicates that clean cultivation has been most economical of water, while the demand on the moisture supply has been greatest where the alfalfa sod mulch system is practised.

An experiment to determine the desirability of fall irrigation was carried out this year. An application of three acre-inches was made to the south half of Nos. 3 and 4 orchards early in November. At time of application the soil in No. 4 orchard was very dry, while there was already a good moisture content in the soil of No. 3. The effect of this treatment on the condition of the trees will be observed closely in 1922.

Date	No. 1		No. 2		No. 3		No. 4		No. 5		No. 6		A		U.S.		L.S.	
	In.	Hrs.	In.	Hrs.	In.	Hrs.	In.	Hrs.	In.	Hrs.	In.	Hrs.	In.	Hrs.	In.	Hrs.	In.	Hrs.
May 1–10	0·6	24	2·4	31	1·4	22	1·5	28	0·6	28	1·1	29						
11–20	1·1	26	4·2	34	.....		1·7	32	.....		.....		5·0	45	2·7	50	2·8	50
21–31	.....		.....		2·6	23	.....		1·1	27	1·6	26	.....		.....		.....	
May totals	1·7	50	6·6	65	4·0	45	3·2	60	1·7	55	2·7	55	5·0	45	2·7	50	2·8	50
June 1–10	.....		3·0	30½	2·8	25	1·2	30	0·6	22½	0·8	17	.....		.....		.....	
11–20	1·1	40	.....		.....		.....		.....		.....		1·0	21	1·2	40½	1·0	27
21–30	.....		.....		3·1	27	1·6	33	1·6	32½	2·2	40	3·2	29	.....		.....	
June totals	1·1	40	3·0	30½	5·9	52	2·8	63	2·2	55	3·0	57	4·2	50	1·2	40½	1·0	27
July 1–10	.....		5·3	42	.....		2·8	47	.....		.....		.....		3·8	69	2·7	66
11–20	2·0	30	5·8	48	4·0	36	3·3	48	1·4	19½	2·4	50½	.....		5·0	55	2·1	27
21–31	.....		.....		.....		2·0	51	1·5	41½	.....		4·8	41	.....		3·4	33
July totals	2·0	30	11·1	90	4·0	36	8·1	146	2·9	61	2·4	50½	4·8	41	8·8	124	8·2	126
Aug. 1–10	.....		5·0	27½	3·2	19½	1·6	27	1·6	45	2·5	34	4·7	47	.....		.....	
11–20	1·5	54½	.....		4·1	37½	.....		.....		.....		.....		.....		2·6	44
21–31	.....		6·0	39½	.....		1·6	43½	.....		.....		.....		.....		.....	
Aug. totals	1·5	54½	11·0	67	7·3	57	3·2	70½	1·6	45	2·5	34	4·7	47	.....		2·6	44
Season Totals..1921	6·32	174½	31·75	252½	21·22	190	17·29	339½	8·42	216	10·625	196½	18·7	183	12·7	214½	14·64	247
1920	5·70		25·50		16·20		13·50		9·30		14·00		18·08		11·98		8·62	
1919	3·66		18·00		13·55		10·15		11·61		12·27							
1918	1·91		20·50		15·02		16·18		7·52		13·67							
1917	4·39		20·21		17·33		15·21		12·87		12·14							
1916	5·25		9·41		9·90		7·36		6·50		11·33							
Average for 6 years	4·54		20·89		15·54		13·28		9·37		12·34							
Fall irrigation Nov. 5-9, 1921	.....		.....		3·0	23½	3·0	38½	(South half of each orchard only).									

EXPLANATION—

Chart shows Cultural Apple Orchards numbered 1 to 6.
1—Clean cultivation—2 acres.
2—Alfalfa sod mulch—2 acres.
3—Hairy Vetch—2 acres.
4—Alfalfa—New seeding—2 acres.
5—Vegetable intercrops—2 acres.
6—Farm rotation, 2 acres.

Variety Apple Orchard—3a—Timothy and clover—3 acres.

Stone Fruit Orchards—Upper S.—Vetch—2·6 acres.
Lower S.—Alfalfa—New Seeding—3·4 acres.

Amount of water applied per acre at each irrigation is shown in *acre inches*. Time required to apply water at each irrigation is shown in *hours*. The quantity of water applied per acre, and time required to apply it, is totalled for each month, and for the entire season. The season total is compared with the total water applied per acre each year since the orchards were planted, and an average application for the six years is calculated. The fall irrigation applied to Nos. 3 and 4 Cultural Orchards in November, 1921, is shown separately.

DISEASES AND INSECT PESTS

Project 68.—The entire orchard was sprayed with lime sulphur 1 to 9 in April, and the cultural apple orchards were sprayed with Black Leaf 40 in June.

POWDERY MILDEW was much more prevalent this year. Partial control was secured by the removal and destruction of affected twigs early in the season, but it will probably be necessary to spray for this disease in 1922.

FIRE BLIGHT made its first appearance in the orchard this year. The infection was confined to a few isolated cases of twig blight, occurring mostly on trees of the Wagener variety.

CODLING MOTH was discovered in the orchard in early autumn. The infection was local, the area where wormy apples were found being restricted to four acres at the extreme west end of the orchard. Immediately upon discovery of the infestation, all

windfall apples were gathered up and destroyed. The field packing house was burned down to make sure of the destruction of any cocoons which might be spun up in the cracks and crevices of the building. Investigation of a number of cars on the railway siding adjacent to the farm revealed the fact that there were a number of empty cocoons in a refrigerator car. This discovery left no doubt as to the source of the infestation. Every precaution is being taken to prevent the spread of the pest to nearby orchards.

GREEN APHIS made their appearance in the cultural orchards early in June, but a prompt application of Black Leaf 40 gave satisfactory control.

SMALL FRUITS

A number of varieties of currants have been grown between the trees in the variety apple orchard since 1916, the object being to ascertain the varieties which thrive best under Okanagan conditions. The following table shows the average yield per bush in 1921, with notes as to fruit and bush characteristics.

IRRIGATION OF VEGETABLES

Project 78.—The experiment with different amounts of water for vegetables was continued this year. The primary object of the experiment is to determine the most economical amount of water to apply to various truck crops, grown under the soil and climatic conditions prevalent in the southern Okanagan. The block of land chosen as the site of the experiment slopes gently to the east. The soil is a sandy loam underlaid with a coarse sandy subsoil. The experiment includes eight plots, each one-twentieth of an acre in area. Four of these plots are planted to vegetables each year, the other four being sown to vetch, which is ploughed under to maintain the nitrogen and humus content of the soil.

The following chart shows the rate per acre at which water is applied to each plot in acre inches, the time which was required to apply this water in 1921 in hours, the number of applications, and the date when each application was made.

The above table shows that the soil took up water less rapidly as the season advanced. It was found impossible to get the soil to absorb more than three acre inches of water in a ten-hour day. Consequently, since the water could not be accurately measured at night, it was found necessary to prolong the irrigation of plots C and D over two and sometimes three days.

Photo showing Plot B, Vegetable Irrigation Experiment. Note the thrifty, vigorous growth of all crops, in spite of the fact that water was applied at the rate of only 12 acre inches per acre during the entire season.

Variety	Fruit Characteristics							Bush Characteristics	
	Average yield per bush	Date of ripening	Date of picking	Size of bunches	Size of fruit	Flavour	No. of bushes	Size of bushes	Remarks as to vigour, amount of new growth, quality of foliage, etc.
BLACK CURRANTS									
	lb.								
Magnus	14½	July 5	July 13	Medium	Large	Sour	6	Large	New growth profuse and thrifty, foliage healthy.
Boskoop Giant	13½	" 2	" 6	Large	Large	Excellent	6	Large	Bushes robust, new growth profuse, foliage clean.
Buddenborg	7½	" 10	" 13	Small	Medium	Fair	5	Large	Bushes robust, new growth profuse, foliage healthy.
Topsy	5½	" 5	" 13	Small	Small	Fair	6	Medium	Bushes in poor condition, suffered from drought.
RED CURRANTS									
Wilder	25½	July 10	July 13	Large	Medium	Excellent	6	Medium	New growth strong and abundant, foliage good.
Chautauqua	21½	" 5	" 8	Large	Large	Good	6	Large	Bushes healthy, new growth strong.
Red Cross	20½	" 9	" 9	Small	Medium	Good	5	Medium	New growth strong and vigorous, foliage healthy.
Greenfield Red	20½	" 5	" 8	Medium	Small	Sweet	5	Medium	New growth strong, foliage good, but some green aphis.
Versaillaise	18½	" 5	" 7	Medium	Medium	Good	6	Medium	New growth strong, foliage healthy.
Diploma	15	" 8	" 8	Small	Large	Good	6	Medium	New growth strong and abundant, foliage healthy.
Cumberland Red	14½	" 1	" 5	Small	Small	Sweet	6	Medium	Bushes in poor condition, suffered from drought.
Cherry Red	14	" 5	" 8	Large	Large	Sour	6	Medium	New growth strong, foliage healthy.
Fertile d'Angers	8	" 1	" 5	Medium	Large	Sour	6	Small	New growth thrifty, foliage very luxuriant.
Comet	8	" 1	" 5	Medium	Large	Fair	5	Small	New growth strong, foliage healthy and abundant.
Admirable	7	" 5	" 8	Large	Large	Poor	5	Medium	New growth very strong and abundant, foliage healthy.
Fay's Prolific	6½	" 2	" 6	Large	Large	Sour	6	Small	New growth sparse but thrifty, foliage rich and healthy.
Redpath Ruby	5	" 5	" 10	Small	Small	Sweet	2	Small	Bushes in poor condition, suffered from drought.

CURRANTS—YIELDS AND PICKING NOTES, 1921—*Concluded.*

Variety	Fruit Characteristics							Bush Characteristics	
	Average yield per bush	Date of ripening	Date of picking	Size of bunches	Size of fruit	Flavour	No. of bushes	Size of bushes	Remarks as to vigour, amount of new growth, quality of foliage, etc.
WHITE CURRANTS	lb.	July	July						
White Grape	20	" 5	" 10	Small	Small	Sweet	6	Large	New growth strong, foliage luxuriant, but attacked by green aphis.
Bar le Duc	16	" 10	" 15	Large	Large	Good	4	Large	Bushes robust, foliage luxuriant but badly attacked by green aphis.
White Cherry	15	" 10	" 13	Medium	Small	Fair	5	Large	Bushes making good growth, foliage healthy.
Large White	12	" 10	" 15	Medium	Medium	Good	6	Large	New growth sparse, foliage badly attacked by aphis.
De la Rochepoge	5	" 10	" 15	Large	Small	Sour	2	Small	New growth abundant and thrifty, foliage healthy.

Summary.

Summary: Black Currants—With proper care any of the four varieties listed above should give good results.
Red Currants—The two outstanding varieties as regards yield and vigour were Chatauqua and Wilder; other varieties recommended are: Fay Prolific and Perfection.
White Currants—All varieties tested gave good yields, Bar le Duc and Large White are recommended.

TABLE SHOWING APPLICATION OF WATER TO VEGETABLE IRRIGATION PLOTS, 1921

Date of application	Number of applications	Water applied	Time required to apply water
	Plot A		
June 1st	1st	2 acre inches	4 hours
" 15th	2nd	2 " "	7¼ "
" 29th	3rd	2 " "	7¾ "
Season total	3 applications	6 " "	19 hours
	Plot B		
June 1st	1st	3 acre inches	6 hours
" 15th	2nd	3 " "	10¾ "
" 29th	3rd	3 " "	10½ "
July 14th	4th	3 " "	10½ "
Season total	4 applications	12 acre inches	37¾ hours
	Plot C		
June 1st and 2nd	1st	3·6 acre inches	9½+6 =15½ hrs
" 15th and 16th	2nd	3·6 " "	9½+7 =16½ "
" 29th and 30th	3rd	3·6 " "	9 +8 =17 "
July 14th, 15th and 16th	4th	3·6 " "	9 +9+8 =26 "
" 30th, 31st and 1st	5th	3·6 " "	9 +9+8 =26 "
Season total	5 applications	18·0 acre inches	101 hrs.
	Plot D		
June 1st, 2nd	1st	4 acre inches	9½+ 8 =17½ hrs
" 15th, 16	2nd	4 " "	9½+10 =19½ "
" 29th, 30th	3rd	4 " "	9½+10 =19½ "
July 14th, 15th. 16th	4th	4 " "	9+10+10=29 "
" 30th, 31st, 1st	5th	4 " "	10+10+13=33 "
Aug. 15th, 16th. 17th	6th	4 " "	10+10+13=33 "
Season total	6 applications	24 acre inches	151½ hrs.

TABLE SHOWING 1921 YIELDS FROM VEGETABLE IRRIGATION PLOTS

BEANS (STRINGLESS GREEN POD—70FT. ROW)

Date	Plot A	Plot B	Plot C	Plot D	Remarks
	lb.	lb.	lb.	lb.	
July 13	2	4	1½	¾	Date of ripening delayed, and yield reduced where larger amounts of water were applied.
" 18	7	12	8	6	
" 21	5	6	5	4	
" 25	5	10	8	8	
" 29	6½	2½	3½	2½	
Aug. 3	4½	2¼	1¾	3½	
" 17	5	4	3	7	
Total	35¼	41¼	30¾	31¾	

CABBAGE (DANISH BALL HEAD—30 FT. ROW)

Oct. 20	12	16	23	33	Yield increased by greater amounts of water.

CARROTS (WHITE FIELD—100 FT. ROW)

Date	Plot A	Plot B	Plot C	Plot D	Remarks
	lb.	lb.	lb.	lb.	
Oct. 20	101	71	113	157	Yield increased by larger amount of water.

CORN (GOLDEN BANTAM—100 FT. ROW)

Aug. 6	25	24	24	31	Most thrifty growth at lower ends of rows, where least water was received.
" 13	35	15	12	30	
" 18	8	2	19	19	
Total	68	41	55	80	

CUCUMBERS (DAVIS PERFECT—100 FT. ROW)

Date	Plot A	Plot B	Plot C	Plot D	Remarks
	lb.	lb.	lb.	lb.	
July 20	1	1½	.....	1½	Yield increased by larger amounts of water.
" 22	3	3	1	2	
" 25	10	11	6	9	Comparatively low yield in Plot due to poor germination of seed.
" 29	11½	12	5	8½	
Aug. 5	15	35	22	27	
" 13	15	34	18	23	
" 17	20	28	26	33	
" 27	16	44	23	35	
Sept. 2	15	34	27	51	
" 10	28	29	38	42	
" 24	25	32	49	52	
Total	159½	263½	215	284	

MELONS (HOODOO—100 FT. ROW)

Sept. 24	.....	¾	.....	.....	Date of ripening delayed and yield reduced by larger amounts of water.
Oct. 1	3½	1¼	.....	.....	
" 12	8	28	.....	.....	
" 20	14	11	5	1	
" 20	36 (green)	15 (green)	53 (green)	53 (green)	
Total	61½	56	58	54	

POTATOES (JERSEY ROYAL—100 FT. ROW)

Aug. 4	17	36	24	37	Yield reduced where smallest amount of water supplied.
" 10	32	56	40	34	
" 15	59	79	77	73	
Total	108	171	141	144	

TOMATOES (EARLIANA—100 FT. ROW)

Aug. 5	4	8	.....	.....	Date of ripening delayed but yield increased by larger amounts of water.
" 13	27	20	20	12	
" 18	21	15	21	15	
" 27	23	21	32	25	
Sept. 2	12	8	30	12	
" 10	8	18	22	38	
" 24	9	7	28½	39	
" 24	54 (green)	41 (green)	76 (green)	85 (green)	
Total	158	138	229½	226	

Project 72.—Selections of Hoodoo cantaloupe and Earliana tomato were made again this year. The object of this work is to isolate superior strains of these varieties of vegetables. In 1921 seed was saved from ten outstanding plants of Hoodoo cantaloupe. The seed from each of these plants will be sown separately in 1922, and detailed records kept of the performance of the progeny of each individual plant. The characteristics to which particular attention is given in making the selections are: yield, size, shape, netting, ribbing, earliness, uniformity, firmness and shipping quality of the fruit; colour, thickness, texture and quality of the flesh; also vigour and disease resistance in the vines.

A similar procedure is followed in the work with Earliana; selections being made with a view to isolating a strain possessing the qualities desired in a table tomato for the retail market. Further selections are also made with the object of developing another strain to meet cannery requirements. The qualities to which most importance is attached in making the selections are:—yield, smoothness, uniformity, earliness, size, shape, colour, firmness, and shipping quality of the fruit; colour, texture, solidity and quality of the flesh; also vigour and disease resistance in the vines.

EXPERIMENTS WITH POTATOES

This year we carried out numerous tests with varieties of potatoes, the results being shown in the following table. With the exception of Ormandy and Pride of Montmamah the seed was grown on this Station. Our experience shows that seed grown in the Dry Belt shows increased lack of vigour year after year. This was so marked during the year under review that we decided to keep none of our own seed for 1922, but to make an entirely new start.

The following varieties (seed received from the Experimental Farm, Ottawa), were grown in the orchard devoted to truck crops. The growth of the tops in each instance was vigorous.

The low yield of all varieties is explained by the late date of planting, and also by the fact that owing to a shortage of irrigation water and to the diversity of crops grown in this orchard it was not possible to apply water at such times and in such quantities as to provide optimum conditions of soil moisture for the promotion of tuber growth. Neither can the experiment be considered a fair comparative test, since in all cases the yield varied directly with the distance the variety was planted from the tree rows. That is to say the yield of those varieties planted nearest to the tree rows was in all cases less than that of those varieties which occupied the land further away from this competing crop.

POTATOES, VARIETY TEST

Area of Plot, 1/83 acre. Soil, Gravelly loam

Name of Variety	Date of planting	General vigour and uniformity of plants based on score of 1-10	Yield of marketable tubers in lb.	Yield of small tubers in lb.	Total yield in lb.	Per acre yield in lb.
Ormandy	May 11	10	210	58	268	22,244
Oregon Beauty	"	10	203	43	246	20,418
Pride of Montnamah	"	10	146	64	210	17,430
Jersey Royal	"	10	142	38	180	14,940
Drought Proof	"	9	141	42	183	15,189
Rural New Yorker	"	8	111	26	137	11,371
Jones White	"	10	109	49	158	13,114
Agassiz Special	"	9	105	40	145	12,035
Hillcrest	"	8	91	33	124	10,292
Table Talk	"	8	89	39	128	10,624
Netted Gem	"	10	81	35	116	9,628
Dalmeny Beauty	"	9	81	39	120	9,960
Million Dollar	"	6	81	50	131	10,873
Livingstone	"	6	74	23	97	8,051
Delaware	"	8	60	49	109	9,047
Hard to Beat	"	6	58	31	89	7,387
Factor	"	7	55	23	78	6,474
Mortgage Lifter	"	4	53	16	69	5,727
Gold Coin	"	6	49	14	63	5,229
American Wonder	"	5	48	25	73	6,059
Royal Russet	"	7	43	21	64	5,312
Morgan Seedling	"	7	43	37	81	6,723
Early Norther	"	6	42	12	54	4,482
Carman No. 1	"	6	37	35	72	5,976
Empire State	"	9	35	17	52	4,316
New Queen	"	6	30	14	44	3,652
Green Mountain	"	3	25	12	37	3,071
Ashleaf Kidney	"	3	23	14	37	3,071
Vick Extra Early	"	3	14	17	31	2,573
Eureka	"	3	12	16	28	2,324
Irish Cobbler	"	3	10	11	21	1,743
Everett	"	3	8	14	25	2,075
Early Ohio	"	3	7	14	21	1,743
Rochester Rose	"	3	6	21	27	2,241
Triumph	"	4	5	13	18	1,494
Reeves Rose	"	3	5	18	23	1,909

Planted April 11, 1921. Harvested October 28, 1921

Yield per Acre—lb.

Variety		Commercial	Small	Total
Great Scott	O-918	6,500	1,000	7,500
Majestic	O-915	9,250	1,500	10,750
King George	O-923	16,300	4,500	20,800
Kerr Pink	O-916-17	4,000	1,250	5,250
Edzell Blue	O-919	10,750	2,500	13,250
Raleigh (Planted 27, V-21)		17,800	2,800	20,600

VEGETABLE CULTURE

Numerous varieties of vegetables were tested with the following results:—

BRUSSELS SPROUTS

Project 79.—Four varieties of these were grown, viz: Dwarf Gem, Paris Market, Dalkeith, and Amager Market; but none of them produced any sprouts. We have tested this vegetable for several years with similar results. Under most favourable conditions Paris Market seems to be the most satisfactory.

BEETS

Project 80—

Row	Variety	Yield
30 ft.	Detroit Dark Red, thinned to 2 inches	89 lb.
30 ft.	Detroit Dark Red, thinned to 3 inches	86 "
30 ft.	Detroit Dark Red, thinned to 4 inches	50 "

The three highest yields were given by:

1st.	Detroit Dark Red	98 lb.
2nd.	Crimson Globe	97 "
3rd.	New Dandy	82 "

BEANS

Project 81.—Experiment on different dates of planting:

Length of row	Variety	Date of planting	Date ready for use	Yield
Feet				lb- oz.
30	Round Pod Kidney Wax	June 20	Aug. 13	7 12
30	" "	" 27	" 17	8 9
30	" "	July 4	" 31	5 8
30	" "	" 11	" 31	3 12
30	Stringless Green Pod	June 20	Aug. 13	28 0
30	" "	" 27	" 16	21 6
30	" "	July 4	" 29	3 5
30	" "	" 11	" 29	8 12
30	Refugee	June 20	Aug 17	16 7
30	"	" 27	" 24	9 2
30	"	July 4	" 30	5 10
30	"	" 11	Sept. 7	4 3

In the variety tests the highest yields were obtained on the 30-ft. row from—

Extra Early Valentine	27 lb.
Davis White Wax	15 lb. 9 oz.
Kentucky Wonder Wax	14 lb. 10 oz.

CAULIFLOWERS

Project 82—

Planted	Variety	Date ready for use	Yield
			lb.
April 7	Early Snowball. Protected with cheese cloth.	July 15	18 good heads
" 7	Early Snowball. Not protected.	" 15	16
" 7	Early Erfurt. Protected with cheese cloth.	" 15	20
" 7	Early Erfurt. Not protected.	" 15	17

CABBAGE

Project 83—

Twelve varieties of cabbage were grown. Good results were obtained from Kildonan, Flat Swedish and Enkhuisen Glory. Through an oversight Danish Ballhead was omitted from our variety tests. This variety has always given us great satisfaction.

CARROTS

Project 84.—Experiments on distances apart in the rows.

Length of rows	——	Variety	Yield
			lb. oz.
30 ft	Thinned to 1½"	Chantenay....	112 12
30	" 2"	" ...	84 2
30	" 3"	" ...	74

Carrots of good marketable size.

In the tests of varieties Select Chantenay gave the highest yield.

CUCUMBERS

Project 85.—The most satisfactory cucumber for this district appears to be Davis Perfect. We have tested this variety for a number of years and it has invariably given good results. This year it gave the highest yield yet. From 3 hills 6 by 6 feet, we gathered 100 pounds.

SWEET CORN

Project 86.—These tests included 17 varieties. Golden Bantam still maintained its superiority. In fact, for commercial purposes this is practically the only variety to grow. Cobs ripened on September 14. The earliest to ripen was Pickaninny, ready on August 14, but this is a dwarf small eared variety.

EGG PLANTS

Project 87.—3 varieties tested as follows:—

Length of row	Variety	Date planted	Date ready for use	Yield
				lb. oz.
30 ft. 18 in. in rows	New White Round	April 6.....	Aug. 20.....	93 6
30 ft. 18 in. in rows	New York Purple	" 6.....	" 26.....	114 0
30 ft. 18 in. in rows	Black Beauty.....	" 6.....	" 25.....	77 13

The variety recommended is New York Purple

LETTUCE

Project 88.—Eleven varieties were tested, all being satisfactory. The varieties to be recommended are Grand Rapids and Iceberg.

WATERMELONS

Project 89.—4 varieties were tested with results as follows:—

	Variety	Date planted	Date ready for use	Yield
2 hills 9' x 9'.....	Harris' Earliest.....	June 1.....	Sept. 10.....	37 melons.
3 hills 9' x 9'.....	Ice Cream.....	" 1.....	" 10.....	31 "
3 hills 9' x 9'.....	Cole Early.....	" 1.....	" 21.....	30 "
2 hills 9' x 9'.....	Fordhook.....	" 1.....	" 10.....	23 "

Burpee's Baby Delight was omitted from our tests this year. This is a water melon which we can highly recommend; it is small and of excellent flavour.

MUSK MELONS

Project 90—

—	Variety	Date planted	Date ready for use	Yield
2 hills 9′ x 9′	Extra Early Hackensack	June 1	Sept. 10	46 melons.
2 hills 9′ x9′	Netted Gem	" 1	" 19	33 "
3 hills 9′ x 9′	Hoodoo	" 1	" 10	104 "
2 hills 9′ x 9′	Montreal Improved Nutmeg	" 1	" 19	96 "
2 hills 9′ x 9′	Emerald Gem	" 1	" 10	49 "
3 hills 9′ x 9′	Paul Rose	" 1	" 26	80 "
3 hills 9′ x 9′	Hearts of Gold	" 1	" 26	120 "

For commercial purposes the Hoodoo is unsurpassed. Emerald Gem and Paul Rose are both good.

ONIONS

Project 91.—Cultural tests with onions, to determine the advantage or otherwise of raising plantlets in the hotbed as against seeding in the open and thinning to distances of one, two and three inches apart in the rows.

Row	Thinned to	Variety	Date planted	Date ready for use	Yield
Feet					lb. oz
30	Hotbed 1″	Large Red Wethersfield	April 16	Oct. 11	3 12
30	Outside 1″	" "	" 19	" 11	3 10
30	" 2″	" "	" 19	" 11	11 2
30	" 3″	" "	" 19	" 11	2 14
30	Hotbed 1″	Giant Prize Taker	April 16	Oct. 11	4 8
30	Outside 1″	" "	" 19	" 11	4 4
30	" 2″	" "	" 19	" 11	9 0
30	" 3″	" "	" 19	" 11	5 14
30	Hotbed 1″	Yellow Globe Danvers	April 16	Oct. 11	1 8
30	Outside 1″	" "	" 19	" 11	3 0
30	" 2″	" "	" 19	" 11	4 14
30	" 3″	" "	" 19	" 11	3 8
30	Hotbed 1″	Extra Early Flat Red	April 16	Oct. 11	3 12
30	Outside 1″	" "	" 19	" 11	3 8
30	" 2″	" "	" 19	" 11	3 6
30	" 3″	" "	" 19	" 11	2 4

All onions were badly attacked by maggot, which to a great extent accounts for the irregularity in the yields.

The sets were not so badly effected with maggot.

Row	Planted	Variety	Date planted	Date for use	Yield
Feet					lb oz.
30	1″	Onion sets	April 18	Sept. 15	23 4
30	2″	"	" 18	" 15	21 0
30	3″	"	" 18	" 15	20 3

PUMPKINS

Project 92.—The most satisfactory variety we have found is the Small Sugar. This also gave the highest yield.

PEAS

Project 93.—Cultural tests to determine the most satisfactory date for planting. Four varieties planted out at intervals of a week with the following results:—

Length of row	Variety	Date planted	Date ready for use	Yield	
Feet				lb.	oz.
30	Thos. Laxton	April 28	June 28	7	10
30	"	May 5	July 2	7	8
30	"	" 12	" 2	11	13
30	"	" 19	" 20	5	8
30	"				
30	McLean Advancer	April 28	July 1	13	15
30	"	May 5	" 4	10	10
30	"	" 12	" 20	11	6
30	"	" 19	" 20	6	14
30	Gradus	April 28	July 1	7	9
30	"	May 5	" 1	7	4
30	"	" 12	" 20	6	10
30	"	" 19	" 20	3	0
30	Danby Stratagem	April 28	July 20	2	10
30	"	May 5	" 20	4	0
30	"	" 12	" 20	5	2
30	"	" 19	Aug. 4	5	8

In the variety tests the highest yields were obtained from 30-ft. row McLean Advancer.

Variety	Planted	Date ready for use	Yield	
			lb.	oz.
McLean Advancer	May 5	July 4	22	14
Western Beauty	" 5	" 15	13	13
Stratagem	" 5	" 26	12	3

PARSLEY

Project 94.—Four varieties tested as follows: Triple Curled, O.H.M. Moss, Dwarf Perfection, Exquisite Dwarf. All gave good results.

RADISHES

Project 95.—Three varieties as follows: Early Scarlet Turnip, Icicle, Scarlet Turnip White Tip. All were planted on April 22, were ready for use May 27, and were all satisfactory.

SPINACH

Project 96.—Five varieties and strains were treated. The most satisfactory were New Zealand and Longstanding.

SQUASH

Project 97—

Hills	Variety	Date planted	Date ready for use	Yield	
				lb.	oz.
3 hills 9′ x 9′...	English Bush Marrow	June 1	Aug. 2	53	—
3 hills 9′ x 9′...	English Vegetable	" 1	" 2	55	..
3 hills 9′ x 9′...	Delicious	" 1	Oct. 14	17	..
3 hills 9′ x 9′...	Hubbard	" 1	" 14	17	..
3 hills 9′ x 9′...	Golden Hubbard	" 1	" 14	16	..

All these varieties were quite satisfactory.

TOMATOES

Project 72a.—Cultural tests to determine the advantage or otherwise of pruning the plants.

No. of Plants	Variety	Pruned to	Date planted	Date ready for use	Yield	
					lb.	oz.
10 plants—						
4′ x 4′	Chalk's Early Jewel	1 stem	April 4	Aug. 13	89	0
4′ x 4′	" "	2 stems	" 4	" 13	103	1
4′ x 4′	" "	Unpruned	" 4	" 13	159	12
10 plants—						
4′ x 4′	Bonny Best	1 stem	April 4	Aug. 13	75	2
4′ x 4′	"	2 stems	" 4	" 13	116	0
4′ x 4′	"	Unpruned	" 4	" 13	147	9

The varieties recommended for cannery purposes are: John Baer, Chalk's Early Jewel and Earliana (if smooth). Landreth is in big demand by some of the canneries. We have not yet tested this variety but are planning to do so during the coming year.

Sufficient data have not yet been collected to justify a definite statement as to the water requirement of individual truck crops, but from the two years' work which have been conducted it is apparent that it is quite possible to apply too much water for the optimum development of crops such as beans, corn and melons. Again, the yields from Plot A, where only three irrigations were given, and where the water was run for only 19 hours during the entire season, demonstrate that when the soil is kept in good condition for absorbing and retaining moisture, and when proper attention is given to cultivation, it is possible to grow satisfactory crops of many vegetables with very little water.

ORNAMENTAL GARDEN

As in previous years, our lawns and ornamental garden were very much appreciated by the numerous visitors to this Station. The picturesque log building which was erected for the accommodation of visitors was frequently in use. New shrubberies were planted out round about the log building, near the office building, and grounds were very much improved around the residences on the upper bench. New roses were planted in the rose garden to fill up the gaps left after the severe winter of 1919-20. In our report last year appeared a list of roses that successfully withstood the severity of the fall of 1919. The following is a list of roses that have given satisfaction on this Station and we can recommend anyone about to make a rose plantation to make selections therefrom:—

ROSES

Margaret Dickson,
Ulrich Brunner,
Juliet,
Triumph,
Paul Neyron,
Viscountess Folkstone,
Frau Karl Druschki,
Mme. Caroline Testout,
George Dickson,
Hugh Dickson,
Mme. Ed. Herriott,
American Beauty,
Soleil d'Or,
Souv. de President Carnot,
Prince de Bulgaria,
George Arends,

Roses—*Concluded*

King George V,
Mrs. John Laing,
Gruss an Teplitz,
Climbing Roses
Dorothy Perkins, white,
Captain Christy,
Kaiserin Augusta Victoria,
Hiawatha,
Captain Christy,
Wakefield Christy Miller,
Gen. Superior Arnold Janssen,
Dorothy Perkins, pink,
Tausendschon,
Crimson Rambler,
Gloire de Dijon.

During the spring we had a splendid display of bulbs, the following being especially good:—

TULIPS

Pelican,
Artus,
Clara Butt,
Baron de la Tonnaye,
Chrysolora,
Isabella,
Phillippe de Commines,
Duchesse de Parma,
Picotee,
Isis,
La Tulip Noire.

NARCISSI

Golden Spur,
Madame de Graaffe,
Barri Conspicuus,
Emperor,
Poeticus Ornatus,
Empress,
Sir Watkin.

CROCUSES

Five varieties, all did very well.
King of Whites,
Large Yellow,
Lothair,
Baron Bruno,
Sir Walter Scott.

SNOWDROPS

These did not do very well; only a few bloomed.

We give below a list of the flowers that have been tried out on this Station for a number of years, giving satisfaction. Those easy to grow are indicated by x; those of which seed can be sown outside by *, and those which should be raised in hot-bed by †—

x * Acrolinium,
x * Alyssum Dwarf,
x † * Anthirrhinum,
x * Brachycome (Swan River Daisy),
x * Calendula Officinalis,
x * Chrysanthemum,
x * Cosmos,
x * Eschscholtzia,
x * Helichrysum,
x * Larkspur,
x * Linum,
† * Lobelia Ramosa,
x * Mignonette,
x * Nemesia,
x † * Ageratum Mexicanum,
x Amaranthus,
† x Aster,
x * Candytuft,
x * Coreopsis,
x * Clarkia,
x * Godetia,
x * Kochia tricophylla,
x * Lavatera,
x * Sweet Peas,
x * Gysophila,
x * Nicotiana,
† * Lobelia,

SNOWDROPS—*Concluded*

x * Pansy (best to start in late summer and use as biennial),
x † * Phlox Drummondii,
x * Poppy,
x * Rudbeckia,
x * Scabious,
x * Purple Sunflower,
x * Tagetes (African marigold),
† * Verbena,
x * Malope,
x * Nigella (the Devil in the Bush),
x † * Pyrethrum (Golden Feather),
x † * Schizanthus,
x * Marigold French,
x * Nasturtium,
x * Orange Daisy,
x * Corn Flower (*Centaurea yanus*)
x * Portulaca (in the sun),
x † * Salpiglossis,
x † * Stocks,
x * Sweet Sultan,
x * Linaria,
x * † Petunia,
x * Virginian Stock,
x * Balsam,
x * Morning Glory.

BIENNIAL FLOWERS

x * Iceland Poppy (Papaver nudicule),
x * Campanula (Canterbury bell, Protect in winter with green brush),
x * Pansy (Sow in late summer, protect with leaves in winter),
x * Hollyhock (is best as biennial),
x * Wallflower,
x * Sweet William (*Dianthus barbatus*),

PERENNIAL FLOWERS

x * Arabis, Single,
x * Aubretia,
x Arabis, double (start from cutting after flowering),
x * *Alyssum saxatile,*
* *Campanula Isophylla* (start root cutting),
† * *Campanula pyramidalis,*
x * Columbine,
x * Delphinium,
x * *Dianthus deltoides* (Maiden Pink),
x * *Dianthus plumarius,*
x * *Gypsophila paniculata,*
x † Heuchera (Alum root), Protect in winter with spruce branches,
Iris, Plant root,
† * *Physalis Franchetti,*
x * Pyrethrum,
x * Saponaria,
† * Oriental Poppy,
x * *Chrysanthemum maximum* (Shasta Daisy),
x * Lupinus,
x * *Lychnis chalcedonica,*
x * *Lathyrus latifolia,*
x * *Anthemis Kelwayi,*
Sedums,
* Rudbeckia (Golden Glow), (Root Division),
x * *Rudbeckia purpurea,*
x * *Veronica spicata,*
* Paeony,
* Dahlia.

CEREALS

The work of the Cereal Division at this Station is to conduct experiments in testing out cereals of favourable promise. This particularly applies to new selections and varieties originated at the Central Experimental Farm, Ottawa. The accompanying tables give the results in average yields of this work for the years 1916 to 1920 inclusive.

YIELD OF GRAIN ON TEST PLOTS OVER A PERIOD OF 5 YEARS, 1916-1920.

Pounds per acre

Variety	1916	1917	1918	1919	1920	Average
Barley—						
Chevalier	1,412	1,740	1,875	1,515	1,950	1,698
Manchurian Ottawa 50	1,350	1,635	2,000	1,070	1,035	1,418
O.A.C. 21	1,225	2,340	1,700	1,520	435	1,444
Charlottetown No. 80	.....	.....	1,840	971	225	1,012
Hulless	.....	.....	.....	.....	495	495
Oats—						
Banner Ottawa 49	1,400	1,455	1,920	1,095	850	1,344
Daubeney Ottawa 47	1,225	3,135	1,935	1,380	970	1,729
Victory	1,054	2,445	2,120	875	1,200	1,539
Ligowo	1,228	2,175	1,460	740	2,100	1,541
Liberty Ottawa 480 (Hulless)	.....	.....	.....	900	369	635
U.B.C. Banner	.....	.....	.....	.....	390	390
Wheat—						
Marquis Ottawa 15	1,142½	1,995	1,635	1,320	970	1,412
Prelude Ottawa 135	637½	1,215	1,920	920	855	1,109
Red Fife Ottawa 17	1,350	2,205	1,300	470	960	1,257
Huron Ottawa 3	1,300	1,650	1,940	1,170	2,205	1,617
Pioneer Ottawa 195	1,275	1,780	1,520	1,060	1,320	1,391
Ruby Ottawa 623	.....	.....	1,480	1,240	510	1,077
White Russian	.....	.....	.....	.....	420	420

The Daubeney oats gave the highest yield during the five year test. This oat is not well known on the market. It should be better distributed, especially for late districts.

In the year 1921 nineteen varieties of wheat, oats and barley were sown in duplicate plots one sixtieth of an acre in extent. Owing to soil variations, particularlly as regards water-holding capacity, extreme care was exercised in locating plots on representative soil. Spring conditions for seeding and growth were very favourable, and the grains made excellent growth. Later in the season, however, portions of the grain under test suffered a severe check owing to water shortage. This setback particularly occurred on plots that were unfavourably situated as regards soil conditions and distance from irrigation flumes. The high weight per bushel of the majority of the grains should be noted. All plots were sown on the 19th of April. Two irrigations were applied throughout the season—May 19 to the 20, 2.14 acre-inches; and June 25 to the 29, 11.16 acre-inches. The total amount of water applied for the season was 13.3 acre-inches.

The results of the grain variety test for 1921 are shown in the following tables.

WHEAT—VARIETY TEST

Soil, gravelly loam.

Variety	Date of ripening	Number of days maturing	Average length of straw including head in inches	Strength of straw on scale of 10 points	Average length of head	Actual yield of grain per acre in in pounds	Weight per measured bushel after cleaning
Pioneer, Ottawa 195	July 26	99	43	7·5	3·5	2,160	64
Burbank	" 27	100	34	10·0	3·0	1,950	65
Marquis, Ottawa 15	" 26	99	33	10·0	3·5	1,920	63
Ruby, Ottawa 623	" 20	93	37	9·5	3·0	1,590	64
Red Fife, Ottawa 17	" 29	102	36	9·5	3·5	1,350	60
Prelude, Ottawa 135	" 18	91	39	8·0	3·0	1,230	63
Huron, Ottawa 3	" 30	103	43	10·0	4·0	960	62
White Russian	" 23	96	31	9·5	4·0	870	55

OATS—VARIETY TEST

Daubeney, Ottawa 47	July 23	96	54	6·5	9·0	2,550	36
Victory	" 22	95	49	8·0	8·5	2,310	36
Banner, Ottawa 49	" 25	98	55	9·0	10·0	2,160	38
Ligowo	" 26	99	54	8·0	9·0	2,100	39
Liberty, Ottawa 480	" 28	101	48	9·0	10·0	480	44

BARLEY—VARIETY TEST

O.A.C. 21	July 26	99	43·5	9·5	3·5	3,960	53
Chevalier	" 20	93	36·0	10·0	3·5	2,640	56
Manchurian, Ottawa 50	" 20	93	33·0	7·5	3·5	2,580	52
Himalayan, Ottawa 59	" 20	93	27·0	9·0	3·0	2,280	65
Hulless	" 24	97	29·0	8·5	3·0	1,890	65
Charlottetown No. 80	" 20	93	25·0	10·0	3·5	960	54

Twenty-nine varieties of beans were planted. Of these, two were numbered sorts from the Vancouver Island Experimental Station. All varieties were planted on May 14 and early development was good. In considering the low yields per acre it should be noted that no water was available for this crop between May 31 and August 3. During this period of water shortage the plants received a very severe check. The high weight per bushel of all varieties under test should also be noted. Irrigation water applied throughout the season was as follows: Month of May, .42 acre inches, and August, .67 acre inches, or a total of 1.09 acre inches. This amount of water, if applied at the proper time, would have given far better results.

For several years the following varieties have given very satisfactory results:—

Yellow Eye,
Norwegian,
White Pea,
Extra Early Refugee,
Canadian Wonder,
Small Navy.

BEANS—VARIETY TEST

Project 18—Area of plots, 1-47th acre. Soil, loam. Fertilizer, 10 tons barnyard manure per acre.

Name	Actual yield of Beans in pounds per acre	Weight per measured bushel after cleaning
Small Navy	997	65
Canadian Wonder	874	67
Extra Early Refugee	789	66
Pearce's Improved Tree	789	66
White Pea	704	67
Robust Navy Pea	633	67
Yellow Eye	574	65
Norwegian Ottawa 710	514	63
Hodson Long Pod	479	67
New Prizewinner	460	67
White Marrowfat	386	69
New Stringless Green Pod	369	67
V. I. S. No. 3	369	66
V. I. S. No. 7	354	64
Grennell's Wax	339	68
White Creaseback	339	67
Refugee	317	64
White Navy S. D.	310	64
White Navy	304	66
Grennell's Rustless	292	68
White Wonder	292	66
Sutton's Wax	281	65
Large White Ottawa 713	263	66
Navy Ottawa 711	225	65
Valentine Wax	223	63
Golden Wax	210	66
Bountiful Green Bush	210	65
Beauty Ottawa 712	163	67
Extra Early Valentine	139	63

KHARKOV—FALL WHEAT

Area of plot, 1½ acres. Soil, gravelly loam.

Date of Sowing	Date of Ripening	Yield of grain per acre in pounds	Weight per measured bushel after cleaning in pounds	Number of bushels per acre
Sept. 27, 1920	July 11, 1921	1,376·66	63	22·94

Remarks:—This wheat was sown to make use of a piece of land where grass seed failed to catch. It is not recommended.

The cereal division is conducted under a five year rotation, as follows:—

1st year. Cereal Test Plots.

2nd year. Clover and Grass mixture.

3rd year. Clover and Grass mixture ploughed under in autumn.

4th year. Peas and Oats, cut green for hay.

5th year. Hoed crop, variety tests—Beans and Corn.

The following table gives the grass and clover mixture employed in this rotation. Although the second crop was cut for seed it will be noted that it is primarily a hay mixture.

FORAGE CROPS

The early part of the season up to the middle of June was very favourable for good development of all forage crops. The mangel and carrot variety tests suffered several checks owing to untimely irrigation during the water shortage of July and August. Forty-eight grass and clover plots were seeded, and early development was good. With the water shortage in July, however, it became necessary to plough the plots under. This scarcity of water also prevented the seeding of the proposed Western Rye variety tests. New work was started with alfalfa, with the object in view of determining the actual influence of planting, harvesting, irrigation methods and water amounts on alfalfa seed production. Notwithstanding the water shortage this season for this division of work, 94 plots, each one-fiftieth of an acre in extent were successfully established. The season of 1922 will give the first year's results for this special work. Work was begun in July of this year with native bunch grass (agropyron spicatum) with a view to developing constant varieties particularly suitable for improving the natural dry grazing lands throughout the southern interior of British Columbia. Very careful selections were made from which 2,300 plants were planted in the field in early autumn.

CLOVERS AND GRASSES

Hay. Mixture for Bench Lands

Area of Plot, 2½ acres. Soil, gravelly loam.

Clover and grass mixture used	Rate sown per acre	Plot seeded	1921 First cutting June 9, for hay	1921 Second cutting Sept. 12 for seed	Yield per acre	
					Hay	Seed
	lb.		lb.	lb.	lb.	lb.
Alsike..... 5 lb. Red Clover..... 5 lb. Tall Oat Grass.....10 lb. Orchard Grass..... 5 lb. Italian Rye Grass..... 5 lb.	24	April 29, 1920	6,205	212	2,482	84·8

CLOVERS AND GRASSES

Grass plots tested prior to 1920 were watched carefully and checked up with other grasses at the B.C. Agronomy Conference each year, and this mixture can be recommended to farmers to use where a strong mixture is needed. The grasses made good pasture, both early and late.

Area of plot, 2 acres. Soil, gravelly loam.

Clover and grass mixture used	Rate sown per acre	Plot seeded	1921 First cutting	1921 Second cutting	Yield per acre	Irrigation					
						Rate of application in acre inches					
						April	May	June	July	Aug.	Total for season
	lb.		tons lb.	tons lb.	tons lb.						
Orchard Grass... 8 lb. Red Top..... 8 lb. Tall Meadow Oat Grass.....12 lb. Red Clover..... 8 lb. Alsike..... 8 lb. Meadow Fescue... 9 lb. Timothy..... 3 lb. Italian Rye Grass 2 lb.	24	April 28, 1920....	June 20, 5 270	Aug. 12, 1 1,960	3 1,115	12·30	12·19	31·44	37·94	3·19	97·06

MANGELS—VARIETY TEST

Area of Plot, 1/112th acre. Soil, light, sandy loam. Sub-soil, sand. Fertilizer, 10 tons barnyard manure to the acre

Name	Source	Planted	Yield per acre	
			tons	lb.
Mammoth White Feeding	Summerland	March 30	22	1,360
Yellow Intermediate	Ottawa	"	21	1,680
Sludstrup	Summerland	"	20	1,720
Golden Tankard	Rennie & Co., Winnipeg	"	20	600
Danish Improved	McKenzie, Brandon	"	20	320
Giant Rose	Scandanavian R. Wiboltt, Denmark.	"	19	920
Mammoth Long Red	Steele Briggs, Winnipeg	"	19	80
Yellow Oval	Scandanavian and R. Wiboltt	"	18	1,520
Sludstrup	Summerland	"	18	400
Giant Yellow Globe	Rennie & Co., Winnipeg	"	17	1,100
Giant Long Red	McKenzie, Brandon	"	16	1,600
Giant White Greentop	Scandanavian and R. Wiboltt	"	15	1,920
Prizetaker	McKenzie, Brandon	"	15	1,360
Tankard Cream	Rennie & Co., Winnipeg	"	15	968
Golden Fleshed Tankard	Steele, Briggs, Winnipeg	"	15	800
Red Intermediate	Sutton, Winnipeg	"	15	560
Giant White Sugar	Rennies, Winnipeg	"	15	240
Yellow Intermediate	Sutton, Winnipeg	"	15	240
Kitchener, Ont	Steele, Briggs, Winnipeg	"	14	1,680
Prize Winner	Sutton, Winnipeg	"	14	1,568
Weilbull's Rose Feeding	McFayden, Winnipeg	"	14	1,120
Weilbull's Eckendorfer Red	McFayden, Winnipeg	"	14	560
Giant Yellow Half Long	Rennie & Co., Winnipeg	"	14	560
Red Half Sugar	Winnipeg	"	14	280
Giant Red Eckendorfer	McFayden, Winnipeg	"	14	–
Golden Globe	Sutton, Winnipeg	"	13	880
Golden Tankard	Sutton, Winnipeg	"	13	840
White Jumbo	Rennie & Co., Winnipeg	"	13	600
Yellow Intermediate	Charlottetown	"	13	320
Half Sugar White	Charlottetown	"	12	920
Weilbull's Cylinder Barres	McFayden, Winnipeg	"	12	920
Yellow Leviathan	Agassiz, B.C.	"	12	920
Giant White Feeding	Rennie & Co., Winnipeg	"	12	640
Yellow Intermediate	Charlottetown	"	12	360
Yellow Globe	Steele, Briggs, Winnipeg	"	12	80
Eckendorfer Yellow	McFayden, Winnipeg	"	11	1,184
Sludstrup	Kentville, N.S.	"	11	640
Leviathan	Rennie & Co., Winnipeg	"	10	720
Alfa Half Sugar	Winnipeg	"	9	866

Irrigation water applied as follows—

IRRIGATION

Rate of application in acre inches

May	June	July	August	Total
1·29	3·98	26·98	3·83	36·08

Mangels hold such an important position in dairy and beef feeds that they should be considered more by stockmen in the Dry Belt where turnips are so ravaged by aphis. Mangels hold first place in root crops. We recommend early seeding and plenty of seed, especially where land is liable to crust over. We have been testing mangels for a number of years, but during the war many varieties were not available and averages only of a few are given.

The total amount of irrigation water applied to the mangel and sugar beet crop throughout the season was 36.08 acre inches. Notwithstanding this large amount of water the plants occasionally severely suffered owing to the light, sandy nature of the soil and the irregular water supply. No irrigation was available for this crop from July 14 to August 6, a period of twenty-three days, during which time the majority of the plants were unable to hold up their leaves. From observations, it would seem that plants possessing large, compact tops with curly or wrinkled leaves have greater drought resistant powers.

Recommendations are as follows:—

Intermediate mangel for bench land and the long red type for deep bottom lands.

AVERAGES

Three of these varieties have been grown for three years. The following are the average results for three years.

Variety	Yield	Per acre
	tons	lb.
Mammoth Long Red	36	877
Golden Tankard	33	293
Yellow Leviathan	22	507

SUGAR BEETS

Project 24.—Four varieties of true sugar beets for sugar content analysis were grown this year under the same conditions as the mangels. The yields were as follows:—

Fertilizer, 10 tons barnyard manure per acre. Area of Plot, 1/112th acre. Soil, light, sandy loam. Subsoil, sand

Seed Grown	Supplied by	Planted	Yield per acre	
			tons	lbs
Chatham	(Dominion Sugar Co.)	March 30th	14	1,680
Waterloo	" "	"	13	1,160
British Columbia	" "	"	13	1,120
Kitchener	" "	"	13	1,050

Samples of each were submitted to the Dominion Chemist for analysis, with the following results:—

Variety	Weight of one root		Sugar in juice	Solids in juice	Coefficient of purity
	lb.	oz.	%	%	%
British Columbia	3	6	18·72	21·83	85·74
Chatham	2	1	21·36	23·83	89·62
Kitchener	3	10	19·16	21·80	87·86
Waterloo	2	15	20·90	23·20	90·07

MANGELS FOR SEED

Project 29

Area of Plot, ½ acre. Soil, gravelly loam. Fertilizer, 10 tons barnyard manure per acre.

Variety	Date of Seeding	Yield of Seed per acre	Weight per measured bushel	Irrigation			Total for season
				Rate of application in acre inches			
				May	July	Aug.	
		lb.	lb.				
Seed grown at Summerland Danish Sludstrup variety...	April 28	880 (cleaned seed)	19	8·25	5·02	3·55	16·82

Remarks:—The crop made very fair progress during the month of May, but owing to no water being available for this crop during June a decided check in growth was experienced, which was largely responsible for the low yield.

Carrot Seed

Project 25.—Selected roots of White Intermediate carrot were planted in No. 5 Orchard in April. Seed was harvested at the rate of 820 pounds per acre. Selection for yield and quality of root is being continued.

Carrots come next to mangels in importance, and where light land is to be used take first place from a tonnage point of view. Owing to the early drying winds quickly evaporating the surface moisture, we recommend early seeding at an approximate depth of 1¼ inches.

Area of Plots, 1/41 acre. Soil, silt loam. Fertilizer, 15 tons barnyard manure per acre-

Variety	Source of Seed	Planted	Yield in tons per acre	Irrigation		
				May	August	Total for season
			tons lbs.	acre ins.	acre ins.	acre ins.
Danish Champion	Central Experimental Farm, Ottawa	May 19th	28 170			
White Intermediate	E. S. Summerland, B.C.	" 19th	23 330			
Giant White	Sutton's Seed Co., Winnipeg	" 19th	13 1,142			
Ontario Champion	Graham Bros.	" 19th	9 1,065	4·88	6·00	10·88
Yellow Belgian	Wm. Rennie & Co., Toronto	" 19th	9 655			
White Belgian	Wm. Rennie & Co., Toronto	" 19th.	5 1,480			

Remarks:—No irrigation water was available for this crop between May 22 and August 18. During this time the plants suffered a severe check, and growth practically ceased. With the advent of an irrigation on the 18th of August the recovery of the plants was rapid; growth was resumed and continued late into autumn. Considering the shortage of water in the early part of the season the yields far exceeded our expectation. For a number of years the White Intermediate has given good results.

Soy Beans

Projects 44 and 45.

Area of Plot, ¼ acre. Soil, gravelly loam. Fertilizer, 10 tons barnyard manure per acre.

Date of Seeding	Yield of seed per acre	Weight per measured bushel after cleaning	Irrigation	
			Rate of application in acre inches	
			July	Total for season
	lb.			
May 18th	440	62	3·38	3·38

Remarks.—The Soy bean is recommended as a soil improver, and a crop that will give satisfactory results, under very dry conditions on light soils. It makes excellent fodder when cut green. The Summerland soy bean was obtained from the only plant that set seed out of 5 acres of commercial seeding. From this, 5 plants were obtained the next year. One year ago we seeded an acre of these beans with very fair results.

CORN VARIETY TEST

Project 21

Area of Plot, 1/50 acre. Soil, sandy loam. Fertilizer, 10 tons barnyard manure per acre

Variety	Planted	Yields per acre			Irrigation			
					Rate of application in acre inches			
		Corn on cobs	Stalks	Total weight of corn and stocks	June	July	Aug.	Total for season
		lb.	lb.	tons lb.				
Compton's Early	May 27th	6,250	58,750	32 1,000	4·52	1·44	0·28	6·24
North West Dent	" 27th	9,000	46,000	27 1,000				
Longfellow	" 27th	3,000	51,000	27 –				
Yellow Flint	" 27th	8,000	42,000	25 –				
North Dakota	" 27th	300	47,750	24 50				
Leaming	" 27th	1,500	46,000	23 1,500				
Wisconsin No. 7	" 27th	2,000	45,500	23 1,500				
Bailey	" 27th	2,250	42,000	22 250				

From the results of testing corn for several years we recommend Longfellow and North West Dent. These varieties have given very fair yields and reliable seed is easier to obtain of these varieties.

AVERAGES

The following are the average results for three years of these two recommended varieties:—

Variety	Yield per acre	
	tons	lb.
Longfellow	21	667
North West Dent	19	1,867

KUDZU GRASS

Project 98.—Seed was scarified, soaked, and sown in a greenhouse flat on June 7th, and transplanted to the field on July 21st. Owing to the late start the plants made only a weak growth. In the autumn half the plants were mulched with straw and half were left with no protection against frost. This spring there was no sign of growth, all plants having apparently perished during the winter.

COW PEAS

Project 99.—A few rows of cow peas were grown in No. 3A orchard in continuation of the soy bean and cow pea nodule experiment begun in 1920. Nodules were very abundant on the soy beans, but comparatively scarce on the cow peas. The cow peas were allowed to go to seed, and selections were made for robustness of plant and yield of seed. Consequently it is not possible to give the yields of forage; but it was apparent that continuous selection for a strain of cow pea which will ripen seed under our climatic conditions has resulted in a reduction of the amount of forage produced.

HUBAM SWEET CLOVER

Project 100.—Seed was sown in a greenhouse flat on June 7th and set out in the field on July 21st. The plants made over three feet of growth and blossomed profusely. Owing to the lateness of planting, however, they failed to mature seed before

winter set in. More extensive trials of this legume will have to be made before a definite statement can be advanced as to its adaptability to Okanagan Valley conditions.

BERMUDA GRASS

Project 101.—A few plants of this grass were planted in 1920 on a very light, dry soil. During the first season of planting the plants lived without irrigation. In the spring of 1921 the grass was so slow in starting growth that it was thought to be dead. A very weak growth was made during the season. From observations made to date it is doubtful whether this grass will be of much value under Okanagan climatic conditions.

SUDAN GRASS

Project 36.—Eight short rows of Sudan grass were grown with very excellent results. The grass was seeded on the 29th of March, and a strong vigorous growth was made. Where the grass was cut in late summer a strong aftermath followed. Sections of this grass were cut at different times for exhibition work, and no records of yields were taken. From one season's observations it would seem that this grass is well adapted to dry belt conditions, for either pasture or silage purposes.

SORGHUM

Project 102.—The sorghum produced was also used for exhibition work. It was exhibited as a silage crop along with Sudan grass, North West Dent corn and Russian Mammoth sunflowers. The crop made splendid growth and withstood drought conditions better than corn and sunflowers growing in the same field. No record of yields were taken.

THOUSAND HEADED KALE AND KOHL RABI

Project 103.—A few rows of each were grown for feeding to the sheep in the early autumn. Owing to severe yearly infestations of aphis on these crops we cannot recommend them for general use.

SUNFLOWERS—DRY MATTER CONTENT ANALYSIS

Project 22.—On June 19th an average row of sunflowers in the field was selected and thinned to three stalks per hill. Once a week a hill was cut from this selected row, carefully weighed and submitted to the Dominion Chemist, Ottawa, for dry matter content analysis. No report of the same has been received to date. The accompanying tables gives the weekly increase of green matter in height and weight.

WEEKLY CUTTINGS OF GREEN SUNFLOWERS FOR DRY MATTER CONTENT ANALYSIS

Date of Cutting	Weight of stalks		Height of stalks	
	lb.	oz.	feet	inches
June 20th	1	11½	4	–
" 27th	3	11½	5	–
July 4th	4	1½	5	7
" 11th	5	10½	6	9
" 18th	4	1½	6	7
" 25th	6	8	9	2
Aug. 1st	10	15	10	–
" 8th	3	½	9	3

SUNFLOWERS—FOR ENSILAGE

Area of plot—2 acres. Soil—silt loam. Fertilizer—10 tons barnyard manure per acre.

Variety	Planting date	Date of harvesting	Yield in tons. per acre	Irrigation			
				June	July	August	Total
Russian Mammoth.....	April 22	Aug. 16	11	5·75	25·37	5·19	36·31

The growing of sunflowers has come into such prominence that we are growing them as a check on corn for yields per acre.

The crop this year was planted on one of the lower benches. Method of planting was three feet apart between rows and two feet apart in the rows. Five to six seeds were planted to a hill. Favourable growing conditions prevailed, and the plants made rapid growth until the middle of August, when considerable wilting occurred, owing to water shortage. On August 8 this crop was standing up in a very fair condition, and it was considered to be able to stand three weeks longer, providing one more thorough irrigation could be given. At this time practically all the plants were in head, with only a small percentage of the flower rays fallen. The water shortage, however, continued, and the crop was cut August 16 and made into silage. Three years' sunflower silage feeding experiments with steers have given very encouraging results. Where corn can be economically grown, however, we would recommend it in preference to sunflowers. It is generally conceded that sunflowers are more drought resistant than corn. Our observations at this Station, however, to date are in favour of corn. Experiments are planned for the coming season to test further the drought resistance of corn versus sunflowers. Sunflowers will grow at a lower temperature than corn, hence may be planted earlier, and in late districts where corn is likely to freeze the sunflower crop should prove valuable.

HULLESS BARLEY

Area of Plot, 2 acres Soil, gravelly loam.

Date of sowing	Date of ripening	Number of days maturing	Yield of grain per acre in pounds	Weight per measured bushel after cleaning lbs.	Number of bushels per acre	Irrigation			
						Rate of application in acre inches			
						May	June	July	Total
March 27...	July 10	103	1,965	64	32·75	6·44	·92	.....	7·36

REMARKS:—Hulless barley has given fair results in unirrigated districts on account of earliness, and under irrigation has yielded well. It is valuable to many farmers who have a short irrigation season. Extreme care should be exercised in treating this grain for smut. Soaking the grain in water for two hours before treatment will lessen the danger of damaging the grain from burning.

NOTE:—The above is included in this place on account of its being in a forage crop rotation.

POULTRY

THE PLANT

The poultry plant at this Station is situated on several acres of rough bottom land immediately to the south of Trout Creek. The situation is sheltered, being surrounded on three sides by hills from sixty to one hundred and fifty feet high, but it is not too much enclosed to exclude the sun. The land is stony and gravelly, but an

attempt is being made to build up a patch on which to grow green feed for the flock. This location has proved quite satisfactory.

BUILDINGS

Near the entrance to the plant is situated the administration building for office, incubator cellar, feed rooms, etc. There are three permanent poultry houses to accommodate one hundred layers each, with runs facing south, and a number of movable colony houses are placed over the range. The types of houses, both permanent and movable, have proved quite satisfactory. Plans of these houses can be obtained free of charge upon application to the Superintendent of this Station.

STOCK

The poultry work is carried on with one breed—the White Wyandotte. At the end of January there were on hand the following:—123 hens, 370 pullets and 32 males. All the former have been carried through from last season, being selected after a rigorous culling from trap-nest records and hatching results in their pullet year, as well as type. The 370 pullets are the pick of the season's rearing, after selected breeding in the spring. The males are all from dams which laid over 200 eggs in the first laying year, and are being held for breeding this spring. A number of hens and pedigreed cockerels were sold in the district last fall.

EGG PRODUCTION

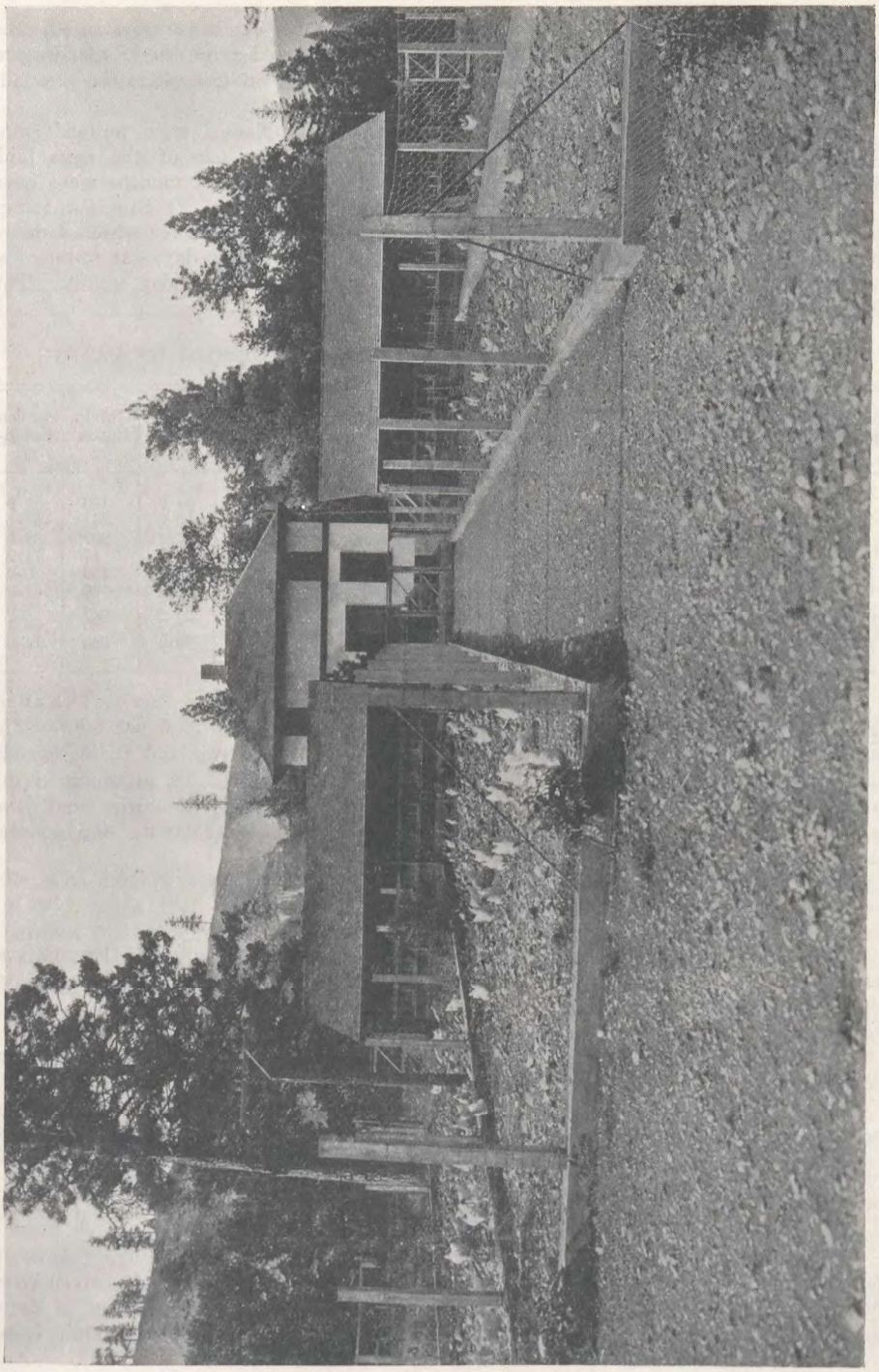
HENS VS. PULLETS BY MONTHS

Date	Hens			Pullets		
	No.	Eggs	Average	No.	Eggs	Average
1920						
November	76	524	6·89	128	1,353	10·57
December	64	374	5·84	252	3,638	14·43
1921						
January	64	321	5·01	329	5,250	15·95
February	64	725	11·33	326	5,204	15·95
March	57	1,002	17·58	295	5,481	18·58
April	54	869	16·09	292	5,246	17·96
May	40	688	17·20	277	5,080	18·33
June	24	455	18·96	261	4,196	16·07
July	16	299	18·68	254	3,954	15·56
August	11	123	11·18	238	2,589	10·83
September	9	57	6·33	181	3,140	17·34
October	7	7	1·00	145	1,911	13·18
Average per bird per year			135·09			184·75
Average per bird per month			11·25			15·38

Below are the records, by groups, of the breeding hens now on hand:—

No. of birds laying 176-200 eggs	58
201-225 eggs	37
226-250 eggs	19
over 250 eggs	9

The average number of eggs in the pullet year for the entire flock of 123 breeding hens is 208.4, the highest individual laying 289. All these birds were raised during the season of 1919.



Permanent Poultry Houses. Administration Building in background.

BREEDING

Project 104.—During the breeding season of 1921 41 hens were used, 136 pullets, and 17 males, 5 of the latter having been imported from the Experimental Station, Sidney, Victoria Island, and the remainder raised on this plant the previous year.

Although so much of the hatching work was accomplished with pullets' eggs, the breeders had been carefully selected, especially for the size of the eggs laid, and only those females which had been laying from three to six months were used at all. Three methods of using the males were followed, viz.: (1) Single matings where the one male was left throughout the season, (2) Large pens for which 4 males were kept, 2 being alternated daily, that is 2 males in the pen to-day, out to-morrow, and two others in, (3) Medium sized pens without males each day about. The table below gives the results by pens for the 1921 season:—

TABLE SHOWING RESULTS OF DIFFERENT METHODS OF MATING

No. of pen	No. of females	Age of females, years	Pullet year laying record	No. of males	Treatment of males	No. of eggs set	Per cent fertility	Chicks hatched	Per cent hatched
1	41	1	185–259	4	Alternate pairs.....	327	64·9	170	51·9
2	38	1	162–239	4	"	432	72·2	247	57·1
6	37	1	155–250	4	"	390	86·2	271	69·5
7	8	3	134–176	2	Alternate single.....	66	81·9	47	71·2
	20	2	142–192			226	88·0	156	70·0
8	9	2	189–233	1	Single mating.....	122	88·5	68	64·0
9	4	3	182–219	1	"	58	54·7	34	58·6
	7	1	197–262			132	78·3	85	64·4
10	13	1	191–289	1	"	353	89·3	253	71·6

NOTE.—From the above table the following conclusions may be drawn: The alternate single matings gave the best hatches with an average of 70·6 per cent. The single matings were better than pairs by 7·1 per cent. The two and three-year-old hens gave 10·6 per cent better results than the pullets. Pen No. 10, although giving such a high fertility and hatching return, was high in mortality of chicks bred compared with other pens; and judging by the progeny for winter laying and general qualities, pens 1 and 9 were the most valuable.

PEDIGREE RECORDS

Full hatching records have been kept of all individuals used during the past two seasons, so that all pens, other than those containing pullets, will be chosen from these records, with a hope that the high standard of fertility and hatching already possessed by this flock may be increased.

The first pullet commenced laying August 25, when five months and eight days old; and three hundred and fifty were laying by December 23, 1921.

So much information of real value is to be gathered from pedigree record keeping that an effort will be made during the season of 1922 to record permanently at least 75 per cent of the chicks hatched.

EXPERIMENT ON INCREASING SIZE OF EGGS

Project 105.—A test pen of 13 hens, whose egg weights, taken during June of their pullet year, averaged 22·6 ounces to the dozen, is mated to a male received from the University of British Columbia, and which was raised from a string of dams laying exceptionally large eggs for this breed. The purpose is to ascertain the value of the male in increasing the size of eggs in its progeny.

INCUBATION AND PRODUCTION

Project 106.—In further confirmation of the information given in last year's report that some time between April 1 and 15 is the ideal period to take off big hatches under local conditions, the following figures are here given:—

Number of birds	Date hatched	First eggs	Number of winter eggs	Average per bird for winter
93	April 12	Sept. 22	5,330	57·3
23	" 17	Oct. 19	1,309	56·9
119	May 6	Nov. 4	5,111	42·9
39	" 11	" 17	1,443	37·0

EFFECT OF WINTER PRODUCTION ON FERTILITY AND HATCHABILITY

Project 107.—From the results tabulated below it would appear that heavy winter production does not affect hatching results during the following spring, but that fertility and hatching qualities vary in proportion to the maturing qualities of the average individuals in the flock.

TABLE SHOWING EFFECT OF WINTER PRODUCTION UPON FERTILITY AND PRODUCTION

Number of eggs to March 1	Number of birds in group	Total eggs set	Per cent fertile	Per cent total eggs hatched	Per cent fertile eggs hatched	Total eggs required for one chick hatched
Over 100	6	168	83·3	69·0	82·8	1·45
76–100	16	263	78·7	63·4	80·4	1·57
50–75	40	573	69·8	58·4	83·7	1·71

HEAVY VERSUS LIGHT LAYERS FOR CHICKS

The following results are from records covering two seasons. Table 1 includes birds hatched 1918 and 1919, for hatching season 1920. Table 2 includes birds hatched 1919 and 1920 for hatching season 1921. For convenience the birds have been divided into groups according to the number of eggs laid by the birds in their pullet year.

Group A comprises birds laying .. .. 100-150 eggs
B " " " .. .. 151-175 "
C " " " .. .. 176-200 "
D " " " .. .. 201-225 "
E " " " .. .. 225-250 "
F " " " .. .. 251-289 "

TABLE 1—1920 HATCHING RESULTS FROM BIRDS HATCHED IN 1918 AND 1919

Group Letter	No. of birds	Eggs set	Infertile	Dead germs	Dead in shell	Hatched	Per cent fertile	Per cent fertile hatched	Per Cent total eggs hatched
A	12	244	63	15	37	129	74·2	71·2	52·8
B	23	434	70	28	123	213	83·9	58·5	49·1
C	21	494	113	35	103	253	76·5	66·4	51·2
D	9	202	65	4	98	98	67·8	71·5	48·5

TABLE 2—1921 HATCHING RESULTS FROM BIRDS HATCHED IN 1919 AND 1920

Group letter	No. of birds	Eggs set	Infertile	Dead germs	Dead in shell	Hatched	Per cent fertile	Per cent fertile hatched	Per cent total eggs hatched
A	10	115	14	11	11	79	87·8	78·2	68·7
B	33	384	52	17	53	262	86·4	78·9	68·2
C	39	567	123	24	65	355	78·3	79·9	62·6
D	25	403	90	10	35	268	77·6	85·6	66·5
E	13	250	44	9	33	164	80·2	79·6	65·6
F	7	183	30	10	25	118	83·4	77·1	64·5

NOTE.—The groups were tabulated from hens in different pens and not mated as arranged in the tables; therefore the individuality of the males would be fairly averaged. The results show only very slight advantage in fertility in favour of the poor producer.

SHIPPING DAY-OLD CHICKS

On March 21 we received by express a shipment of day-old chicks from Vancouver Island, with the following results:—

125 chicks received alive (2 dead in boxes).

30 died in first three weeks, a mortality of 24 per cent.

55 alive July 1, or 44 per cent.

To compare with these, 164 chicks, home hatched, were put into the same brooder at the same time, with the following results:—

No mortality at the end of 3 weeks.

146 alive July 1, or 89 per cent.

DRY V. WET MASH FOR WINTER EGG PRODUCTION

The following table gives a comparison between the feeding of dry and wet mash. Both pens were fed the same amounts of grain. A dry mash was kept before the birds all the time and in addition to this one pen was fed a wet mash composed of the dry mash which is before the birds, but slightly moistened. Each pen consisted of 60 pullets (reduced to 59 in second month) in good condition It was only possible to carry this experiment on for two months, as after that period we were compelled to break up the pens.

WET VS. DRY MASH

Pen No.	Mash	No. of eggs laid	Value per dozen	Total value eggs	Total cost of feed	Cost feed per bird	Cost feed per dozen eggs	Total weight of feed	Weight feed per bird	Weight feed per dozen eggs	Profit per pen	Profit per bird
Dec., 1921—			c.	$ cts.	$ cts.	c.	c.	lb.	lb.	lb.	$ cts.	c.
1	Dry	1,083	0·53	47 83	14 17	23·4	15·7	501	8·3	5·5	33 66	56·1
4	Wet	1,061	0·53	46 86	14 91	28·8	16·8	527	8·8	5·9	31 95	53·2
Jan., 1922—												
1	Dry	942	0·43	33 92	14 72	24·9	18·7	531	9·0	6·7	19 20	32·5
4	Wet	1,006	0·43	36 05	16 11	27·3	19·2	578	9·8	6·9	19 94	33·8

SUMMARY FOR THE TWO YEARS OF WET VS. DRY MASH

Pen No.	Mash	No. of eggs laid	Value per dozen	Total value eggs	Total cost of feed	Cost feed per bird	Cost feed per dozen eggs	Total weight of feed	Weight feed per bird	Weight feed per dozen eggs	Profit per pen	Profit per bird
			c.	$ cts.	$ cts.		c.	c.			$ cts.	c.
1	Dry	2,025	48	81 75	28 89	24·1	17·2	1,032	8·6	6·1	26 43	44·3
4	Wet	2,067	48	82 91	31 02	28·1	18·0	1,105	9·3	6·4	25 94	43·5

BEES

In the fall of 1920 two colonies of bees were prepared for the winter, these being left in the Kootenay cases from which they had not been taken during the summer. These cases have given us great satisfaction and it is proposed to increase the number. To date colonies wintered in the Kootenay case have been lost. The three inches of chaff packing at the bottom and sides, and the protection given at the top, afford excellent protection during the autumn, winter and early spring; it also tends to keep the hive cool in the hot summer months. Further, it obviates the necessity of moving the hives in the spring with the resultant loss of bees; a loss at a time when the life of every bee is a great consideration. The colonies were not fed in the fall, sufficient honey being left in the hive. These two colonies came through the winter in excellent condition. The first thorough examination was made on April 13, at which time there were approximately ten pounds of stores in each hive with seven and five combs respectively covered with bees, eggs and brood being present.

The apples were in bloom from about May 11 to 19, and by the time the first real honey flow came on, towards the end of June (from white Dutch and Alsike clovers) both colonies were in a strong condition to take care of this. The increase at this time was good, but early in July a period of very dry weather set in and the secretion of nectar was very small. During the remainder of the summer there was no period during which the honey flow was abundant but the hive on the scales continued to show small increases up to early September, this coming principally from alfalfa and sweet clover. The amount of extracted honey taken from hive No. 1 was 90 pounds. From hive No. 2, from which a swarm issued on June 3, we took 70 pounds, an average of 80 pounds for each hive spring count.

On June 3 a swarm issued from hive No. 2. This was hived on a new stand, and by August 1 there were about five combs covered with bees. No surplus honey was taken from this colony, but they stored enough for winter feed.

On June 3 we were notified by the express company that two two-pound packages of Italian bees had arrived from San José, California. The bees in both packages were dead. We notified the shippers and they promptly sent a replace consignment. One of these was dead, the other in fairly good condition. This two-pound package with an imported Italian queen was hived in a "Jumbo" hive, and by August 1 four combs were covered with bees. This colony did not store enough honey to carry it through the winter.

Autumn feeding was commenced on October 10 and completed by October 15. The feed consisted of syrup made from pure white granulated sugar, two parts sugar to one of water, as recommended on page 45 of the bulletin issued by the Department of Agriculture, Ottawa, "Bees, and how to keep them."

Four colonies were put away for the winter, two in Kootenay cases and two in four-colony wintering cases. The winter has been long and steady. On March 22 we took a hasty look at them to make sure they had enough food. All colonies appeared to be in good condition.

FIBRE PLANTS

HEMP SEED PRODUCTION FOR FIBRE

Project 108.—The object of the hemp experiments conducted at this station is to determine whether hemp will successfully mature seed in this district, with a view to supplying the prairie provinces with Canadian grown seed for fibre production. Past experiments with hemp culture on the prairies have shown that their season is too short for seed production.

This season's work in hemp seed production gave small results. Of the four varieties under test only one set and matured seed. Up to date, it is quite obvious that not enough seed has been produced. The reason may possibly be that our season

is too short or that we need earlier maturing varieties. With this in mind, very careful selections were made this year of all plants possessing early and heavy seeding capacity. It should be borne in mind, however, that plants having such characteristics are usually somewhat stunted. Since the ultimate aim of this work is fibre production, plant selection for earlier maturity, with its resultant short plants, may not effect the object in view. Next season it is planned to test out home grown selected seed against unselected home grown seed with a view to ascertaining whether the former shows any marked advantage over the latter as regards earliness, seeding capacity and height of plant. It is hoped, however, that next year more encouraging results will be obtained through the use of home grown selected seed, improved irrigation, and possibly earlier planting.

The Tochigi, Tochimengton and Chinamengton varieties under test developed large, sturdy plants. Towards the end of August these plants produced flowers, but set no seed. A variety from Kentucky (name unknown), however, set a heavy load of seed, but only matured a small amount. The results with this unknown variety are as follow:—

A deep sandy soil a little less than one and a quarter acres in area, with a well exposed aspect, was selected for the work. Planting was done on April 15, in hills four feet apart each way. With the exception of a few severe high winds which somewhat damaged the young plants, the early growing season was very favourable and the plants made good progress. Later in the season, however, the plants received another check through water shortage. On June 16, each hill was thinned to five stalks. Prior to this, a very thorough cultivation was given with a single section of a spring tooth harrow. On August 8 the majority of the plants were in full bloom and a few plants had set seed. In early September all male plants or 45·50 per cent of the entire crop were eradicated, this date, however, was a little too late for best results; 1·71 per cent of the crop was selected for earliness and heavy seeding capacity. These selected plants, one hundred and fifty-seven in number, produced seven pounds, two ounces of high quality cleaned seed. The remainder of the crop yielded twenty-six pounds, eleven ounces of cleaned seed, making a total of thirty-three pounds, thirteen ounces from a little under one and a quarter acres. Sixteen pounds five ounces of seed were submitted to the C.P.R. Agricultural Department, Winnipeg Man., to be tested for fibre production.

FLAX FOR FIBRE

Project 109.—Area of plot, ¼ acre. Soil, light gravelly loam.

Variety	Date of sowing	Date of pulling	No. of days maturing for fibre purposes	Actual yield of stems for fibre	Actual yield of cleaned seed	Yield per acre stems for fibre	Yield per acre cleaned seed	Irrigation Water amounts applied for the season in acre inches			
								May	June	July	Total for season
Longstem.....	June 2....	Aug. 10.	70	502	105	2,008	420	1·83	2·36	1·61	5·80

Remarks:—Seed was sown at the rate of two bushels per acre. When the lower half of the stems were yellow and the leaves had fallen the crop was pulled, the seed threshed, and the stalks put up into bundles and forwarded to Ottawa to be tested for fibre purposes.

LAND AND BUILDINGS

LEASE OF LAND FROM INDIAN

In the spring of 1921 we leased from the Indian owner the fifty acres of land lying immediately to the east of this Station along the lake front. At that time there were approximately six acres of meadow and four acres of ploughed land.

We have cleared up a further fifteen acres so that we shall be able to get approximately twenty-five acres under crop this year. This will be arranged under a rotation. Some stumping has to be done on the land but it is intended to seed down this portion to grasses, leaving the stumping to be done at a later date. Some liming and manuring experiments were started on the meadow land last year, and these will be continued.

NEW BUILDINGS

A plant pathologist has now been stationed on the farm, a building 26 by 30 having been put up for the field laboratory of plant pathology. This structure, which is just to the west of the office, has been incorporated into the general scheme of buildings and is a very creditable addition to these. The laboratory has been established for the investigation of fruit tree diseases in the field, and it is hoped that this will make possible the solution of numerous problems with which the fruit grower is confronted.

Horticultural Building

A Horticultural building was erected this year. The concrete basement of this building is divided into four compartments, each having a capacity of 16,000 cubic feet. These basement rooms are frost proof, and equipment will be installed which will make it possible to regulate the humidity of the air in each of them. They were designed for the express purpose of experimenting with the storage of fruit, and will be devoted entirely to this work.

The main floor of the building, which measures 30 by 40 feet, will be equipped for grading and packing purposes, while the upper story will be used for the making and storing of boxes.

Implement Shed

A valuable addition has been added to the implement shed, which will serve as a repair shop for implements and machinery in the winter time. New flumes have been built and old ones replaced. Grades of roads have been improved.

FAIRS AND MEETINS, ETC.

This Station attended the following fairs with an educational exhibit—Penticton, Armstrong, Salmon Arm, Kelowna, Peachland, Summerland, Vancouver and New Westminster. Our exhibit occupied 30 feet of wall space by 4 feet deep, and at some places we were able to extend beyond this, according to the space available. Special features were made of *Orchard Soils* showing samples of soil from six different orchards which have been brought up under different methods of cultivation.

Application of water with working models of flumes and measuring devices.

Poultry.—A hen of high record of productivity, her pedigree and production of her parents, cost of feed, etc.

Forage crops.—Silo models with boxes of silage, etc.

Seed Production.—Seed stalks of mangels, carrots, grains. Glass containers of various vegetable and flower seeds.

Tomatoes.—Boxes of tomatoes from selected seed from this Station—a very smooth and even type of the Earliana.

The Superintendent attended the Western Canada Irrigation Convention at Vernon, the convention of the B.C. Fruit Growers' Association at Victoria, spoke at several Farmers' Institute and other agricultural and horticultural meetings, and made an extensive tour through the Okanagan and Kootenay districts with the Dominion Horticulturist in July. During the winter months, in co-operation with the provincial horticulturists he organized and attended a series of meetings through the Okanagan from Oliver in the south to Salmon Arm in the north, and a similar series throughout the Kootenay district.

VISITORS

Each year shows an increased number of visitors to this Station. Officials from colleges to the south of us have visited us to see what we are doing, and as usual trips have been arranged from neighbouring towns.