DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL SUB-STATION

BEAVERLODGE, ALBERTA

REPORT OF THE SUPERINTENDENT

W. D. ALBRIGHT

FOR THE YEAR 1925

Bee-hives in the shelter of a good wind-break, Beaverlodge Experimental Station.

Printed by Authority of the Hon. W. R. Motherwell, Minister of Agriculture.
Ottawa, 1927

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INTRODUCTION

WEATHER AND CROPS*

After three dry cropping seasons the spring of 1925 opened favourably. An exceptionally deep snow cover, especially in the Grande Prairie district, went away gradually under conditions permitting a certain amount of absorption. Seeding on the Station commenced April 29, but it did not become entirely general until May 4.

Although there seemed to be plenty of moisture in the soil, it is probable that the reserve was less ample than commonly supposed, since the hard subsoil thoroughly dried out by a series of drouthy summers, did not favour permeation. Ever where the late rains of 1924 had rendered roads and fields a sea of mud, it is doubtful whether borings would have revealed a reservoir sufficient to withstand a long siege of drouth.

Good May weather brought crops along rapidly for a while. By the middle of that month some of the grain had appeared. Grass and tree foliage developed rapidly.

By the third week of May grasshoppers were hatching in swarms. Cool, showery weather and a four-degree frost at the end of the month apparently checked them effectively for a while. A certain amount of destruction was wrought by cutworms, and wireworm injury was reported from widely scattered points. In quite a few cases the latter insects had bored into the seed.

Thanks to Professor E. H. Strickland, there is hope that means will be found to combat this wireworm pest by cultural methods. The Northern Prairie Wireworm, as he proposes to name our peculiar Alberta species, does not breed by preference in old grass land. On the contrary, it appears to be most abundant in land long out of sod, and to multiply most rapidly in fields summer-fallowed by ploughing early and deeply. Pending further studies, Professor Strickland recommends shallow, surface cultivation of the fallow until July, infested fields to be ploughed not less than 6 inches deep during the latter half of that month. Such a system of tillage, along with periodical seeding of all land to meadow, has for several years been practised on the Beaverlodge Station, except that the fallow has been ploughed usually in the fore part of July instead of in the latter half and the preliminary cultivation has been rather deeper than he now advises. Even so, comparatively little wireworm injury has been experienced on the Station beyond one or two garden patches where the cultivation had been decidedly varied from the regular procedure.

The Station has been pleased to co-operate with Professor Strickland in his investigation of the problem as affecting the Peace River region, and recommends every reader to apply to the Department of Extension, University of Alberta, Edmonton, for a copy of Research Bulletin No. 2, " Wireworms of Alberta."

During June the favourable early crop prospect relapsed somewhat. Rains, distinctly local and nowhere heavy, had discontinued toward the end of the month.

* For tables showing temperatures and precipitation see page 66.

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On June 19 a mere touch of frost showed itself on the buckwheat. On lower land appreciable injury was done to tender garden crops. The official thermometer registered only 36 degress Fahrenheit, but a thermograph half a mile distant at a slough, 109 feet below the level where the official readings are taken, recorded 28 degrees, a difference of eight degrees.

By Dominion Day meadows had been irredeemably reduced to a light yield, grain was yellowing somewhat in the bottom, potatoes blooming prematurely, and strawberries drying up.

Meantime, grasshoppers had been again multiplying to troublesome numbers, and although poisoned with a measure of success, they later did considerable damage by defoliating grain, discriminating in favour of barley. The greatest difficulty in fighting them was the large area of unoccupied land adjacent to so many of the cropped fields. With a farmer on every half-section the poison campaign would have been more effectual.

The crop situation was much improved by 1⅛ inches of rain toward the end of July, bringing the total since May 1 up to 3.54 inches. A measured 2-acre block of Garnet wheat threshed 24 bushels per acre, machine-run, and a like area of Marquis about 27 bushels, proving again that the Peace River region can produce paying crops on lower precipitation than can less fertile districts with parching climates.

North of the Peace and in certain portions of Grande Prairie the rains had been more copious and crops were heavier. From the Berwyn and Griffin Creek neighbourhoods wheat yields of 41 bushels per acre from 50-acre fields were reported in the local newspaper, while from the alluvial High Prairie district, west of Lesser Slave lake, came a newspaper report of 45 bushels off a field of 105 acres, half of which was Ruby. Correspondence from High Prairie confirmed the tenor of this and elicited other details as follows: 5,062 bushels wheat from 104 acres, or 48 bushels per acre; 97½ bushels of oats per acre; and 72 bushels of barley per acre. It was said that a number of farmers in that district had over a 100 bushels of oats per acre, but records had not been kept with a view to publication.

In the Grande Prairie district August rains renewed the growth and prolonged the filling of grains that were not too far advanced. The Station deferred its harvest of Marquis until August 24, the 2-acre block of Garnet having been cut on the eleventh.

In some districts Marquis was cut "on the green side" as early as the first week in August, and, generally speaking, the 1925 wheat harvest was completed in the eighth month.

Threshing was interrupted by rain in early September and snow in the middle of the month, but was resumed under favourable conditions and rapidly prosecuted, little remaining unfinished after the middle of October. Wheat was, generally, the heaviest crop, it seeming to withstand the mid-summer dry weather better than oats. The coarse grains were more seriously affected by both weather and insects and a feed shortage was anticipated, but a mild winter helped stockmen through.

For the fourth successive season the Station threshed paying yields of alfalfa seed, the crop from intercultivated rows being 8 bushels of cleaned seed per acre, grading No. 1 at Calgary, with fairly good yields also from broadcast stands.

Vegetables and potatoes were productive. On the Peace river flats, where high banks concentrate solar heat, while radiation from a water surface protects from frost at night, J. B. Early, who has a situation permitting the irrigation of 90 acres, produced tomatoes and cucumbers by the ton, and another gardener, Pendell Bush, ripened about 4 tons of tomatoes on 1,800 plants,

occupying about half an acre. There were about as many more that did not ripen. This would bring the total yield up to nearly 9 pounds per plant. Some plants had as much as 25 pounds. He did not irrigate and had no rain from transplanting time until July 23. The land is a warm, south slope and was in tomatoes for the eighth year, never having been fertilized.

In a similar situation at Dunvegan, the writer in early August saw well-filled ears of garden corn 10 or 12 inches long, and ripened beans, some pods of which were 11 inches long.

History in small fruit production was made by R. S. Magill, of Peace River, who ripened 30 Opata plums from one of two trees that bloomed. Loganberries grown locally were exhibited at the Lake Saskatoon Fair.

On the Experimental Station, Champa sandcherries and Oregon Champion gooseberries were notable additions to the list of successful fruiting species, though the Champas did not all ripen. The raspberries produced sparingly, the canes not having been laid down over winter.

Autumn of 1925 was marked by several heavy snowfalls which seemed to presage a hard winter. Ere New Year's, however, chinooks had repeatedly taken the snow away and the ensuing months proved remarkably mild. The first snows came before there was much frost in the ground and on December 12 rows of stakes were driven without trouble, there being only a thin crust of frost occurring a few inches beneath the thawed surface. December notes on the condition of meadow crops and winter grain were taken by the staff, working quite comfortably in summer clothes and minus gloves. The Peace river broke up about the middle of the second week of December, was navigated with rafts and canoes in January and at many points did not again become safe to cross with a team on the ice. During the whole winter to the end of February, 1926, there were only twelve below-zero nights at Beaverlodge, the lowest being —11° on October 28. The only crop failure was the ice harvest, which in some districts had to be cut in ponds and dead water.

GRAIN SHIPMENTS BY DISTRICTS BETWEEN AUGUST 1, 1925, AND JULY 31, 1926.
(1925 CROP YEAR)

—	Wheat	Oats	Barley	Flax and Rye	Aggregate
	bush.	bush.	bush.	bush.	bush.
E. D. & B. C. Railway	1,711,104	857,111	234,910	5,977	2,809,102
Central Canada Railway	615,010	1,600	1,175	.....	617,785
Totals Dunvegan lines	2,326,114	858,711	236,085	5,977	3,426,887
Alberta and Great Waterways	364,930	176,942	115,224	.....	657,096
CANADIAN NATIONAL LINES—					
Athabasca subdivision	.....	.....	.....	.....	1,792,000
St. Paul subdivision	.....	.....	.....	.....	2,968,000
Whitecourt subdivision	.....	.....	.....	.....	355,000
St. Albert subdivision	.....	.....	.....	.....	520,000
Totals Canadian National lines	.....	.....	.....	.....	5,635,000
Grand total all lines north of Edmonton	.....	.....	.....	.....	*9,718,983

*An increase of 1½ million bushels over 1924.

THE TYPE OF FARMING FAVOURED

The Peace River country should be considered neither a ranching nor a straight grain-growing proposition. It is a mixed-farming proposition, but the type will not be that of Eastern Canada. The climate favours cereals more than perennial forage crops, though the latter must have a place, for various reasons. Again the precipitation is irregular, hence crop production varies considerably,

and the man who stocks his farm with enough animals to consume his average feed production would be entirely overstocked in off years and profits would vanish in ruinous liquidation. The writer's opinion is that, for the average man, the best system of farming at present will probably be one that produces about 50 to 70 per cent of the revenue from cash-crops, such as wheat, pure seed grain, grass seed, etc., and the balance from live stock. The proportion will vary, of course, with districts, with farms and according to individual preference.

LIVE STOCK SHIPMENTS

Through the co-operation of Mr. J. A. Macgregor, of the E. D. & B. C. and Central Canada Railways; Mr. John Callaghan, Deputy Minister of Railways, Edmonton; and Mr. R. H. Bell, it is possible to present a tabulation of live stock shipments during the calendar year 1925, as well as aggregate grain shipments for the crop year of 1925.

In the case of the Dunvegan line, which is more definitely within the territory served by the Beaverlodge Station, shipments by districts are first given, followed by the summary of statistics from all the railroads operating in Alberta north of Edmonton. These serve the settlements of the Peace and Athabasca watersheds, together with some lying in country draining to the North Saskatchewan, all within a latitude not long since considered of doubtful worth for agriculture.

Live stock shipments in 1925 over the Dunvegan lines, representing the whole surplus of the Peace River country together with a quota from the district immediately north of Edmonton, showed a very substantial increase over 1924, the totals standing as 57,187 head for 1925 against 51,545 in 1924.

Considering all the Alberta railways north of Edmonton, the figures reveal a slight shrinkage in the aggregate shipments of cattle, sheep, and horses, but a noticeable gain in swine. This accords with the logic of economy. Hogs are converted at Edmonton into a concentrated shipping package with a relatively low carrying charge. The product caters successfully in Britain to a fastidious trade and commands a large and growing premium in price. Our surplus cattle, on the other hand, in order to command a fair price in Britain, must be shipped overseas alive, entailing a high transportation charge. Obviously we compete to much better advantage in hog production, and shall probably continue to do so as long as Britain is the market for our exportable surpluses of bacon and beef.

STATEMENT OF CATTLE, CALVES, HOGS, SHEEP, AND HORSES, SHIPPED FROM POINTS ON THE E. D. & B. C. AND CENTRAL CANADA RAILWAYS DURING 1925

Commodity	District Edmonton to Athabasca river	District Athabasca to Smoky rivers	District Smoky River to Spirit river	District Roycroft to Wembley (chiefly Grande Prairie district)	District McLennan to Whitelaw (chiefly north of the Peace)	Grand Total
Cattle	3,571	1,273	2,359	8,894	3,205	19,302
Calves	181	59	27	269	10	546
Hogs	7,982	4,457	4,853	11,735	7,145	36,172
Sheep	238	114	60	214	189	815
Horses	30	15	.....	295	12	352
Totals all stock	12,002	5,918	7,299	21,407	10,561	57,187

PRICES FOR LIVE STOCK

From good lots originating on the Dunvegan line, figures supplied by the Live Stock Branch show that 667,860 pounds of good to choice steers sold for $37,973.11, an average of $5.68 per hundredweight. Of good to choice heifers 227,300 pounds sold for $10,701.19, averaging $4.70 per hundredweight. Thick smooth hogs, amounting to 809,180 pounds, sold for $94,027.48, averaging $11.62 per hundredweight.

It will be noticed that the price of thick smooth hogs averaged more than twice as much as the price of good to choice butcher steers. Were net proceeds compared the contrast would be still more marked, for the cost of delivering and selling is a dollar per hundredweight for hogs from the end of the line and 85 cents for cattle, and these deductions would make the net price $4.83 as against $10.62—almost 120 per cent more per hundredweight. From intermediate points the disparity in net price would be not quite so pronounced as from the end of the line.

October appeared to be the month of heaviest deliveries in good to choice butcher steers, with May second. With hogs, September was the low month in deliveries, while November and December were the months of heavy shipments. Hog prices held consistently good throughout the year, January being the lowest with a price of $9.67 and August the highest, $12.96.

DAIRYING

As in other parts of Alberta, the production of butter fell off slightly from the heavy increase registered in 1924, probably due to the fact that an ampler grain crop claimed farmers' attention and at the same time rendered them less dependent upon the creamery cheque. Five Alberta creameries, shipping over the Dunvegan lines, made 693,550 pounds of butter against 763,723 pounds in the previous year, but the selling value was slightly greater, being $247,283.85, or over 35½ cents a pound. According to Dairy Commissioner C. Marker, of Edmonton, the total output of the ten Alberta creameries north of Edmonton was 1,335,196 pounds, with a selling price at the factory of $476,336.01. Adding in the output of the Pouce Coupe creamery, located in British Columbia, the make would be 1,367,826 pounds, with a factory selling value of $484,308.18. Dairy butter and by-products would foot up a total considerably above half a million dollars.

POULTRY

From a series of co-operative turkey kills in 1925 dressed turkeys averaged a little better than 10½ pounds in weight and the two carloads netted the growers slightly over 26 cents a pound. No. 1 birds over 12 pounds netted 30 cents. The total proceeds of the co-operative shipment were around $15,000, and Mr. A. R. Judson, District Representative, estimated that all dressed poultry brought between thirty-five and forty thousand dollars into the Grande Prairie District.

Mr. J. H. Hare, Provincial Poultry Commissioner, offers the following rough estimate of the quantity of eggs and poultry shipped from the whole Peace River country, while pointing out that the precise figures are not available: 180,000 pounds turkeys; 100,000 pounds other poultry; 5,000 cases eggs.

The Peace River climate is particularly suited to turkey-raising, which is especially successful in the dry seasons, when some other lines of production are handicapped. Mature birds frequently perch in the open during the coldest weather, though shed shelter is desirable at times.

CEREALS

Cereal work was expanded along several lines. Twenty-five hundred rod rows, of which about one-third were test rows and the remainder flanks, afforded opportunity for the trial of many novelties, as well as certain older kinds of minor promise. The regular variety plots were in quadruplicate, two plots of each variety being on summer-fallow and two others after hoed crops, affording, incidentally, some very interesting comparisons of these two preparations. Two varieties each of wheat, oats, and barley were employed in duplicate plots to compare four rates of sowing, while two wheats, three oats, and one barley were used in a duplicate trial of six dates of planting. The wheats selected for these several cultural experiments were Garnet and Marquis, which were further compared in a measured two-acre block of each, so that altogether these two important kinds were comparable in some twenty-nine instances, with opportunity of observation from many standpoints.

TWO-ACRE BLOCKS OUTYIELDED SOME SMALLER PLOTS

It is noteworthy that the yields of the measured two-acre blocks ran 29 per cent higher than the averages of the twenty-eight small plots of each. It is especially significant that the hundredth-acre date-of-seeding plots in every instance threshed lower yields than the two-acre blocks, although grown in the same field and after like preparation. None of these areas were hand-weeded. It would appear that, with marginal drills removed, the employment of a small plot does not tend to exaggerate yields over those obtainable in field practice where careful harvesting and threshing are done. On the contrary, with hundredth-acre plots there is a danger of reducing yields appreciably by slight losses in reaping and threshing. On such a plot one pound of oats represents nearly 3 bushels in yield per acre, and a pound of wheat 1⅔ bushels. Somewhat larger plots than this are usually employed, and in the main it is believed that, despite troublesome variation, fairly reliable average data usually have been secured.

Seed selection, pure-line propagation, studies of natural hybridization, and participation in two co-operative investigations into the effect of environment upon quality in wheat have been other interesting lines of work. From the last-named, one of the most arresting results of the whole season's effort was brought to light.

EFFECT OF SOIL UPON QUALITY OF WHEAT

A plot of Marquis wheat was sown with seed supplied by T. J. Harrison, Professor of Field Husbandry, University of Manitoba. Convenience located this plot on an area of sunflower stubble on a knoll where the vegetable mould had been originally but 3 or 4 inches deep above a grey zone of mineral deposition. After the plot was sown, the Superintendent reflected from field experience that in all probability this would produce a piebald, starchy wheat, not fairly representative of the district. Accordingly, a few days later some of the left-over seed was sown on an area of summer-fallow where the original brownish-black loam layer had been 5 to 7 inches deep. But for a probably unimportant difference of a few days in the date of sowing, the climatic conditions were alike, yet at harvest time the contrast in appearance between the wheats was most remarkable, one being red, the other yellowish-white.

After requisite samples were despatched to Professor Harrison, smaller ones were sent for inspection to the Dominion Chemist, who submitted them to chemical examination, finding the wheat grown on the deeper black loam

(summer-fallowed) to analyse 45 per cent higher in nitrogen than the wheat grown on the thinner soil (after sunflowers). Results of this analysis follow:—

	Sample No. 1	Sample No. 2
Moisture	10.91	10.36
Nitrogen	2.02	2.93
Protein (N x 5.7)	11.53	16.70
Ash	1.61	1.45
Weight of 1,000 kernels	24.8 gms.	29.7 gms.

No. 1, grown after sunflowers on soil described as vegetable mould 3 to 4 inches thick, underlaid with a greyish silt zone of mineral precipitate. Description of wheat: Piebald, dull, opaque; cross-section starchy.

No. 2, grown on summer-fallow. Soil: " brownish-black loam." Description of wheat: Hard, clear, bright, translucent; no piebald or starchy grains; excellent quality.

The analytical data emphasize the difference between these two samples, confirming the conclusion arrived at from inspection that No. 2 is much the superior grain.

Quite in line are the results obtained by Professor Harrison, who wrote under date of March 9:

Most investigations have gone to prove that there is a greater variation (in quality) due to climate than to soil. As a matter of fact there is a greater variation in your two samples than in all the other samples (from various co-operating stations) put together.

You will be interested to know that the loaf from your good sample was one of the best of all those produced on the prairie, which again has broken our theory that as you go north on the Canadian prairie you get a wheat with a smaller amount of protein.

GENERAL EXPERIMENTAL CONDITIONS

Dry weather and grasshoppers reduced the yields of grain to less than 50 per cent of what they would otherwise have been. The grasshoppers were particularly severe upon the barley, almost stripping the foliage from many plots in certain cultural experiments.

All the larger variety test plots, as well as the date-of-seeding plots, were harrowed with a lever harrow as the plants were emerging. This destroyed many weeds. The thickness-of-seeding test was not harrowed nor were the rod-row plots. The latter were raked lightly with a garden rake at the emergence stage. All except the date-of-seeding plots and the two-acre blocks were hand-weeded once.

VARIETY PLOTS OF WHEAT

Nine varieties of wheat were compared in quadruplicate plots sown 7 by 165 feet and trimmed at harvest to a width of 5 feet, leaving a computable area of 1/52.8 of an acre per plot. Two ranges occurred on the previous season's potato ground and two on fallow immediately to the east of it and on declining ground, which would appear to have possessed some advantage in saturation, as well as in natural soil quality.

For convenience in drilling and harvesting, the summer-fallow and hoe-crop plots of each variety abutted, thus reducing the turning of machinery by half. Partly for convenience in harvesting and partly to equalize as perfectly as possible any variation in soil conditions, the arrangement in each case placed the earliest kind (Reward) on the extreme north and south, with the latest one (Kitchener) in the middle, the four plots of this variety being thus brought together. In binding, this permits working gradually towards the centre as the varieties progressively ripen. This detail of arrangement was observed with advantage in practically all the cereal experiments.

In spite of quadruplication, studied arrangement, and elaborately careful work, the outcome inclines to be erratic. Unequal saturation by spring run-off may account for a good deal. In the potato-ground ranges certain plots, notably Kitchener, Huron and Marquis, ran up onto a high knoll, on one small portion of which germination was delayed, although other areas had plenty of moisture at

that time. For some reason Reward, Early Red Fife, Red Bobs, and Early Triumph did relatively well, while Garnet, Marquis, and Kitchener were below their normal relative performance. Ruby rivalled Garnet much more closely than usual, although located adjacent to it, with Reward on the other hand.

SPRING WHEAT, VARIETY TEST (DRILLED PLOTS), 1925

Variety	Days to mature			Yields of threshed grain per acre					
	1925	Average four years 1922 to 1925	Average six years 1920 to 1925	1925	Average four years 1922 to 1925	Average six years 1920 to 1925	Average seven years 1919 to 1925	Average eight years 1918 to 1925	Average eleven years 1915 to 1925
				bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.
Early Red Fife, O. 16	112	118·7	121·1	27 34	26 16	34 5	.. ..	.. ..	.. ..
Early Triumph	106	115·2	.....	26 24	25 54	.. ..	.. ..	.. ..	.. ..
Garnet, O. 652	102	112·7	.....	23 55	24 48	.. ..	.. ..	.. ..	.. ..
Huron, O. 3	113	118·6	121·9	25 54	29 24	38 38	39 43	39 45	40 26
Kitchener	114	119·2	122·3	24 18	29 48	39 19	.. ..	.. ..	.. ..
Marquis, O. 15	112	118·2	120·6	24 38	25 23	34 4	35 48	34 55	33 25
Red Bobs	107	116·0	118·8	26 33	24 21	34 28	35 58	.. ..	.. ..
Reward, O. 928	103	112·7	.....	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
Ruby, O. 623	102	112·6	113·0	23 6	20 46	26 38	27 41	27 10	.. ..

Varieties of Wheat (Drilled Plots), 1925

Comparing yields on potato ground and on summer-fallow

	Average yield per acre two plots on potato ground			Average yield per acre two plots on summer-fallow			Average yield per acre of the four plots			
	Total crop	Grain	Ratio grain to total crop	Total crop	Grain	Ratio grain to total crop	Total crop	Grain	Ratio grain to total crop	Grain
	lb.	lb.	p.c.	lb.	lb.	p.c.	lb.	lb.	p.c.	bush. lb.
Early Red Fife, O. 16	2,896·0	1,542·0	53·24	3,656·4	1,766·4	48·30	3,276·2	1,654·2	50·49	27 34
Early Triumph	2,943·6	1,597·2	54·26	3,049·2	1,570·8	51·51	2,996·4	1,584·0	52·86	26 24
Garnet, O. 652	2,785·2	1,524·6	54·73	2,758·8	1,346·4	48·80	2,772·0	1,435·5	51·78	23 55
Huron, O. 3	2,996·4	1,478·4	49·34	3,273·6	1,630·2	49·79	3,135·0	1,554·3	49·57	25 54
Kitchener	2,613·6	1,359·6	52·02	2,877·6	1,557·6	54·12	2,745·6	1,458·6	53·12	24 18
Marquis, O. 15	2,521·2	1,359·6	53·92	3,432·0	1,597·2	46·53	2,976·6	1,478·4	49·66	24 38
Red Bobs	2,904·0	1,511·4	52·04	3,326·4	1,676·4	50·39	3,115·2	1,593·9	51·16	26 33
*Reward, O. 928	3,115·2	1,386·0	44·49	4,488·0	2,085·6	46·47	3,801·6	1,735·8	45·65	28 55
Ruby, O. 623	3,022·8	1,412·4	46·72	2,943·6	1,359·6	46·18	2,983·2	1,386·0	46·46	23 06
Totals (except Reward)	22,682·8	11,785·2	51·95	25,317·6	12,504·6	49·39	24,000·2	12,144·9	50·60	.. ..
Averages "	2,835·3	1,473·1	51·95	3,164·7	1,563·0	49·39	3,000·0	1,518·1	50·60	25 18

*Two plots only.

The distinction of Reward in first place is remarkable, since this does not appear to be a particularly high-yielding wheat. It happened that all the plots of this variety were rather favourably situated as to contour and seepage. There is also a possibility that, being a large-kernelled sort, it had the advantage of thin seeding, which, according to cultural tests, appeared to be beneficial in this season. Unfortunately, a question concerning the harvested area of two Reward plots leaves only a pair of them eligible for the tabulations, one on the potato ground and one on summer-fallow. If the other two plots were included and their yields estimated according to the relative performance of adjacent plots of other kinds, the outturn of Reward would be even higher than it is.

COMPARING YIELDS OF WHEAT VARIETIES OCCURRING IN BOTH VARIETY-TEST PLOTS AND ROD-ROW PLOTS, 1925

Variety	Average yield, quadruplicate regular variety-test plots (drilled) 1925		Average yield, quadruplicate rod-row (hand-sown) plots, 1925		Average of the two experiments	
	bush.	lb.	bush.	lb.	bush.	lb.
Early Red Fife, O. 16	27	34	26	59	27	16·5
Early Triumph	26	24	24	6	25	15
Garnet, O. 652	23	55	21	17	22	36
Huron, O. 3	25	54	23	4	24	29
Kitchener	24	18	27	9	25	43·5
Marquis, O. 15	24	38	22	17	23	27·5
Red Bobs	26	33	23	57	25	15
Reward, O. 928	*28	55	20	41	24	48
Ruby, O. 623	23	6	20	36	21	51
Averages (except Reward)	25	18	23	40	24	29

*Only two plots Reward considered in the regular variety test.

In the main, those varieties which stood high or low in the rod-row test stood likewise in the larger plots, but there were certain conspicuous exceptions, undoubtedly due, for the most part, to variation in soil-moisture conditions. For instance, Reward stands eighth in the rod-row test—about where previous performance would lead us to expect it—but first in the larger plots. Kitchener, in the rod-row test, takes its accustomed first place, but drops to seventh in the larger plots, due, doubtless, to the unfavourable location this plot was observed to have, running up as it did on the point of a dry knoll. It is believed that in 1925 the rod-row test of the wheats was much fairer than the test in the larger-scale plots, though the reverse was thought to be true in 1924.

Such erraticisms go to emphasize that varieties should be compared in extensively replicated plots under varying conditions, in successive seasons and from different standpoints. One should know he has afforded each particular variety its optimum rate and date of seeding ere he may finally judge its capacity. The best time and best rate for one kind may not best suit another. Even with extensive replication a single year's results must be held inconclusive.

While erraticism is never a cause for surprise in a given season's results, the law of averages largely counterbalances this in the course of a period of successive trials. In the six years' work (1920-1925) we find Early Red Fife, Marquis Ottawa 15, and Red Bobs yielding substantially alike, with Ruby nearly 22 per cent below Marquis, Huron 13 per cent above Marquis and Kitchener 15 per cent above. In days estimated necessary to reach full maturity Red Bobs is about 2 and Ruby 7½ days earlier than Marquis, while Early Red

Fife, Huron, and Kitchener are a day or so later. During the past few dry years the differences in this respect have been less than usual. For the eleventh successive season Huron has exceeded Marquis in yield, its serial-average betterment in the eleven years being almost 21 per cent. It often produces a better-looking sample of berry than Marquis though experts claim that with two samples of equal appearance the Huron would intrinsically deserve about two grades lower.

VARIETY PLOTS OF OATS

A peculiar contrast developed between the oat plots on potato ground and those on summer-fallow. While the wheat plots after summer-fallow yielded nearly 12 per cent more total crop and 6 per cent more grain than those after potatoes, the reverse was the case with the oats. When the prolonged period of warm, dry mid-summer weather occurred, the oats plots on summer-fallow made a disappointingly poor growth and at harvest were decidedly inferior in weight of total crop and of threshed grain. In weight of oat bundles the summer-fallow was nearly 17 per cent lower than the potato ground, and in weight of threshed oats more than 21 per cent lower, hulless varieties being omitted from the calculation in each case.

The result was disconcerting until fall cultivation of the stubble on the summer-fallow ranges turned up chunks of undecomposed manure, and it was then recalled that an excessively heavy winter application had been ploughed under a year or two previously and this, in a droughty season, had undoubtedly proven detrimental.

So far as could be recalled or determined by spring observation (1926) the application had extended up as far as the 1925 oat ranges, not many of the wheat plots being affected and these not to their apparent disadvantage. Beyond doubt, in semi-arid climates a too heavy application of strawy manure may be detrimental in a dry year. Humus, in reasonable proportion, is a moisture-holder. Raw manure in chunks may be a moisture-waster, keeping the soil open, and facilitating its drying out.

Omitting the hulless varieties, the yields of eighteen plots, representing nine varieties on potato ground, was 48 bushels 30 pounds, and the yield of a like number of plots on summer-fallow 38 bushels 14 pounds.

34180—3½

VARIETIES OF OATS (DRILLED PLOTS), 1925

Comparing yields on potato ground and on summer-fallow with an excessive dressing of manure

	Average yield per acre two plots on potato ground			Average yield per acre two plots on summer-fallow			Average yield per acre of the four plots			
	Total crop	Grain	Ratio grain to total crop	Total crop	Grain	Ratio grain to total crop	Total crop	Grain	Ratio grain to total crop	Grain
	lb.	lb.	p.c.	lb.	lb.	p.c.	lb.	lb.	p.c.	bush. lb.
Abundance	3,168·0	1,755·6	55·41	2,930·4	1,557·6	53·15	3,049·2	1,656·6	54·32	48 24
Banner, O. 49	3,036·0	1,650·0	54·34	2,296·8	1,234·2	53·73	2,666·4	1,442·1	54·08	42 14
Columbian, O. 78	3,036·0	1,828·2	60·21	2,323·2	1,320·0	56·81	2,679·6	1,574·1	58·74	46 10
Daubeney, O. 47	2,032·8	1,128·6	55·51	2,138·4	1,122·0	52·46	2,085·6	1,125·3	53·95	33 3
Gold Rain	3,471·6	1,894·2	54·56	2,890·8	1,471·8	50·91	3,181·2	1,683·0	52·90	49 17
Laurel, O. 477 (hulless)	2,745·6	1,280·4	46·63	2,257·2	950·4	42·10	2,501·4	1,115·4	44·59	32 27
Leader	2,798·4	1,729·2	61·79	2,178·0	1,267·2	58·18	2,488·2	1,498·2	60·21	44 2
Liberty, O. 480 (hulless)	2,310·0	1,089·0	47·14	2,178·0	950·4	43·63	2,244·0	1,019·7	45·44	29 33
Ligowo	2,851·2	1,544·0	54·15	2,574·4	1,359·6	52·81	2,712·8	1,451·8	53·51	42 23
Prolific, O. 77	2,970·0	1,709·4	57·55	2,059·2	1,115·4	54·16	2,514·6	1,412·4	56·16	41 18
Victory	2,838·0	1,722·6	60·69	2,442·0	1,306·8	53·51	2,640·0	1,514·7	57·37	44 18
Totals, all varieties	31,257·6	17,331·2	55·44	26,268·4	13,655·4	51·98	28,763·0	15,493·3	53·86	.. ..
Averages, all varieties	2,841·6	1,575·5	55·44	2,388·0	1,241·4	51·98	2,614·8	1,408·4	53·86	41 14
Totals, excluding hulless varieties	26,202·0	14,961·8	57·10	21,833·2	11,754·6	53·83	24,017·6	13,358·2	55·61	.. ..
Averages, excluding hulless varieties	2,911·3	1,662·4	57·10	2,425·9	1,306·0	53·83	2,668·6	1,484·2	55·61	43 22

Yields nine hull-retaining varieties of oats: Potato ground..... 48 bushels 30 pounds per acre.
Summer-fallow..... 38 " 14 "

At first glance the showing of the two hulless varieties appears relatively low, but it is much improved if one adds a fair allowance for absence of hull. Ordinary oats in the West commonly run from 25 to 30 per cent hull, which means that the hull amounts to one-third and three-sevenths respectively, of the weight of meat contained. In order to compare hulless and ordinary hull-bearing varieties equitably it is necessary to add to the former from one-third to three-sevenths of the weight of kernel threshed. Here are two distinct comparisons made in this way:—

—	Actual yield threshed		Estimated yields if adding one-third to weight of hulless varieties		Estimated yields if adding three-sevenths to the weight of hulless kinds	
	bush.	lb.	bush.	lb.	bush.	lb.
Daubeney	33	3	33	3	33	3
Banner	42	14	42	14	42	14
Laurel	32	27	43	25	46	29
Liberty	29	33	39	33	42	28

Of the two hulless kinds Laurel is the heavier yielder, but a little later than Liberty and too short in the straw to be recommended for general cultivation under Grande Prairie conditions, since in dry seasons it is inconvenient to harvest. Liberty is a nice oat to handle and at the Beaverlodge Station has yet to show the first head of smut, though said to be subject to this infection.

As in the case of the wheats, the combination of yields from the rod-row plots with the regular variety plots alter considerably the standing of some of the varieties. The fluctuating performance of varieties from field to field, as well as from season to season, is a warning to grain-raisers inclined to form hasty judgments.

OATS, COMPARING AND COMBINING YIELDS VARIETY TEST (DRILLED PLOTS) AND ROD ROWS (HAND-SOWN) 1925

Variety	Variety test (drilled) plots		Rod-row (hand-sown) plots		Average of the two experiments	
	bush.	lb.	bush.	lb.	bush.	lb.
Abundance	48	24	65	19	57	4·5
Banner, O. 49	42	14	74	23	58	18·5
Columbian, O. 78	46	10	73	33	60	4·5
Daubeney, O. 47	33	3	53	33	43	18
Gold Rain	49	17	67	0	58	8·5
Laurel, O. 477	32	27	47	28	40	10·5
Leader	44	2	71	32	58	0
Liberty, O. 480	29	33	38	2	34	0·5
Ligowo	42	23	64	23	53	23
Prolific, O. 77	41	18	63	16	52	17
Victory	44	18	69	22	57	3

OATS—VARIETY TEST (DRILLED PLOTS), 1925

—	Days to mature						Yields of threshed grain per acre									
	1925	Average 2 years 1924 and 1925	Average 3 years 1923 to 1925	Average 4 years 1922 to 1925	Average 6 years 1920 to 1925	Average 8 years 1918 to 1925	1925	Average 2 years 1924 and 1925	Average 3 years 1923 to 1925	Average 4 years 1922 to 1925	Average 5 years 1921 to 1925	Average 6 years 1920 to 1925	Average 7 years 1919 to 1925	Average 8 years 1918 to 1925	Average 9 years 1917 to 1925	Average 10 years 1916 to 1925
							bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.
Abundance	100	104·5	113·0	112·0	114·5	119·1	48 24	39 11	45 33	43 32	54 23	64 4	70 30	75 33	75 2	.....
Banner, O. 49	102	105·5	113·3	113·5	116·5	.....	42 14	39 19	47 24	45 33	55 21	67 25	77 2	.....	.....	.....
Columbian, O. 78	103	107·0	113·6	.....	.....	.....	46 10	40 14	50 22	.....	.....	.....	.....	.....	.....	.....
Daubeney, O. 47	90	96·0	107·3	106·0	105·7	108·5	33 3	25 28	30 31	33 2	40 22	47 0	52 16	48 16	59 20	60 0
Gold Rain	102	107·0	114·6	113·2	115·8	.....	49 17	41 31	49 28	47 11	56 15	67 15	.....	.....	.....	.....
Laurel, O. 477 (hulless)	99	105·7	113·5	111·8	.....	.....	32 27	24 27	29 22	28 22	.....	.....	.....	.....	.....	.....
Leader	107	109·2	115·8	115·8	118·9	.....	44 2	38 9	47 25	45 25	55 2	66 12	.....	.....	.....	.....
Liberty, O. 480 (hulless)	98	103·7	112·1	110·8	113·5	118·5	29 33	21 24	28 6	26 26	34 16	40 33	45 14	49 22	.....	.....
Ligowo	102	105·5	113·6	113·7	116·0	121·1	42 23	35 32	45 32	46 26	55 33	66 0	72 29	79 1	78 14	79 15
Prolific, O. 77	106	108·7	114·8	.....	.....	.....	41 18	34 20	45 13	.....	.....	.....	.....	.....	.....	.....
Victory	107	109·7	116·1	116·1	119·0	.....	44 18	39 16	52 27	48 15	58 23	71 9	78 6	81 2	81 1	82 27
Legacy	93	100·5	110·3	109·5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

VARIETY PLOTS OF BARLEY

Five hull-retaining varieties together with the Eureka were compared in quadruplicate, two plots of each being on summer-fallow, one of each on turnip ground and one of each on land that produced mangels, sugar beets, and carrots in 1924, the grain plots crossing the 1924 plots of roots. The yield of turnips had been good and the soil was left somewhat depleted. The yields of beet were much less and the yield of carrots very small, so that it was by no means surprising to find a good growth on the mangel, sugar beet, and carrot range and a much inferior growth on the turnip land. As a matter of fact, averaging the five ordinary barleys (which lend themselves most readily to intelligible computation) we find that the turnip ground yielded barely over a ton of total crop and 23 bushels 21 pounds of threshed barley per acre; the beet and carrot ground over a ton and three-quarters of total crop and 41 bushels 38 pounds of threshed grain, while the mean of two summer-fallow ranges was slightly over a ton and a half of bundles, threshing 33 bushels 36 pounds of grain per acre.

The beardless-hulless barley, Eureka, which stood high in 1924 fell short this year, although if its yield be weighted to compensate for the usual hull percentage of other kinds, the estimated yield would be 28 bushels 33 pounds instead of 25 bushels 44 pounds. Considering its very great advantage of beardlessness this is a reasonably satisfactory yield. In ordinary practice its turnout is often discounted, first because quite a few heads are often left on the field, and secondly because, judging the crop in grain tank or bin, one is liable to compare bulks instead of weights and is liable to forget that 9 pounds of hulless are about equivalent to the meat content of 10 pounds of the ordinary kinds. It must be emphasized that Eureka is not a good brewing barley. As a feed proposition the Station prefers it to any other tested here as yet.

Of the other varieties Bearer stands first in the regular variety test, though only fourth in the rod rows. In the arrangement of a 4-year average the rating is: Bearer, Hannchen, Charlottetown 80, Trebi, Eureka, and O. A. C. 21. If Eureka were allowed credit for a normal percentage of hull it would be promoted to third position.

VARIETIES OF BARLEY (DRILLED) PLOTS, 1925

Comparing yields from turnip ground, from mangel and carrot ground and from summer-fallow

—	Yield per acre one plot on turnip ground			Yield per acre one plot on mangel and carrot ground			Average yield per acre two plots on summer-fallow ground			Average yield per acre of the four plots			
	Total crop	Grain	Ratio grain to total crop	Total crop	Grain	Ratio grain to total crop	Total crop	Grain	Ratio grain to total crop	Total crop	Grain	Ratio grain to total crop	Grain
	lb.	lb.	p.c.	lb.	lb.	p.c.	lb.	lb.	p.c.	lb.	lb.	p.c.	bush. lb.
South Finnish	1,848·0	907·5	49·10	.....	.....	.....	*3,234·0	*1,518·0	46·93	†2,541·0	†1,212·7	47·72	25 12
Lapland	.....	.....	.....	3,432·0	1,633·5	47·59	*2,508·0	*1,254·0	50·00	†2,970·0	†1,443·7	48·60	30 3
Eureka	1,504·8	739·2	49·12	2,877·6	1,438·8	50·00	2,745·6	1,399·2	50·96	2,468·4	1,244·1	50·40	25 44
Bearer, O. 475	3,366·0	1,864·5	55·39	3,669·6	2,035·6	56·83	2,902·5	1,471·8	50·70	3,210·1	1,723·4	53·68	35 43
Charlottetown, 80	1,531·2	897·6	58·62	3,775·2	2,046·0	54·19	3,234·0	1,861·2	57·55	2,943·6	1,666·5	56·61	34 34
Hannchen	1,980·0	1,042·8	52·66	3,537·6	1,914·0	54·10	2,943·6	1,478·4	50·22	2,851·2	1,478·4	51·85	30 38
O. A. C. 21	1,663·2	924·0	55·55	3,352·8	1,821·6	54·33	2,864·4	1,518·0	52·99	2,686·2	1,445·4	53·80	30 5
Trebi	1,584·0	897·6	56·66	3,616·8	2,164·8	59·85	3,207·6	1,775·4	55·34	2,904·0	1,653·3	56·93	34 21
Averages, 6 varieties	1,938·2	1,060·9	54·73	3,471·6	1,911·8	55·06	2,982·9	1,584·0	53·10	2,843·9	1,535·1	53·98	31 47
Averages, 5 hull-retaining sorts	2,024·8	1,125·3	55·57	3,590·4	2,006·4	55·88	3,030·4	1,620·9	53·48	2,919·0	1,593·4	54·58	33 9

* One plot only. † Two plots only.

Yields of 5 hull-retaining kinds of barley on turnip ground ..... 23 bush. 21 lb.
Yields of 5 hull-retaining kinds of barley on mangel, sugar-beet and carrot ground ..... 41 bush. 38 lb.
Yields of 5 hull-retaining kinds of barley on summer-fallow ..... 33 bush. 36 lb.

BARLEY, COMPARING AND COMBINING YIELDS VARIETY TEST (DRILLED) PLOTS AND ROD-ROW (HAND-SOWN) PLOTS, 1925

Variety	Variety Test (drilled plots)		Rod Rows (hand-sown)		Average of the two experiments	
	bush.	lb.	bush.	lb.	bush.	lb.
Bearer, O. 475	35	43	42	39	39	17
Charlottetown No. 80	34	34	49	27	42	6
Eureka	25	44	37	42	31	43
Hannchen	30	38	40	46	35	42
O. A. C. No. 21	30	5	44	20	37	12
Trebi	34	21	45	17	39	43

BARLEY—VARIETY TEST (DRILLED) PLOTS, 1925

Variety	Days to mature			Yields of threshed grain per acre					
	1925	Average four years 1922 to 1925	Average six years 1920 to 1925	1925	Average four years 1922 to 1925	Average five years 1921 to 1925	Average six years 1920 to 1925	Average seven years 1919 to 1925	Average ten years 1916 to 1925
				bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.	bush. lb.
Bearer, O. 475 (6)	108	115·7	.....	35 43	35 24	.. ..	.. ..	.. ..	.. ..
Charlottetown No. 80 (2)	105	113·6	.....	34 34	30 41	.. ..	.. ..	.. ..	.. ..
Eureka (6)	100	110·9	109·8	25 44	29 1	32 12	36 3	.. ..	.. ..
Hannchen (2)	106	115·3	114·7	30 38	32 31	37 27	41 7	.. ..	.. ..
O. A. C. No. 21 (6)	101	110·0	110·0	30 5	26 35	31 36	38 20	40 43	36 17
Trebi (6)	106	114·3	.....	34 21	30 19	38 39	.. ..	.. ..	.. ..

PEAS

Four varieties of peas were compared along with common vetches in two ranges, one on summer-fallow and the other on the previous season's mangel, sugar beet, and carrot ground. As with the barley, the latter range outyielded the summer-fallow range. The four varieties averaged nearly six per cent more total crop and over fifteen per cent more threshed grain from the hoe-crop land than from the summer-fallow range.

Peas and vetches are the only experimental grain crops grown at the Beaverlodge Station from which marginal drills are not removed. this operation being difficult. Consequently, yields of both vines and threshed grain are somewhat exaggerated, though the ratio of grain to total crop may be depressed a little. Allowing for this exaggeration the pea yields were still creditable considering the season, the four varieties averaging over 30 bushels per acre.

The peas, as well as the cereals, were tested in rod rows, with results quite the reverse of what might have been expected. From the fact that marginal drills cannot readily be removed from either wide or narrow plots of peas, one would look for greatly exaggerated yields from the rod-row range. The reverse however, was the case, and the cause is unknown, save that a good deal of shelling was observed. The rod rows of peas, as of other grains, were all located on sunflower stubble.

VARIETIES OF PEAS AND VETCHES (DRILLED PLOTS), 1925

Comparing yields from mangel, sugar-beet and carrot ground, and from summer-fallow ground

	Yield per acre one plot on mangel, sugar beet and carrot ground			Yield per acre one plot on summer-fallow ground			Average yield per acre of the two plots			
	Total crop	Grain	Ratio grain to total crop	Total crop	Grain	Ratio grain to total crop	Total crop	Grain	Ratio grain to total crop	Grain
	lb.	lb.	p.c.	lb.	lb.	p.c.	lb.	lb.	p.c.	bush. lb.
Arthur, O. 18	4,618·2	2,092·3	45·30	4,410·9	1,753·0	39·74	4,514·5	1,922·6	42·58	32 2
Chancellor, O. 26	4,090·4	1,705·9	41·70	3,798·2	1,536·2	40·44	3,944·3	1,621·0	41·09	27 1
Mackay, O. 25	4,524·0	2,148·9	47·50	4,203·5	1,734·2	41·25	4,363·7	1,941·5	44·49	32 21
Golden Vine (Sask. 625)	4,297·8	1,837·8	42·76	4,165·8	1,724·7	41·40	4,231·8	1,781·2	42·09	29 41
*Vetch (common)	3,166·8	1,187·5	37·49	2,262·0	584·3	25·83	2,714·4	885·9	32·63	14 45

* Crop shattered.

Excess yield in total crop per acre of 4 varieties peas on mangel, sugar-beet and carrot ground over yield on summer-fallow..... 5·74 per cent.
Excess yield in grain per acre of 4 varieties peas on mangel, sugar-beet and carrot ground over yield on summer-fallow..... 15·36 "
Average yield per acre of the 4 varieties on mangel ground..... 32 bush. 26 lb. per acre
Average yield per acre of the 4 varieties on summer-fallow..... 28 " 7 "

PEAS—COMPARING AND COMBINING YIELDS OF VARIETY TEST (DRILLED PLOTS) AND ROD-ROWS (HAND-SOWN), 1925

Variety	Variety test plots (drilled)		Rod-row plots (hand-sown)		Average of the two experiments	
	bush.	lb.	bush.	lb.	bush.	lb.
Arthur, O. 18	32	2	16	1	24	1·5
Chancellor, O. 26	27	1	12	10	19	35·5
Mackay, O. 25	32	21	18	58	25	39·5
Golden Vine, Sask. 625	29	41	12	40	21	10·5

PEAS AND VETCH—VARIETY TEST (DRILLED PLOTS), 1925

Variety	Days to mature					Yields threshed grain per acre			
	1925	Average two years 1923 and 1925	Average three years 1922, 1923 and 1925	Average four years 1921 to 1923 and 1925	Average six years	1925	Average four years 1922 to 1925	Average five years 1921 to 1925	Average eleven years 1915 to 1925
						bush. lb.	bush. lb.	bush. lb.	bush. lb.
Arthur, O. 18	117	122·0	123·6	124·2	126·8	32 2	22 54	25 35	20 5
Chancellor, O. 26	96	108·0	112·6	114·7	.....	27 1	20 6	24 33	.. ..
Mackay, O. 25	117	122·5	.....	.....	.....	32 21	.. ..	.. ..	.. ..
Golden Vine (Sask. 625)	97	108·5	113·0	114·7	.....	29 41	19 17	23 47	.. ..
Common vetch	107	118·0	.....	.....	.....	14 45	9 20	.. ..	.. ..

NOTE.—No crop was harvested in 1924, so it is omitted from calculations of time to mature.

FLAX

A strip of Premost flax, sown May 19 on clean fallow ground, bloomed July 12, and was bound on September 4, yielding 1,415 pounds of total crop per acre and 8 bushels 47 pounds of very nice seed, the ratio of grain to total crop being 34.96 per cent. The staple was shorter than usual and the yield of seed less, but the 8-year average stands at 11 bushels 23 pounds per acre.

BUCKWHEAT

Four successive sowings of buckwheat were made but the early ones were thinned out badly by frost. The third sowing, made on May 27, was harvested after a 99-day period and yielded 21 bushels 23 pounds per acre. In 1923 the yield was 30 bushels 17 pounds. In 1924 the crop was flattened by frost and snow in late September, while the binder was waiting for the late growth to ripen. Profuse volunteering next spring indicated that a good deal of seed had ripened.

SPRING RYE

Prolific, which had done particularly well at Scott, Saskatchewan, gave evidence of a disappointingly weak straw and is a doubtful acquisition. Sown early in May on sunflower stubble, on a rather inferior soil, it yielded 2,594.6 pounds of bundles per acre, threshing at the rate of 20 bushels 55 pounds, the grain constituting 45.29 per cent, by weight, of the total crop.

WINTER GRAINS

WHEAT

Three Macdonald-College strains of Kharkov winter wheat were sown August 16, 1924, in a test to compare them with Turkey Red and O. A. C. No. 104, but seed supplies permitted duplication of only one of the three Kharkov

strains and the yields of these appeared to vary pretty much according to the degree of winter protection and the spring condition as noted April 21. Plots saturated for weeks in spring, even almost to the point of water-logging, seemed to sustain little injury from this cause, but any portions which lay on prominent knolls were either extensively killed, as in the case of O. A. C. No. 104, or were at least browned and perceptibly injured. Winter-killing at Beaverlodge, when it occurs at all, has usually been confined to such exposed areas rather than to hollows, although in rare cases ice crust does damage to the latter.

As between the Kharkov No. 22 and the Turkey Red, the comparison is by no means absolute in spite of duplication, though these varieties appeared to have nearly an equal chance.

Of O. A. C. No. 104 there was seed for but one half-width plot, but this so nearly all winter-killed as to confirm previous deductions that it is not adapted to this district, although capable of a high yield when not winter-injured.

The 8-year average yield of Turkey Red is 23 bushels 42 pounds per acre.

A simple date-of-planting experiment with winter wheat was introduced by sowing an additional plot on September 1. This winter-killed extensively and yielded about one-third as much as a companion plot sown August 16. But for hand-weeding, the comparison would likely have been still more adverse, since winter-injured stands afford a fine chance for weeds to grow.

RYE

Duplicate plots of winter rye were sown August 16 and a second-date plot on September 1. The earlier sowings did well, wintered successfully and grew nicely in spite of dry weather. The September 1 sowing also maintained a partial stand, although winter-injured to some extent. Unfortunately, the rye was allowed to stand a little too long and was caught by high wind, shattering at least two-thirds the crop of the early-sown plots and a substantial part of the second sowing, which was not quite so ripe. The loss is roughly indicated by the two ratios of grain to total crop, the ratios being more than twice as high for the second-date as for the first-date, although even the former had lost considerable.

A similar mishap occurred in the same way in 1924. Rye seems to resist shattering well up to a certain point and then it shells easily. These mishaps pull down the 8-year average to 37 bushels 50 pounds per acre.

SMUT TREATMENTS FOR HULLESS GRAINS

Eureka (beardless-hulless) barley and Liberty (hulless) oats were each subjected to three different fungicidal treatments, while a plot of Eureka was also sown with seed treated with hot water.

It will be observed that since the untreated oats showed no smut at all, the efficacy of the respective treatments cannot be illustrated with this grain. Liberty has always been smut-free at this Station.

With Eureka barley best results were had from the modified formaldehyde treatment, as follows:—

Place the seed in a pile and sprinkle with water, using about 2½ pints to 100 pounds and mixing the whole mass until it is in a uniform condition. Cover with sacks and allow to stand for a short time (probably half an hour will suffice in most cases) until the grain is dry on the surface. Then sprinkle with formaldehyde solution, composed of half an ounce formaldehyde and five Imperial quarts of water (1 pound to 40 gallons of water), using half an ounce of this weak solution to each pound of grain and stirring thoroughly. Cover again with sacks and allow to stand for one or two hours—*not longer*. Then spread out in a very thin layer so as to expose the grain to the air for a few hours before sowing.

Copper carbonate was not so effectual as usual and it was disappointing to find the hot-water plot showing 2 per cent smut. From the fact that this treatment had in former seasons produced 100 per cent results in cleaning up Eureka infested with both loose and covered smut, it is suspected that the temperature of the water was possibly not quite high enough to be effectual.

THICKNESS OF SEEDING EXPERIMENTS WITH WHEAT, OATS AND BARLEY

An acre and one-half of land, ploughed in 1923 out of six ranges of the grass-and-clover-mixture experiments and cropped in 1924 to a thin commercial planting of sunflowers for silage, was devoted in 1925 to an experiment to compare various thicknesses of seeding of two varieties each of wheat, oats, and barley. Of each grain it was desired to use one small-kernelled sort and another kind with a larger berry. An unavoidable exception was afforded in the barley, of which one variety was standard, while the other was hulless, though not particularly small of kernel. In sowing this, an endeavour was made to allow about one-tenth extra in weight of seed applied so as to put on about the same amount of meat as in the case of the standard kind.

In the matter of comparison of the several rates of seeding, the results were consistent with few exceptions and seemed to indicate the advantage of thin seeding in a dry season.

In the case of most varieties both the weight of bundles and the yield of threshed grain showed a distinct tendency to diminish as the rate of seeding increased. There were minor exceptions and some of them occurred where least expected, notably in the Garnet wheat.

DATE OF PLANTING EXPERIMENTS WITH SPRING GRAINS

For some years a rather desultory experiment was conducted to determine the most likely dates of planting wheat, oats, and barley. In 1925 the test was systematized and expanded to include three varieties of oats and two of wheat, as well as one each of barley and buckwheat, also mixtures of flax with certain cereals. All were seeded at weekly intervals.

It had been learned from former work that with oats, at least, a more vigorous growth is often obtained from mid-May, late-May, or June seedings than from April or early-May plantings, though, of course, the very late sowings of standard varieties would not always ripen. This suggested to the Cereal Division that an early or medium-early oat sown in May might compare favourably with a standard variety sown early to escape fall frosts.

It was decided to compare an early, a medium, and a late kind not only from the standpoint of threshing returns but also from the standpoint of green-feed production. Thus, six successive weekly sowings of each of the three kinds of oats were made, commencing with the opening of seeding, which this year was not until the beginning of May.

There were four sowings of buckwheat and three of the various cereal-flax mixtures. The latter were virtually failures, so far as the flax was concerned, since late spring frosts injured it and the cereals nearly choked it out.

As the test was in duplicate there were twelve hundredth-acre plots of each variety of the staple grains, making seventy-two in all.

The test described was on summer-fallow. Adjacent to it was a strip of spring ploughing on which a series of 21 two-hundredth-acre plots were laid out for comparison, and on the spring ploughing one-half of each plot was dressed with nitrate of soda with a view to seeing what this might do towards bringing up the yields on stubble land.

Wireworms badly marred this supplementary test and to some extent impaired the stands of certain portions of the summer-fallow block, dealing much more severely with the Garnet wheat than with an other variety of grain in the field. This was then assumed to be due to accident of location. The injury was rather worse in one summer-fallow range of Garnet than in the other range and the later plantings were observed to be particularly affected, so that the yields of Garnet fell off badly in the deferred seedings whereas the Marquis, although a later variety, held up to a fairly uniform yield throughout. It is true that the arrangement was such as to bring the later seedings of Garnet together in a slight depression, which might have been prone to wireworm multiplication, but, making allowances for this, the results still appear suggestive.

On the spring ploughing the Garnet stands were reduced by wireworms to about 15 per cent and the Eureka barley also suffered, so that these plots admitted of no reliable comparison. Only the Liberty oats and the buckwheat retained passable stands on the spring ploughing and on the former, nitrate of soda seemed to have a favourable effect, but areas were too small to afford dependable data and all the spring ploughing yields were thrown into the discard.

A fact to keep in mind is that May and early-June conditions were unusually favourable to growth, mid-summer conditions unfavourable, and the late-summer and autumn weeks moist and free of destructive early frosts, permitting late sowings to approach maturity, though a few had to be harvested a week or so in advance of the time estimated necessary for complete ripening. Thus it is not surprising to find erratic results, with very early and very late sowings giving relatively good account of themselves in several cases. A conspicuous exception is the poor showing from the late seedings of Garnet wheat, in contrast to Marquis, which produced from its last sowing (June 4) the second-highest yield of the six dates, in spite of the fact that it had to be cut immature following a hard frost. The work needs repetition as it is difficult to deduce from this year's yields any definite principles.

A SUMMARY COMPARISON OF MARQUIS AND GARNET

Since public interest is focussed on the new wheat Garnet, it is well to summarize a comparison between it and Marquis, since both occurred in four extensively replicated series as well as in 2-acre blocks.

During the three years 1922 to 1924 Garnet ripened practically with Ruby, being in those abnormally dry years only four days ahead of Marquis, which outielded it by only 32 pounds per acre. In 1925 rains came at a time to prolong the maturing period of Marquis and help its filling but were too late to be of much advantage to Garnet. Under these conditions the Garnet in the regular variety test ripened ten days ahead of Marquis yet yielded within 43 pounds as much grain per acre. In the rod-row test it yielded a bushel less than Marquis. From the average of eight plots of each in the thickness-of-seeding test Marquis outyielded Garnet by only 46 pounds per acre, but coming to the date-of-planting experiment, where wireworms played havoc with certain plots, we find an average disparity in yield of nearly 5 bushels per acre. In the average of the whole twenty-eight plots of each variety the Marquis exceeded the Garnet by 151 pounds, but if we were to leave out the experiment affected by wireworms, the yield, even in a season distinctly adverse to an early wheat, would be within a bushel per acre of the well-known sort, which is remarkable considering the difference in time of ripening.

In the same field with the date-of-planting hundredth-acre plots, but on receding ground, perhaps a little better supplied with moisture, were the 2-acre blocks. Here the Marquis, cut August 24, outyielded Garnet cut thirteen days sooner by 191 pounds, or about 3 bushels per acre. The Garnet in this block

may have been slightly handicapped by a mishap in drilling, which resulted in about 8 per cent of its area being sown at only half the intended rate per acre. It is not believed that this made any great difference in yield, however. It is possible that some wireworm injury occurred in these blocks, though none was noted.

In the 2-acre blocks the Marquis straw averaged an inch longer and the heads 5 millimeters longer than in the case of Garnet.

FORAGE CROPS

Extensive run-off, resulting from the deep snow, took place as quietly as could be expected, but not a little erosion occurred. This, of course, was not serious on sodded land. It covered certain plots with silt and thoroughly saturated several, causing these to yield extraordinarily well compared to others adjacent.

In some cases this snow-moisture was artificially directed, to very good purpose, and where the water could be spread over knolls or ridges, remarkable increases in yield were obtained.

Outstanding results of the season were the excellent yields of alfalfa seed, the better-than-usual growth of corn, and the falling off in production of western rye grass relative to other grasses, mainly, it is thought, owing to grasshopper attack.

THE NURSE-CROP TEST AND GRASS AND CLOVER MIXTURES EXPERIMENT

Two elaborate series of experiments are nearing completion, viz., the nurse-crop test and the grass-and-clover-mixtures experiment. Until the 1926 data are available, final analysis may be deferred.

During 1924 and 1925 western rye grass has lost some of the lead it had over other grasses, notably timothy, grown beside it in both series of experiments.

The falling-off was particularly marked in the 1922 seeding of the nurse-crop test. In this instance there may be two explanatory factors. In the very dry summer of 1922 western rye and alfalfa were the only two out of ten grasses and legumes to produce full stands, and hence the only ones to produce crops of consequence in 1923. The timothy was almost a failure, particularly under nurse-crop seeding, so much so that in 1923 it exhibited a mere scattering tufted stand instead of the mat it usually produces. It was so open that had it not been sown on clean land, and hand-weeded besides, it would have become very weedy. Contrary to usual experience, it had not nearly so close a turf as western rye. In the blistering drouth of 1924 this very thin stand seemed distinctly to its advantage and for once it outyielded western rye, repeating its performance in 1925, the timothy turf being still very open.

The grasshopper is another factor in the equation. He seems to centre his attack on western rye grass and on winter rye grain. During 1923, 1924, and 1925, but particularly during the latter two years, hoppers were extremely numerous and during these latter two seasons great difficulty was experienced in securing stands from new seedings of this crop. In considerable degree the difficulty was met with in the case of all the grasses but it was most pronounced with western rye, some new seedings being 90 per cent destroyed. Sweet clover and alfalfa generally escaped hopper ravages.

It would appear that established meadows of the grasses were injured, although it is not easy to observe the comparative degrees of hopper damage done to the various meadow crops. It is significant, however, that from having outyielded timothy by fifty-eight per cent on the average of 133 comparisons

down to and including 1923, western rye is now during the last two seasons running little above it, and in the one experiment cited above where an additional factor came into play, it has actually fallen below timothy in both 1924 and 1925. On the average of the last two years it has yielded in this experiment only 84 per cent as much, while brome has exceeded timothy by less than 3 per cent. Here is the chronological record of the 1922 seeding of the Nurse-crop test:—

—	Timothy	Western rye	Brome
1923 crop	778	1,935	1,625
1924 crop	806	644	917
1925 crop	1,454	1,256	1,404
Totals	3,038	3,835	3,946

In casting about for probable explanations inquiry was addressed to various quarters, but the only definite light was obtained from Professor E. H. Strickland, who wrote under date of November 12, 1925:—

We have always observed that western rye was the favourite grass upon which the adults feed at the time of oviposition. In fact, when scouting for breeding grounds we looked for nothing except patches of this grass while driving through the country by car and if we found them to be free from eggs in the fall we decided that grasshoppers were not abundant in the district under observation.

PRESENTING results in pounds of hay per acre from the five grasses and two of the five legumes seeded 1922 in the main Nurse-Crop Experiment. Three years' crop in all cases and four years in the case of the south halves of the Check Ranges (clipped in year of seeding). Sweet clover, though very sparse and irregular in its stand, occurring chiefly on the low spots, gave two cuttings in 1923, the second cutting being taken for seed, of which it gave a small yield, much of it being immature. Only the first cutting considered in this table.

Description of seeding	Alfalfa at 10 lbs. per acre				Sweet clover at 10 lbs. per acre			Timothy at 6 lbs. per acre			
	*1923	1924	1925	Aggregate	*1923	1924	1925	*1923	1924	1925	Aggregate
Seeded alone. *North* half of Check Range B. (Not clipped in year of seeding)	2,080	3,045	3,692	8,817	3,760	.....	.....	840	1,467	1,856	4,163
Seeded alone. *South* half of Check Range B. (Clipped in year of seeding)	{1,040 {1,080	1,665	2,236	6,021	{720 {2,360	.....	.....	{0 {440	1,959	1,158	3,557
Seeded alone. *North* half of Check Range A. (Not clipped in year of seeding)	840	423	1,452	2,715	1,840	.....	.....	1,040	878	1,212	3,130
Seeded alone. *South* half of Check Range A. (Clipped in year of seeding)	{240 {520	368	2,307	3,435	{640 {1,280	.....	.....	{0 {1,160	931	1,185	3,276
Seeded with 16 pecks Victory oats	1,240	818	3,438	5,496	460	.....	.....	1,540	340	1,372	3,252
" 14 " "	1,120	621	2,462	4,203	900	.....	.....	800	717	1,369	2,886
" 12 " "	1,000	1,477	5,547	8,024	1,880	.....	.....	1,280	389	1,791	3,460
" 10 " "	1,040	837	3,033	4,910	780	.....	.....	1,260	355	1,242	2,857
" 8 " Ruby wheat	1,000	730	2,616	4,346	300	.....	.....	420	934	1,220	2,574
" 7 " "	1,120	1,030	2,930	5,080	80	.....	.....	260	943	1,790	2,993
" 6 " "	660	758	2,201	3,619	0	.....	.....	0	421	1,263	1,684
" 5 " "	520	403	1,655	2,578	0	.....	.....	380	520	1,233	2,133
" 10 " Trebi barley	820	494	1,912	3,226	300	.....	.....	460	622	1,562	2,644
" 8 " "	1,020	598	2,235	3,853	340	.....	.....	600	988	1,810	3,398
" 6 " "	780	632	2,522	3,934	20	.....	.....	200	846	1,743	2,789
" 4 " "	1,160	668	3,767	5,595	4,000	.....	.....	1,780	588	1,457	3,825
Averages (16 plots in each case)	1,080	910	2,750	4,740	1,228	.....	.....	778	806	1,454	3,038
Averages 12 plots seeded with nurse crop	956	756	2,859	4,572	755	.....	.....	748	639	1,487	2,874
Average 2 plots not clipped in year of seeding	1,460	1,734	2,572	5,766	2,800	.....	.....	940	1,172	1,534	3,646
Average 2 plots clipped in year of seeding	1,440	1,016	2,271	4,728	2,500	.....	.....	800	1,445	1,171	3,416

*Including 1922 crop from south halves of Check Ranges.

Description of seeding	Western rye at 12 pounds per acre				Meadow fescue at 18 pounds per acre				Kentucky blue at 18 pounds per acre				Brome at 18 pounds per acre			
	*1923	1924	1925	Aggre.	*1923	1924	1925	Aggre.	*1923	1924	1925	Aggre.	*1923	1924	1925	Aggre.
Seeded alone. *North* half of Check Range B. (Not clipped in year of seeding)	2,920	1,292	1,606	5,818	560	132	1,183	1,875	320	713	1,436	2,469	1,920	892	1,757	4,569
Seeded alone. *South* half of Check Range B. (Clipped in year of seeding)	480 2,800	1,105	1,293	5,678	0 600	310	793	1,703	0 400	860	954	2,214	40 1,760	1,551	1,417	4,768
Seeded alone. *North* half of Check Range A. (Not clipped in year of seeding)	2,960	736	1,277	4,973	560	387	569	1,516	280	630	501	1,411	2,720	1,204	1,116	5,040
Seeded alone. *South* half of Check Range A. (Clipped in year of seeding)	930 1,920	702	1,172	4,754	40 560	358	719	1,677	0 640	419	584	1,643	0 1,360	1,546	1,193	4,099
Seeded with 16 pecks Victory oats	1,800	640	1,029	3,469	420	550	.....	970	360	485	.....	845	0	685	1,678	2,363
" 14 " "	1,440	749	923	3,112	300	420	.....	720	260	321	.....	581	1,640	1,308	1,617	4,565
" 12 " "	1,840	696	1,805	4,341	400	.....	.....	400	340	.....	.....	340	1,440	782	1,792	4,014
" 10 " "	1,700	303	1,366	3,369	240	.....	.....	240	220	.....	.....	220	1,660	862	758	3,280
" 8 " Ruby wheat	1,680	276	1,093	3,049	120	.....	.....	120	0	.....	.....	0	1,980	440	1,172	3,592
" 7 " "	1,160	468	878	2,506	20	.....	.....	20	0	.....	.....	0	1,420	554	1,420	3,394
" 6 " "	1,340	385	1,192	2,917	320	.....	.....	320	160	.....	.....	160	1,700	999	1,493	4,192
" 5 " "	1,240	440	1,171	2,851	40	.....	.....	40	0	.....	.....	0	1,820	947	1,446	4,213
" 10 " Trebi barley	1,360	818	1,054	3,232	160	612	1,022	1,794	160	501	1,149	1,810	1,300	624	1,473	3,397
" 8 " "	1,700	703	1,386	3,789	460	820	1,142	2,422	180	403	589	1,172	1,740	1,072	1,124	3,936
" 6 " "	1,520	568	1,254	3,342	360	797	1,385	2,542	220	828	1,149	2,197	2,060	743	1,629	4,432
" 4 " "	2,140	429	1,607	4,176	640	447	1,206	2,293	340	330	1,288	1,958	1,440	459	1,384	3,283
Averages (16 plots in each case)	1,935	644	1,256	3,836	362	302	501	1,165	242	343	478	1,063	1,625	917	1,404	3,946
Averages 12 plots seeded with nurse crop	1,576	540	1,229	3,346	290	304	396	990	186	239	348	773	1,517	789	1,415	3,721
Average 2 plots not clipped in year of seeding	2,940	1,014	1,441	5,395	560	259	876	1,695	300	671	968	1,940	2,320	1,048	1,436	4,804
Average 2 plots clipped in year of seeding	3,080	903	1,232	5,216	600	334	756	1,690	520	639	769	1,928	1,580	1,548	1,305	4,433

*Including 1922 crop from south halves of Check Ranges.

NOTES

Nurse-Crop Experiment Tables

(1) This, the fifth successive seeding, was made in 1922 according to the plan originally laid out in 1918 and on exactly the same area, which had grown potatoes in 1921 and was prepared by surface cultivation for further cropping. Seed-bed conditions in 1922 seemed ideal, but the unprecedented drouth resulted in a very weak growth of all the hay crops that were sown with nurse crops. Western rye grass, alfalfa, and brome finally made the best stand, with sweet clover about fourth in order. Kentucky blue, meadow fescue, and timothy did very poorly. In the Check Ranges better stands were obtained all round, although the later-sown range (B) did not give nearly so good a plant as did the earlier-sown range (A) which germinated during the period of early moisture.

(2) Thanks to inoculation, the five legumes made a much better showing by autumn and again the next spring than they had done in the much more favourable season of 1918. The alfalfa this time did particularly well as compared with the other legumes or with the grasses.

(3) Quantities of seed were as in 1918, except Western rye, which was sown at 12 pounds instead of 6 pounds as in the first year.

(4) The grains used as nurse crops were drilled April 27 and 28; the grasses and legumes directly afterwards, excepting Check Range B, which was seeded May 17 and 18.

(5) Owing to drouth in the year of seeding and the early part of 1923 the strips of common red, alsike, and white Dutch clovers were so poor that they were sacrificed. The sweet clover came through the winter very badly patched. Only the alfalfa among the legumes made a full stand, Western rye grass full, brome nearly full but short and backward, the nurse-crop seeding of this grass not being cut until August 18, 1923—more than two weeks after the other strips alongside,—timothy very irregular, fescue and Kentucky blue nearly failures.

(6) Certain plots of meadow fescue and Kentucky blue, which were almost a blank, became so badly infested with a native prairie weed washed down from unbroken land above that pulling was out of the question and these plots had to to be ploughed up early in 1924. As the meadow stands on them were a failure anyway, these plots were counted as giving zero yields and included in average computations. It was conspicuous that where there was any grass to speak of, the weed did not become established even on plots subjected to a full sweep of the seed-bearing wash.

(7) Among other abnormal reactions of a freak run of seasons was the improved showing of timothy as against Western rye grass in the 1924 and 1925 cropping. This was attributed partly to the fact that in the dry summer of 1922 timothy made an extremely poor catch on most of the plots, and consequently yielded very little hay in 1923. Instead, it preserved an open, bunching habit of gowth, and with its extrememly sparse stand stood the 1924 and 1925 drouth rather better, relatively speaking, than did Western rye grass, which had made full stands throughout and yielded consistently in 1923. On those few timothy plots where the stand was good enough to produce anything worth while in 1923, the 1924 yield fell off badly, as expected. It is thought that grasshoppers also had something to do with the altered showing and particularly with the depressed production of Western rye, a crop they have been observed to favour.

PRESENTING THREE YEARS' YIELDS OF HAY IN POUNDS PER ACRE FROM THE 1922 SEEDING OF THE GRASS AND CLOVER MIXTURES EXPERIMENT

—	1923 crop			1924 crop			1925 crop			Three years' crop Range A (full seeding	Three years' crop Range B (two-thirds seeding)	Three years' crop Average both ranges
	Range A (full seeding)	Range B (two-thirds seeding)	Average of both ranges	Range A (full seeding)	Range B (two-thirds seeding)	Average of both ranges	Range A (full seeding)	Range B (two-thirds seeding)	Average of both ranges			
Alsike and Red Clover Series												
Clovers only				711		355	1,646		823	2,357		1,178
Clover and timothy	1,820	2,160	1,990	300	639	469	2,249	1,446	1,847	4,369	4,245	4,307
Clover and western rye grass	2,720	1,760	2,240	1,455	996	1,225	1,992	1,544	1,768	6,167	4,300	5,233
Clover and meadow fescue	1,640	1,420	1,530	1,782	2,396	2,089	1,847	2,149	1,998	5,269	5,965	5,617
Clover and three grasses	2,360	2,060	2,210	2,397	1,918	2,157	1,386	2,110	1,748	6,143	6,088	6,115
Clover and five grasses	2,380	1,540	1,960	1,301	2,443	1,872	1,198	1,572	1,385	4,879	5,555	5,217
Averages	1,820	1,490	1,655	1,324	1,398·6	1,361·1	1,719·6	1,470·1	1,594·8	4,864	4,358·8	4,611·1
Red Clover Series												
Clover only				1,843		921	2,295		1,147	4,138		2,069
Clover and timothy	2,620	2,400	2,510	320	920	620	1,814	1,275	1,544	4,754	4,595	4,674
Clover and western rye grass	2,800	1,760	2,280	1,396	2,883	2,139	1,383	1,374	1,378	5,579	6,017	5,797
Clover and meadow fescue	1,500	1,600	1,550	1,913	1,846	1,879	1,519	1,571	1,545	4,932	5,017	4,974
Clover and three grasses	3,000	2,160	2,580	972	1,648	1,310	1,515	1,467	1,491	5,487	5,275	5,381
Clover and five grasses	2,300	2,440	2,370	983	2,717	1,850	1,757	1,427	1,592	5,040	6,584	5,812
Averages	2,036·6	1,726·6	1,881·6	1,237·8	1,669	1,453·1	1,713·8	1,185·6	1,449·5	4,988·3	4,581·3	4,784·6
Alfalfa Series												
Alfalfa only				3,486		1,743	5,286	3,001	4,143	8,772	3,001	5,886
Alfalfa and timothy	1,120	1,460	1,290	1,546	1,354	1,450	2,749	3,897	3,323	5,415	6,711	6,063
Alfalfa and western rye grass	2,300	1,600	1,950	2,323	1,430	1,876	2,751	3,051	2,901	7,374	6,081	6,727
Alfalfa and meadow fescue	1,400	1,420	1,410	2,864	2,045	2,454	3,316	2,221	2,768	7,580	5,686	6,633
Alfalfa and three grasses	1,960	1,640	1,800	1,372	1,466	1,419	1,989	1,701	1,845	5,321	4,807	5,064
Alfalfa and five grasses	1,580	1,840	1,710	1,442	1,589	1,515	1,499	1,508	1,503	4,521	4,937	4,729
Averages	1,393·3	1,326·6	1,360	2,172·1	1,314	1,742·8	2,931·6	2,563·1	2,747·1	6,497·1	5,203·8	5,850·3
Grand averages (three series)	1,750·0	1,514·4	1,632·2	1,578·1	1,460·5	1,519·0	2,121·6	1,739·6	1,930·2	5,449·8	4,714·6	5,082·0

NOTES

Grass and Clover Mixtures Tables

(1) Location: Course 2, on the block where the 1918 seeding of the experiment had been made. The three series of ranges stood in the same sequence but the order of plots in each range was reversed as from east to west, thus placing on the nurse-crop strips two full-seeded plots of legumes only (Range A) and two thin-seeded plots of five-grass mixture (Range B), which, as in 1918, were along the west side of the block.

(2) Preparation: After being ploughed out of sod in 1920 the land was in oat and barley plots in 1921, these running across the block, i.e. east to west. The stubble of these was disked in the autumn, floated and harrowed in spring, then back-set, disked, floated, disked, and floated again. Seed-bed good, but some turfs showing.

(3) Grass and legume seeds sown June 9 and 10, the latter without inoculation, as the intention was to apply inoculated soil later on.

(4) The nurse crops employed in the test this time were oats sown early to be harvested and winter rye seeded June 10 at one and one-half bushels per acre, to be pastured during the first season. A mishap in seeding caused the rejection of the former strip from the tables. The winter rye gave a considerable amount of grazing toward the end of the first season and cut nearly a ton of winter-rye hay per acre in 1923. Rather a poor catch of "seeds" was obtained, although enough alfalfa persisted to make quite a creditable showing in 1924. There was a sprinkling of grass on the more favoured locations, but very little sign of red or alsike. Only the two alfalfa-series plots of the rye strip were left for hay. The alfalfa-only plot yielded 993 pounds hay per acre and the alfalfa-five-grass-mixture 1,803 pounds. In 1925 the alfalfa plot yielded 3,577 pounds of hay and the alfalfa-five-grasses plot 3,511 pounds, alfalfa being the dominant ingredient of the mixture.

(5) Owing to drouth and late seeding in 1922, the germination was very tardy and sparse. The alfalfa germinated better than the true clovers, but all the legume-only plots (other than those occurring among nurse crops) were ploughed up and re-seeded June 1, 1923. Even this re-seeding met the misfortune of drouth and some of the plots were still failures.

(6) On May 1st, 1925, it was noted that in the alfalfa series (Range B) the alfalfa and the alfalfa-timothy plots were being well soaked. Later, the alfalfa-rye grass plot in the same range was given considerable snow-water irrigation, also. These notes explain three abnormally high yields and suggest a probable explanation of others.

(7) In 1925 the strip originally seeded with a nurse crop of oats yielded as follows:—

Red clover, alsike and five grasses	Range B	2,114 pounds per acre.
Red clover only	Range A	2,520 pounds per acre.
Red clover and five grasses	Range B	1,143 pounds per acre.
Alfalfa only	Range A	3,762 pounds per acre.
Alfalfa and five grasses	Range B	2,507 pounds per acre.

SPECIAL ALFALFA EXPERIMENTS

VARIETY TESTS

On a raw-clay knoll at the front of the premises, as unsuitable for alfalfa as could well be chosen, four varieties and strains of alfalfa were seeded 1923 in duplicate hundredth-acre plots to provide a test of hardiness and production. They were: Grimm (from Brooks, Alberta), Beaverlodge seed (of a variegated sort), Cossack, and Yellow-Flowered Siberian from Rife, Alberta. These plots were cut for seed in 1924 but the crop was partially spoiled by rabbits and weather ere yields could be taken. In 1925 they were cut for hay and after marginal growth was eliminated, yielded as follows:—

Grimm (Ex. Brooks)	1,074 pounds per acre
Beaverlodge	1,090 pounds per acre
Cossack (Boyd)	657 pounds per acre
Yellow-Flowered Siberian (Boyd)	503 pounds per acre

The Brooks and Beaverlodge stocks appeared about equal in growth and identical in type of bloom. The Yellow-Flowered Siberian is very low-set and short, with a conspicuous yellow blossom. The Cossack is intermediate in type. All the stands are still complete.

YIELDS OF ALFALFA SEED

Perhaps the most outstanding issue of the season so far as forage crops are concerned was the big yield of high-grade alfalfa seed harvested from some half dozen different areas. It was the fourth successive year for alfalfa seed to ripen in paying quantities, and the outturn was the best to date. The Dominion Agrostologist, viewing the plots in August, declared they were the best-podded he had seen all summer. This was particularly true of the rows, and, next to those, of the thinner broadcast stands.

Yields are reported from three areas. The plot designated " rows " consisted of two drills three feet apart and 2,060 feet long seeded June 21, 1923, with home-grown seed of 1922. These rows were flanked by trees on one hand and cereals on the other and the area was calculated as 0.28 of an acre. It yielded in 1924 at the rate of 293 pounds per acre, grading No. 3 at Calgary. In 1925 it yielded 605 pounds per acre, of which 498 pounds graded No. 1 at the Dominion Seed Laboratory, Calgary, while the remaining 107 pounds, consisting of the re-cleaned screenings and tailings, floor sweepings, etc., was not quite so good, containing, perhaps, one-third brown and shrunken seed. Throwing this 107 pounds in for good measure we would still have a yield of 498 pounds, or 8 bushels 18 pounds. It sold readily for $20 per bushel, or $160 per acre.

The area designated " broadcast," seeded 1923, was sown with the same run of seed used to drill the rows. In 1924 it threshed 144 pounds per acre, and in 1925, 300 pounds (5 bushels) of the better grade, which at Calgary was rated No. 3, the sample being less plump and bright than that from the rows. There were, in addition, 91 pounds of recleaned screenings, etc., making a total of 391 pounds or not quite 4 bushels per acre.

The third area consisted of eight hundredth-acre plots, with intervening paths largely overgrown, and was computed at one-tenth of an acre. It was strongly established and had the protection of a hedge. It, also, yielded 3½ bushels per acre of the better grade and 135 pounds per acre of recleaned screenings and sweepings, or a total of 350 pounds, equal to 5 bushels 50 pounds per acre.

Certain recently seeded plots with quite thick stands did not do so well, but wherever a well-rooted plant grew without undue crowding it produced seed in abundance, not only on the Station but on the farms of many co-operating experimenters and others. Conditions were favourable for ripening. The plots were cut September 7 and 8 but might have stood longer without much danger of frost injury.

PRESENTING YIELDS OF ALFALFA SEED, 1925

Designation	Area—(fraction of acre)	Seed per plot		Seed per acre		
		Grade A	Grade B	Grade A	Grade B	Total
		lb.	lb.	lb.	lb.	lb.
Rows seeded 1923 with home-grown seed	0·28	139·5	30·0	498	107	605
Broadcast seeded 1923 with home-grown seed	0·50	150·0	45·5	300	91	391
Broadcast seeded 1922 (8 plots 1 rod by 26·4 feet with overgrown paths)	0·10	21·5	13·5	215	135	350

SEVEN-YEAR-OLD STAND OF ALFALFA

The broadcast area seeded 1918 in a cultural test with alfalfa received pretty thorough saturation with snow-water in the spring of 1925 and produced over two tons per acre from the first cutting, with nearly three-quarters of a ton from the aftermath, or a little better than two and three-quarter tons per acre from the two cuttings. The aggregate of seven years' crops (1919 to 1925, inclusive) is 22,954 pounds per acre, or 3,279 pounds per annum. The area is undoubtedly somewhat favoured in situation and has had the advantage of a certain amount of hand-weeding; but in certain other respects it has been handicapped. It is fairly certain that no grass crop would have produced an equal average yield from the same land during the same run of seasons, saying nothing of the superior value of alfalfa hay per ton.

INTERCULTIVATED ENSILAGE CROPS

VARIETY TEST OF SUNFLOWERS

The sunflowers, like the corn, were sown on a summer-fallowed black loam. They were drilled on May 13 in rows 36 inches apart with the index lever of the drill set as to sow two bushels of wheat per acre.

On May 23 a lever harrow was driven one lap crosswise of all the plots, apparently injuring the portions thus treated. Wireworms attacked the stands and seemed to have a more serious effect on the harrowed area.

Emergence and early weeks of growth were tardy, while the hot, dry weather held it back later. Refreshing rains in late August and early September stimulated development in the latter weeks, rendering the crop exceptionally succulent at harvest. Most kinds were immature, while none were up to a normal stature.

Weather being threatening, the crop was cut, weighed, and sampled on September 8, except that one-third of each plot was left standing to test the effect of frost when it might arrive. It came shortly afterwards and on September 12 the remaining rows were cut.

Such early and medium-early sorts as Manchurian and Early Ottawa 76 show up rather well, both in percentage and in total dry-matter content. In fact the Early Ottawa had the second greatest amount of solids, standing next to the Russian Giant.

An interesting comparison was afforded by two strains of Mammoth Russians. The C.P.R. stock was recorded as 90 per cent in bloom while the McDonald strain was merely in bud with no bloom showing. It is true the former was not in full bloom, most of the heads being in the early stage of development. But still there was a conspicuous difference between the two strains, and it is reflected in the percentage of dry matter (12.18 versus 11.27). In yield of total dry matter they were almost alike, while both were decidedly exceeded by the immature Russian Giant (D.I.S.Co.), which headed the list.

All things considered, however, the season's data rather support the previous deduction that a medium-early variety, such as Early Ottawa 76, is to be preferred for ensilage in most parts of the Grande Prairie district, assuming that sunflowers are to be grown at all. The sunflower crop has not acquitted itself with any great honour when compared with other crops on a basis of dry-matter content. It may be useful to grow for succulent fall feed and in limited way to mix with cereals for silage, especially near the top of the silo to secure compression.

VARIETY TEST OF CORN

Corn appeared to thrive better than usual and the early-September prospect of the crop raised hopes that it might yet have a place as an economic substitute for bare fallow. Some of the stalks grew six feet tall or over, and the more promising early kinds, such as Quebec 28 and Twitchell's Pride, stood breast-high and better. In view of this promise the final showing in production of dry matter per acre was disappointingly low, standing at 1,351 pounds absolute dry matter per acre for all the twelve varieties. The only one of these to mature ears suitable for seed purposes was Howes' Alberta Flint. One plot of this was planted with seed from Ottawa. Other rows were planted with seed grown at Fort Vermilion in 1924. Good seed was ripened from all the Howes' Alberta Flint though, of course, the ears were small, averaging less than six inches in length, while the tassels were carried not a great deal higher than heads of millet in adjoining plots. Its production of dry matter per acre was the lowest of all the varieties, being only 871 pounds.

Fodder corn in 1925: Quebec 28 on left, Howes Alberta Flint on right.

Eliminating this and a few of the latest, most immature sorts, the average production of dry matter per acre for the corn would have ranged around three-quarters of a ton, which is still low. Some of the more promising kinds were Twitchell Pride, which has usually done well at Beaverlodge, Red Dent (Brandon), Longfellow, one or two strains of Northwestern Dent, Gehu, Assiniboine Sweet, and Quebec 28.

ARTICHOKES

On May 13 Mammoth French White Jerusalem artichokes were planted on summer-fallowed, black-loam soil and immediately adjacent to the sunflower variety test. Several rows were planted with seed received from Ottawa and one or more others with seed tubers dug up from a neighbouring area where they had wintered in the ground. The Ottawa tubers were much the larger, averaging 1⅞ ounces in weight as against ⅞ ounces for the Beaverlodge. The early growth reflected this difference decidedly, but later in the season the contrast was less marked, although there still remained more difference in apparent growth than the yield returns would indicate.

The tubers were planted in rows centred 3 feet apart.

At first the artichokes seemed to grow away from the sunflowers, but the latter presently overtook them and outyielded them considerably in production of dry matter. The artichokes attained an average height of only about three feet, being evidently shortened by dry weather. From evidence to date they do not look like a promising forage crop.

ARTICHOKES, 1925—TEST OF HOME-GROWN VERSUS OTTAWA SEED TUBERS

—	Yield per acre	
	Green weight	Dry matter
	lb.	lb.
Mammoth French White Jerusalem (Beaverlodge) (one row)	6,400	1,082
Mammoth French White Jerusalem (Ottawa) (average three rows)	6,466	1,124

BROADCAST ANNUAL FORAGE CROPS

THE O.P.V. TEST

On a good piece of summer-fallow a test was laid out to compare Banner oats with oats and peas, oats and vetches, and oats, peas, and vetches (O.P.V.). The plots were drilled 174.24 feet long by 7 feet wide and harvested by driving a 6-foot binder full swath through them, thus eliminating most of the marginal effect.

The oats-only and the legumes were drilled on May 13 after the land had been harrowed. Varieties were Banner oats, Empire peas, and Common vetch. The oats were treated with copper carbonate; the peas and vetches inoculated. The intended rates of sowing were: (*a*) Oats only at 2 bushels; (*b*) oats at 5 pecks and peas at 6 pecks; (*c*) oats at 5 pecks and vetches at 36 pounds; (*d*) oats at 5 pecks, peas at 4 pecks, and vetches at 20 pounds.

The peas and vetches were not put on so thickly as intended, quite a few being cracked in the drilling.

Immediately after the vetches and peas were sown, oats were cross-drilled on one-half of this area. The remaining half was cross-drilled a week later, at which time the vetches were up, many being dislodged by the cross-drilling, notwithstanding that the oats were drilled less deeply than the vetches had been. By accident, the oats cross-drilled on May 20 were sown with the index lever at 9 pecks instead of 5 pecks, as it should have been. For this reason no separate yields were taken of the subdivided areas. From observation, however, it was deduced that the deferred seeding of the oats favoured the peas and vetches, particularly the latter.

A supplementary test was sown the same dates on spring ploughing immediately adjacent, this area having been ploughed early and log-dragged. The

spring ploughing yielded in each instance less than half the crop thrown by the summer-fallow, the average of all plots on each preparation showing the spring ploughing this year to have produced not quite 40 per cent as much as the fallow.

As in former experience with these mixtures, oats alone have outyielded the oat-legume combinations. The oats seem to make fuller use of the limited moisture supply and this superiority over the legumes was conspicuously manifested in the spring ploughing.

TABLE COMPARING YIELDS OF OATS AND OAT-LEGUME MIXTURES, BOTH SUMMER-FALLOW AND SPRING PLOUGHING, 1925

	Pounds cured hay per acre
Summer-fallow Range—Average of duplicate plots—	
Oats only	3,739
Oats and peas	2,973
Oats and vetches	3,669
Oats, peas, and vetches	2,962
Average all plots on fallow	3,335
Spring Ploughing—Single plots only—	
Oats only	1,920
Oats and peas	1,230
Oats and vetches	1,178
Oats, peas, and vetches	899
Average all plots on spring ploughing	1,306

CEREALS FOR HAY

Three varieties of bald barley were compared with Ruby wheat and Banner oats from the standpoint of hay production. There were duplicate ranges of plots drilled 7 feet wide but trimmed at harvest to a width of 4 feet and cut with a mower.

As the grain was emerging on May 23, one-half of the length of each plot was cross-harrowed with a lever harrow, while the remainder was not harrowed. Little injury to the stands resulted. The harrowed portions headed about a day later than the unharrowed, but bloomed almost as soon as the latter, so that retardation due to harrowing was slight.

CEREALS FOR HAY, 1925—CURED HAY IN POUNDS PER ACRE

Kind of crop	Not harrowed			Harrowed			Average of harrowed and unharrowed	Average of various cereals
	North range	South range	Average	North range	South range	Average		
Local beardless barley	3,330	3,267	3,298	3,714	3,422	3,568	3,433	.....
Fenil barley	3,554	3,372	3,463	3,602	3,797	3,699	3,581	3,352
Eureka barley	3,593	2,663	3,128	3,000	2,918	2,959	3,043	.....
Ruby wheat	3,550	3,230	3,390	4,039	3,279	3,659	3,524	3,524
Banner oats	3,902	4,222	4,062	4,095	4,125	4,110	4,086	4,086

VARIETY TEST OF MILLETS

Unduplicated plots of four varieties of millet were seeded June 4 on land adjoining that devoted to corn and sunflowers and similarly prepared. They were sown through the grass-seeder of the grain-drill and covered lightly by the following disks. Emerging June 14 they grew relatively well during the hot, dry weather.

Following a touch of frost, wilting them slightly, they were cut on September 12, yields of green weight being taken from mown swaths each 5 feet by 48 feet. Hog millet, as usual, appeared to be the tenderest and least desirable variety.

Variety	Weight in pounds per acre			Percentage absolute dry matter
	Fresh cut	Cured hay (12 p.c. moisture)	Absolute dry matter	
Siberian	13,250	2,925	2,574	19·43
Common	12,160	2,739	2,411	19·82
Golden	13,250	3,222	2,835	21·39
Hog	11,610	2,308	2,031	17·48
Averages all varieties	12,567	.....	2,462	19·59

DRY MATTER COMPARISONS OF VARIOUS FORAGE CROPS

With a view to enabling summarized comparisons of various crops to be made over a series of seasons, a table is presented setting forth the average 1925 yields in absolute dry matter per acre of ten varieties of sunflowers as grown in the variety test, twelve corns ditto, and two strains of artichokes, all grown adjacently on a piece of summer-fallow land and under approximately similar conditions. The corn plots abutted the sunflowers and the artichokes occurred in the sunflower range.

A second table affords a comparison of various classes of field roots, rape, and cereal fodders grown in the same field as those represented in the first table, and after similar preparation, but situated some distance down a slope where there may have been more moisture. Although the crops covered in each respective table are fairly comparable one with another, those in the one table are not precisely comparable with those in the other.

It will be noticed that the corn and sunflowers are low both in percentage of dry matter and in total dry-matter content per acre. Immaturity, and harvesting in a fresh, sappy condition following weeks of continually showery weather and with prompt weight-taking after cutting, ere wilting could occur, go to account for the low percentage; but, even so, the outcome is surprising. Their percentage of dry matter was considerably less than that of rape (which was more or less wilted when weighed), and not very much higher than that of mangels and turnips, both of which ran under ten per cent.

Once again, Swede turnips have demonstrated their superiority to other field roots, with carrots the lowest, producing less than half a ton of dry matter per acre. Rape in drills did surprisingly well.

Although the turnips averaged over 16 tons per acre fresh weight they were exceeded in production of absolute dry matter by most of the cereal fodders for all that the latter had a much briefer growing period. In two distinct series, viz., cereals for hay and the O.P.V. test, Banner oats proved the most productive of the cereals tested, while in this dry year Ruby wheat outyielded the average of the three bald barleys.

TABLE COMPARING AVERAGE YIELDS OF SUNFLOWERS, ARTICHOKES, AND CORN GROWN IN THE VARIETY TESTS, 1925

—	Number of varieties	Date seeded	Date harvested	Green weight per acre	Absolute dry matter per acre	Average dry matter
				lb.	lb.	p.c.
Sunflowers	10	May 13	Sept. 8 and 12	15,866	2,006	12·6
Artichokes	2	" 13	Sept. 8	6,450	1,114	17·3
Corn	12	" 12	" 10	11,766	1,351	11·5
Millet	4	June 4	" 12	12,567	2,462	19·59

TABLE COMPARING ROOT CROPS, RAPE, AND CEREALS IN PRODUCTION OF ABSOLUTE DRY MATTER PER ACRE ON SUMMER-FALLOW, 1925

—	Number varieties or combinations	Date seeded	Date harvested	Green weight per acre	Absolute dry matter per acre	Average dry matter
				lb.	lb.	p.c.
Swedes	7	May 15	Oct. 12	32,787	3,199	9·8
Mangels	5	" 14	" 10	17,667	1,674	9·5
Carrots	7	" 15	" 13	9,913	1,044	10·5
*Rape (broadcast)	1	" 15	" 14	17,320	3,211	18·5
*Rape (drills)	1	" 15	" 14	23,830	3,892	16·3
†Bald barleys for hay	3	" 14	Aug. 6	.....	3,949	
†Ruby wheat	1	" 14	" 6	.....	3,101	
†Banner oats	1	" 14	" 6	.....	3,595	
‡Oats in O.P.V. Test	1	" 13	" 19	.....	3,290	
‡Oat-legume mixtures	3	"13–20	" 19	.....	2,826	

*Cut with hoe. †Cut with mower. ‡Cut with binder.

HORTICULTURE

The summer of 1925 resembled that of 1924 in that there was a long, dry period extending until towards the middle of August, with the exception of a good rain on July 25. Then followed a very wet season. During May and early June conditions had been favourable for germination and growth, but the hot, dry winds of mid-summer made transplanting very difficult, especially with annual flowers. Adverse weather in the autumn of 1924 had interfered with winter preparations and so the garden was not ploughed until spring. Except for these drawbacks the season was a fairly good one for horticulture. Warm-weather crops, such as corn and beans, did unusually well. With the former the table was supplied for weeks and with the latter almost for months. Tomatoes, held back by dry weather after transplanting, were stimulated by late rains to a strong growth, but few of the fruits ripened on the vines, although a quarter of a ton of large specimens were on the turning point and would doubtless have ripened had the dry and rainy periods been reversed from the order in which they occurred.

An increasing number of shrubs and perennial flowering plants are coming into bloom, while trees and vines are making satisfactory growth, giving the Station grounds a more pleasing appearance year by year.

It was April 27 before the hotbed was sown, over a week later than in 1924. Some outside sowing had already been done.

The season proved favourable to insect pests beyond former experiences. Wireworms, cutworms, turnip-beetles, and root-maggots caused considerable damage. The garden did not suffer from grasshoppers as did so many in the neighbourhood, a great number of gardens being wiped out. Our immunity was due to the use of poisoned bait in the fields around. Considering all the adverse circumstances it is gratifying that favourable results can here be reported. The pond water supply held out until the transplanting was done, leaving enough to water the celery a couple of times.

VEGETABLES

ARTICHOKES.—These not having been dug in the fall were allowed to grow where they stood, but were thinned out, with results considerably better than the previous year both in size and quantity. The Common Jerusalem were larger than the Mammoth French White Jerusalem, doubtless because the latter were propagated from very immature tubers, the result of late planting in 1924.

ASPARAGUS.—A generous table supply was secured of this delicious vegetable.

BEANS.—Fourteen varieties or strains of common beans were planted on May 20, and, in spite of drouth, germinated and flourished without setback, giving the greatest harvest of green beans produced on this Station. The first picked were from Wardwell Kidney Wax and Interloper on July 24. Planting was a week later than in 1924, but the first picking was four days earlier. In all there were ten pickings, extending into September.

The heaviest yielder, Davis White Wax, is recommended as well for quality as for quantity. All the strains of Round Pod Kidney Wax are good, but Ottawa 1638 is considerably the best. Hodson Long Pod, though late, produced good results owing to the favourable late season.

BROAD BEANS.—Five varieties of these rendered a good supply, the Harlington Windsor (S-B) having the highest yield.

POLE BEANS.—In these were included Sutton Scarlet Runners, Kentucky Wonder, from Wm. Thompson, Middlesex County, Ontario, and No. 1 Pole beans (Ottawa 5964). The Scarlet Runners made a good display and produced pods a foot in length. No. 1 Pole are the most prolific.

BEETS.—On May 16 ten varieties and strains were sown in rows three feet apart, triplicate lengths of 14.52 feet each. Germination was fairly even and the whole presented a flourishing appearance throughout the season. When dug on September 21 the yield in each variety was found to be higher than in the previous year, and very much higher on the whole.

BEETS, 1925

Variety	Yield per acre	
	tons	lb.
Extra Early (McKenzie)	17	1,166
Crosby Egyptian (S-B)	16	666
Detroit Dark Red (O. 6050)	16	666
Early Model (Graham)	16	500
Eclipse (McDonald)	16	333
Detroit Turnip (Graham)	15	833
Detroit Dark Red (McDonald)	14	666
Detroit Dark Red (O. 3494)	13	833
Early Wonder (Ewing)	13	1,666
Cardinal Globe (Rennie)	12	1,833

Beets appear to be one of the easiest vegetables to raise in the Grande Prairie district.

BORECOLE OR KALE, sown April 28, was transplanted June 9. As usual, results were most satisfactory. There were two varieties, Dwarf Curled, from Rennie, and Tall Green Curled (McDonald) equally luxuriant.

BRUSSELS SPROUTS.—The varieties stand in order of merit, Dalkeith giving 75 per cent mature plants, Amager Market 60 per cent, and Improved Dwarf 40 per cent, while the Paris Market had none mature. Earlier planting in the hotbed would doubtless have improved the percentages.

CABBAGE.—Sown in the hotbed on April 27 and transplanted to the open June 8. An abundant crop of cabbage is easily raised in the district let the season be wet or dry. Though the growth was slow during the drouth, it was very rapid after the rain. In spite of early treatment with corrosive sublimate (1 ounce to 10 gallons water) during the drouth, the root maggots threatened serious damage, early varieties becoming an easy prey. All were treated again to a dose of the insecticide and the loss was not serious. After the rain, growth

was tremendous, so that cracking became prevalent, Jersey Wakefield being most subject. Twisting the necks checked this difficulty.

Following are the yields as calculated from ten plants of each variety:

CABBAGE, 1925

Variety	Yield per acre	
	tons	lb.
Copenhagen Market (James)	25	375
Succession (Ewing)	24	515
Danish Summer Ballhead (Harris)	19	1,312
Copenhagen Market (Graham)	18	1,562
Flat Swedish (D. & F.)	17	1,468
Enkhuizen Glory (Rennie)	17	1,437
Copenhagen Market (McDonald)	17	578
Ex. Amager Market (O. 3422)	16	1,062
All Head (Steele-Briggs)	16	843
Dala (McDonald)	16	781
Early Summer (Rennie)	16	156
Marblehead Mammoth (Ewing)	15	890
Brandon Market (McKenzie)	13	62
Early Winnigstadt (S-B)	9	1,968
Golden Acre (Harris)	9	468
Select Jersey Wakefield (McDonald)	9	109
Early Paris Market (McDonald)	6	1,015

The earliest cut was Early Paris Market on August 8, followed on August 10 by Golden Acre and Early Summer. As commonly experienced, a strain of Copenhagen Market heads the list. It is new to have Succession standing so high, as the seasons are rather short for the later varieties, unless started quite early. The yield for the whole was much beyond that of 1924. Some of the earliest varieties had to be cut before the rain, so their yields are low.

Golden Acre, a novelty, promises well, with good solid heads, but is subject to root maggots. Copenhagen Market has bold, round, firm heads. Dala, new in 1924, gives large, firm, flattish round heads. Extra Amager Ballhead is a winter cabbage with medium-sized solid heads. Marblehead Mammoth is of good size but not really solid. All Head, fair; subject to cracking; not as firm as others. Brandon Market, conical, good and firm. Early Summer, excellent summer cabbage. Enkhuizen Glory, one of the very best. Select Jersey Wakefield, conical, split badly. Early Winnigstad, conical; better than Jersey Wakefield this year. Early Paris Market, was most subject to root-maggots.

Two varieties of Chinese cabbage were sown in the open on June 9. If sown earlier they have a tendency to go all to seed. The Wong Bok had slightly larger plants than the Pe Tsai variety. All were of vigorous growth, but a choice morsel for the Red Turnip beetle.

CARROTS.—Sown May 12 and dug October 14. The germination was very unequal on account of the drouth. Then the cutworms were discovered depleting the rows, until in Chantenay there was only a 10 per cent stand. All the rest had from 25 to 45 per cent stands.

CAULIFLOWER.—Two varieties were sown in the hotbed on April 27 and transplanted to the open June 8. Like the cabbages, the outside leaves were considerably riddled. On July 18 it was noted they were heading up prematurely. The results calculated from ten heads of each variety follow:—

CAULIFLOWER, 1925

Variety	Yield per acre	
	tons	lb.
Early Dwarf Erfurt (McDonald)	5	1,968
Early Snowball (Graham)	½	192

Plants set out later, which had their growth in the wet season, produced heads more than twice the size. The first used was from Early Dwarf Erfurt on July 24.

CELERY.—On March 25 the following eight varieties were sown in a box in a box in the office:

French Success (Harris), White Plume (Graham), Winter Queen (Graham), Winter Queen (Stokes), Garrahan Easy Blanching (Graham), Easy Blanching, Garrahan, Golden Self-Blanching (O.3410), Golden Self-Blanching (McDonald),

After the frosts the boxes were placed in the cold-frame and were thinned by pricking out into another box.

On May 6 eleven varieties were sown in a first-class hotbed, the above eight varieties and in addition Golden Plume (Morse), New Golden (Ferry), (both novelties), and Paris Golden Yellow.

CELERY VARIETY TEST.—On July 6 two trenches were made, one for the varieties from the office boxes and another for those from the hotbed, the varieties to run parallel. These trenches were 7 inches deep and 12 inches wide, partly filled with well-rotted manure mixed with earth. The plants were placed 6 inches apart and well watered at planting and a few times after. The rain did the rest. Those varieties from the office boxes had an advantage on the whole, having larger heads when dug on October 16, some attaining, as the Winter Queen, 18 inches in height, the poorest, French Success, being 14 inches. Both trenches were a fair success. Best of all in size was the Winter Queen (Graham). The novelties, New Golden and Paris Golden Yellow, were about equal with the others. Paris Golden and White Plume were the best blanched; Winter Queen least so. White plume is the earliest but not so good-flavoured as Golden Self-Blanching.

CELERY—BLANCHING TEST, TRENCH, LEVEL CULTURE, BOARDS.—The trench was similar to the trenches made for the variety test; the rows 5 feet apart and plants 7 inches apart in the row. In each of these were sixteen plants, four of each of the following:—

Garrahan Easy Blanching (Graham), New Golden, Golden Plume, and Winter Queen (Graham).

When they were taken up on October 16, comparing the three methods, the trench proved worth double the others as to blanching and size as well, the boards the least successful. With both boards and level culture, however, the Golden Plume was blanched fit for use.

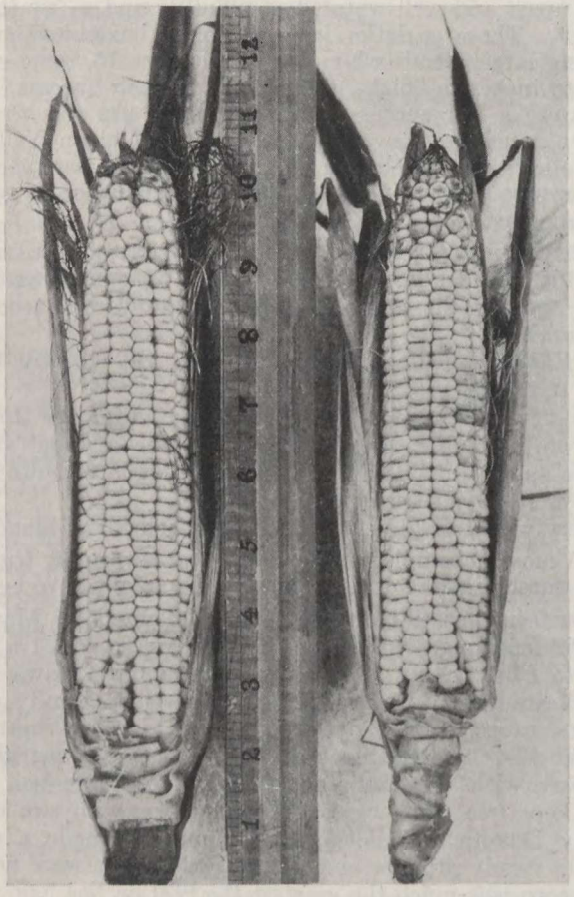
All the celery was stored in earth in the root-cellar and blanching completed.

CITRON.—Almost a complete failure, only a few small fruits forming. If these had been watered at the critical time, results might have been reported.

CORN.—Fourteen varieties or strains were planted on May 20 in rows 3 feet apart, 14.52 feet long, triplicated. To these were added a single row each of Howe Alberta Flint, Early Kloochman, and Squaw Ottawa 1445. Then on May 20 a triplicate row of Improved Squaw received locally was run on the flanks. The first range had the suckers removed twice, in contrast to the third range not suckered. One treatment of nitrate of soda was given the second range to compare with the first and third ranges untreated. All were well cultivated and kept free from weeds. All the rows, with two exceptions (viz., Improved Early Dakota and Pocahontas, Range 1) made a complete stand. The whole made steady growth, and as the early frosts were not injurious, the yield of usable corn was much the greatest the Station has had. Following is a table noting the development and yield of each variety:—

VARIETY TEST GARDEN CORN, 1925

Variety	Source	Average height	Highest	In tassel	In silk	Usable ears	Usable ears per acre, as calculated
		inches	inches	p.c.	p.c.		
Improved Squaw	Mrs. John Smith	30	39	100	100	47	15,666
Assiniboine	Will	47	56	100	100	64	21,333
Early Malcolm	Ott. 8205	45	53	100	100	1	333
Golden Bantam	James (Novelty)	49	60	100	100	9	3,000
Golden Bantam	Graham	49	62	100	100	2	666
Golden Bantam	McDonald	53	64	100	100	4	1,333
Golden Bantam	Moore	49	60	100	100	6	2,000
Burbank	Burbank	46	55	100	100	8	2,666
Banting	C.E.F. (Novelty)	32	42	100	100	45	15,000
Malakoff	Vaughan	46	56	100	100	14	4,666
Whipple Early Sweet	Harris	53	71	100	100	1	333
Whipple Yellow	Harris	53	70	100	100	2	666
Pocahontas	Harris	55	65	100	100	4	1,333
Improved Early Dakota	Will	45	55	100	100	12	4,000
Pickaninny	Ott. 6576-86	31	38	100	100	69	23,000
Early Kloochman (single row)		36	49	100	100	20	20,000
Howe Alberta Flint (single row)		37	44	100	100	15	15,000
Squaw (single row)	Ott. 1445	52	71	100	100	4	1,333



Ears of garden corn 10 inches long grown at Beaverlodge in 1925.

The yield of usable ears by ranges was: Range 1, 84; Range 2, 149; Range 3, 94.

As far as usable ears are concerned, comparing Range 1 with Range 3, suckering Range 1 appears to have been a disadvantage, but two of the rows in Range 1 were not a complete stand, so no very positive conclusion can be drawn.

Comparing Range 2, treated with nitrate, with Range 3, untreated, it is seen that the range treated with nitrate has the greater yield by 58 per cent.

It will be seen by the above table that all the varieties were in tassel and in the silk, a development the Station has not been able to record before. Most varieties yielded results or were just beginning to produce. Had frost delayed another ten days the records would have been excellent. Ripe ears have been secured from the Pickaninny and the Banting. The earliest picking was on August 20 when the Banting gave 14 ears, Pickaninny 6, Improved Squaw 3, Howe Alberta Flint 2, Assiniboine 1. The Improved Squaw was planted a few days later than the others but had the advantage of being a flank.

The Banting, a novelty sent this year from Ottawa, comes immediately to the front with early production and a good yield. It has fair-sized ears of yellow colour and is excellent eating. Pickaninny, hitherto the earliest, comes in about the same time. Its cobs are small and dark when ready for use. Howe Alberta Flint is represented by a single row. Assiniboine, one of the earliest, has a good-sized ear of good quality. It will be seen by the results tabulated that Assiniboine furnishes the most food, Pickaninny ears not being more than half the size. Improved Squaw is winning a distinct place on Grande Prairie.

It may be noticed, too, by the table that the early corns have the shortest stalks.

CUCUMBER.—The season proved unfavourable. The West India Gherkin produced some usable fruit. Best results were from Davis Perfect, which had specimens 6 and 7 inches long, but not in abundance. Prolific had some 4½ inches in length.

EGG PLANT.—Four varieties were sown in the hotbed: Early Dwarf (Will), New York Purple (McDonald), Black Beauty (Graham), and Early White (D. & F.). Good healthy plants of each variety were set out on June 30, and though all grew well only one variety bore fruit, the Early Dwarf. This one bore a number of specimens, the largest being 3½ inches long. Other varieties scarcely bloomed.

HERBS.—The bed of sage, thyme, and summer savory flourished luxuriantly, proving that no one need be without these relishes.

KOHL RABI is well adapted to the district and there is little to choose between the two varieties used, Purple Vienna (Graham) and White Vienna (McDonald).

MELONS.—From the watermelons there is another failure to report. Harris Early was the only one that came into bloom. The muskmelons not only bloomed, but bore diminutive fruit, the Tip Top (Ewing) giving one 4½ inches long and 3 inches in diameter, a promise, let us hope, of good things to come. Muskmelons raised under glass produced a splendid harvest for Mr. F. Guthrie, Grande Prairie, realizing 75 cents each.

LETTUCE.—The first sowing, of May 14, germinated well and was making headway when devoured by cutworms. A re-seeding yielded good results in most varieties. Particular mention may be made of the Iceberg, which proved hardiest and most prolific, giving fine heads far into fall. The two Cos varieties, Trianon and White Paris, were among the best.

MINT.—Thought at first to be winter-killed, but made the usual growth. Many persons got roots to start in their gardens.

ONIONS.—Red and yellow sets were planted on May 5, dug August 31, producing fair-sized onions, most of which matured. The red and yellow were about equal in yield. From some rows the earth was drawn away and these were superior, if anything, to the others.

Thirteen varieties of seed onions planted on the same date germinated very irregularly, but after the rains set in most of the varieties made a fair showing.

While this test is not conclusive, yet the results from Red Wethersfield and Yellow Globe Danvers go to sustain their reputation of former years. The Early Flat Red had the most mature bulbs. Generally the seed-onions were started too late to mature properly, many being still decidedly green when taken up. Some attained a diameter of 2 to 3 inches.

PARSNIPS.—On May 1, with ground mellow and moist but with drying winds prevailing, four varieties were sown in rows 29.04 feet long, triplicated, 3 feet apart. Germination was far from complete, the stand ranging around 50 per cent in three varieties, while the Hollow Crown Ott. 3421 was 70 per cent.

PARSNIPS, 1925

Variety	Yield per acre	
	tons	lb.
Hollow Crown (O. 3421)	5	1,833
Hollow Crown (McKenzie)	4	166
Hollow Crown (O. 6048)	4	0
Guernsey XXX (Rennie)	2	1,583

The result is far below that of 1924, which itself was low. While Guernsey was poorest in yield its roots were a fine sample.

PEANUTS.—Four varieties were sown May 20 and all germinated well, making good growth and considerable bloom, but September frosts took the whole before fruit had formed.

PEAS.—Thirty-one varieties were sown May 8. For the second year the pea plots presented an exceedingly patchy appearance. Added to the drouth were the wireworms which ate right into the seed peas. Damage was quite extensive and the patches were reseeded. The season being prolonged, the re-seeding bore good fruit. The first picking was on July 10 and the last on September 10, two months later. Reliance cannot be placed on the comparative yields.

We have the late peas mostly in the lead, while the earliest are away down, having failed to take full advantage of the late rains. The earliest pickings were on July 10 from Thomas Laxton Ott. 1072-3 and Gregory Surprise, while American Wonder, English Wonder and Gregory Surprise x English Wonder joined them on the 16th.

Among the seedlings and Lincolns there were often nine and sometimes ten peas in a pod. In one range the peas were allowed to ripen, but between the early-sown and late-sown it is hard to make a fair comparison.

PUMPKIN.—Two varieties were planted May 21, two hills of each. Holes were dug 15 inches deep and filled with rotten manure and earth for one hill of each variety. No manure in the other. The vines grew luxuriantly. In the Connecticut Field variety the manured hill nearly doubled the one without manure. The manured hill of the King of the Mammoths produced one fine pumpkin weighing 21 pounds 6 ounces matured, while from the unmanured hill little results were realized.

Pumpkins in the Date-of-planting test began to ripen before the frosts and some completed ripening inside. The Sugar Pumpkin (Graham) produced only a few medium samples this year.

RADISH.—Eight varieties were used on May 14. Every variety was good. The Scarlet Oval, of Rennie, is worthy of especial mention, while the White Icicle still maintains a foremost place for crispness, which is retained a long time.

RHUBARB.—There was vigorous growth in the old rows notwithstanding the drouth, but this continuing so long the plants withered badly, but were resuscitated when the rains came. Some plants from last year's seed were transplanted and made most satisfactory development. Seed was sown of Ruby No. 10 (Ott. 45), giving some fine healthy plants. No vegetable is surer or easier to grow, but in adverse seasons it will not stand the close cropping to which it is so generally subjected. The result is weakened crowns, scant growth, and a proneness to run to seed.

SALSIFY.—On May 19 seed received from Bishop Robbins was sown, it made good stand and formed medium roots.

SOLANBERRY AND SUNBERRY.—These prove to be easy to transplant and, spite of all drawbacks, produced abundantly and ripened the greater part of their fruit.

SPINACH.—The Viroflay, Victoria, King of Denmark, and New Zealand, all from Graham, were sown on May 16. The stand of these, especially the first three, was greatly depleted by cutworms, but New Zealand flourished and does not go to seed as the others.

SQUASH.—These were planted on May 21, the following varieties being used: Long White Bush Marrow (Ewing), English Vegetable Marrow, Golden Hubbard (McDonald), Golden Hubbard (Harris), Delicious (Graham), Kitchenette (Harris), New Acorn (Buckbee), Table Queen (Vaughan), Perfect Gem (Morse). Holes for each variety were made 15 inches deep and filled nearly full of well-rotted manure. Another hill had no manure. From Perfect Gem, Table Queen, and New Acorn no results can be reported. In all the others the hills with the manure, with one exception (English Vegetable Marrow), produced considerably the better results. The Long White Bush Marrow and English Vegetable Marrow were about even in yield, with fine, large fruit, and greatly outdistanced all the others. The Golden Hubbard (McDonald) had some excellent fruit.

SWISS CHARD.—Lucullus and Fordhook were the varieties used. The latter had much the larger plants, the white stalks of some were 4 inches wide, Lucullus 2½ inches wide.

TOMATO.—Seeds of Earliana Grade 2 and of Burbank (Bruce) were sown in window-boxes in the middle of March. When brought down on April 16 these were strong healthy plants about 4 inches high. They were put in cans, placed in the cold-frame for a time and set out for flank rows on June 18. Then twenty varieties were sown in a box in the office on March 25. These came along fairly well and were thinned by pricking into another box. They, too, were taken to the cold-frame.

On April 28 thirty-two varieties were sown in the hotbed, making wonderfully rapid and healthy growth. Five plants of each variety were transplanted to the open on June 15, the weather being very dry. They were put in 6 inches deep and well watered. Then on June 19 a duplicate set of five of each variety was set out. This constituted the variety test.

Commenting generally on the varieties it may be said that, as in previous years, Earliana Grade 2 renders the highest yield. The different strains of Bonny Best show well. Alacrity, as usual, stands among the first. Abbotsford Argo yields the largest number of tomatoes of all the varieties, though of smaller size. The Wayahead produced the first and largest number of ripe fruits. A few

ripe specimens were gathered from Alacrity, Alacrity x Hipper, and Alacrity x Earlibel. About 40 pounds of green tomatoes were placed in shallow boxes in the cellar. These had woollen cloths above and below. The greater part ripened. The blossom-end rot was very prevalent, most observable in the Early Detroit. A number were spotted and many cracked. For size, this year exceeded any previous one. Half-pound specimens were common, while a goodly number weighted 10 and 10½ ounces. The Monumental was quite noticeable for large fruit.

FRUITS

CURRANTS.—The yields of the red and white varieties here recorded are considerably above the average for eight years, although the red is only a little more than a half and the white about one-third of the 1924 record. It will be seen that in the red the New Red Dutch maintains its foremost place. Only in 1924 has the Victoria Red, its nearest rival, equalled it. Possibly the New Red Dutch may have some advantage in regard to soil.

The Large White and White Cherry run about even for the eight years. The blacks appear to be recovering after a few poor years. This improvement may be due to less severe pruning of young wood to secure slips for distribution.

The reason for the yield of red and white being so much below the record of 1924 is not clear. It could not be a question of moisture, as there was considerably more moisture from the preceding fall rains and the amount of snowfall was immensely greater. It may be due to the excessive yield of the previous year, together with the drouth that prevailed then, restricting the formation of the fruit buds.

RED CURRANTS, 1925—SIX BUSHES OF EACH VARIETY

Year	New Red Dutch	Cumberland Red	Victoria Red	Fay's Prolific	Wilder
	lb.	lb.	lb.	lb.	lb.
Aggregate yield 1917-1919	30·5	39·0	27·5	0·2	
1920	42·0	29·0	37·0	1·5	
1921	72·25	55·25	62·75	13·2	3·5
1922	56·5	29·25	31·87	8·93	0·87
1923	25·30	8·58	7·47	2·13	1·20
1924	93·6	76·7	93·6	25·35	40·62
1925	51·90	37·20	35·4	14·1	20·4
Totals	372·05	274·98	295·59	65·41	66·59

WHITE CURRANTS, BEAVERLODGE, 1925

Year	Large White O. 551	White Cherry O. 556
	lb.	lb.
Aggregate yield 1917-1919	7·75	4·4
Yield 1920	1·0	5·0
" 1921	5·25	12·5
" 1922	9·75	9·0
" 1923	Not recorded	
" 1924	66·3	73·12
" 1925	28·42	17·71
Total	118·47	121·73

BLACK CURRANTS, BEAVERLODGE, 1925

Year	Topsy O. 568	Collin's Prolific O. 565
	lb.	lb.
Aggregate yield 1917-1919	18·4	14·3
Yield 1920	38·0	26·0
" 1921	37·3	33·4
" 1922	7·43	1·71
" 1923	12·0	4·2
" 1924	5.68	5.68
" 1925	23·1	19·80
Total	141·91	105·09

Bloom was observed on May 16, ripe fruit on the reds July 21. All the bushes were sprayed with Black Leaf 40 three times to overcome leaf-destruction by the aphides.

GOOSEBERRIES.—All of the eleven Oregon Champion bushes set out in 1922 continue to thrive and this year produced a supply of fruit, 6 or 7 quarts.

HUCKLEBERRIES.—One or two of the bushes received from Glacier, B.C., just showed signs of life.

RASPBERRIES.—The frost setting in so early these were not laid down in the fall, as is the custom. After the attack by rabbits there was little fruiting wood left and little prospect of any crop, only the lower buds of the canes having been spared, thanks to snow protection. However, 31¼ pounds were gathered from an 18-rod row. The new growth was very vigorous. The first bloom was observed June 2. To control the red spider they were sprayed twice with Black Leaf 40.

SASKATOON.—These are in two hedges grown from roots planted in 1918. There was some injury from rabbits in places, though not in the hedges mentioned. The first bloom appeared May 16. From May 22 to June 1 the bloom was abundant and gratifying to the eye. The fruiting lasted from July 10 far into August. Besides the considerable quantity that birds and visitors ate, 98 quarts were picked from the one edge 330 feet long. Assuming that it drew from a width of eight feet, the yield would be 1,617 quarts per acre.

STRAWBERRIES.—This fruit, appreciated by all and so easily propagated, claims first consideration when planning a garden. The plants at the Station all wintered well and began blooming on May 17, but the drouth was severest during blooming and fruiting time. Plenty of moisture is necessary in producing strawberries in abundance and of large size. As this was lacking, the yield for 1925 was low.

	Lb.	Oz.
From a single row about 18 rods long, planted 1924	13	0
From a single row about 18 rods long, planted 1923	23	1½
From a single row about 18 rods long, planted 1922	24	12
From a single flank about 18 rods long, planted 1922	25	15

A row of locally-obtained Senator Dunlap strawberries was set out on June 10. On account of drouth and lateness of the date of planting they were rather slow in starting. The majority are thriving, however.

APPLES.—Most of the 1922 plantation is still in evidence. No bloom can be reported from them nor from the Siberian, Magna, and Beauty crabs ordered from Brookings, South Dakota, in 1922. Some of the latter were injured by the heavy snow banks. The stock of young apple trees received from Ottawa in 1924 are thriving, with two exceptions. Another addition to the apple orchard was purchased from Carl A. Hansen and set out June 3, in very dry condition:

one Anoka on Pyrus baccata and three Anoka on common apple. It appeared doubtful for a time as to their living, but each of them in time showed life and growth.

CHERRIES.—On June 6 the choke cherry tree was loaded with bloom, a thing of beauty; and an abundance of fruit followed. No use, however, was made of it. Hudson's Bay, Select, and Champa sandcherries were full of bloom and loaded with fruit.

The Hudson's Bay sandcherries are about the size of marbles, the Select a little larger, while the Champa are still larger, suggesting small plums. The Tom Thumb cherry, which produced a clump of three in 1924, had no bloom this year. The most of the Hudson's Bay ripened, but the ripening of Select and Champa was tardy, and not half were ripe when the heavy frosts came on September 16 and 17.

Three Compass cherry trees from Morden were added to the cherry row on May 16. One of these showed some bloom, but no fruit resulted.

PLUMS.—The Nigra plum seedlings made continued growth but no bloom was observed. The Pembina and Ojibwa plums planted in 1922 were injured by six-foot snow-banks but are healthy enough.

FLOWERS

The first gleam of colour was observed on April 10 from pansy plants surviving the winter. The number of pansy plants thus living over was far in excess of previous experience. Sweet Rocket, Iceland poppy, Columbine, and Larkspur soon added their varied colour from white to purple. The small bulbs of scilla, crocus, galanthus (snowdrop), muscari and chionodoxa planted in the fall soon pierced the earth and began to bloom on May 6, scilla leading the way with its little blue flower. Chionodoxa, blooming well on May 10, is also a pretty blue with white centre. The snowdrops were not abundant, but their modest white bloom was gratifying to the eye. Latest of these was muscari, bloom being full by May 26. Its odd blue flower thickens for 1½ inches on the end of a single stem. These bloomed long after the others.

TULIPS.—These were springing up in great numbers on May 1. The Pottebakker was first to appear, followed closely by the Artus, Cottage Maid, Chrysolora, and Duchesse de Parma. The white cups of the Pottebakker were first to open out on May 14 and soon the bed was aglow with the bloom of all the varieties mentioned. Special note might be made of the Picotee now blooming in another place, with its cup of white, or creamy white, having a thread of pink running around the edge.

The Darwin tulip-bed, planted in the fall of 1922, with its various shades of red, though somewhat depleted, still presented a gratifying sight. Approaching the tulip-bed set out last fall we first note five rows of early varieties all blooming fairly well together. The first is a single, the yellow Chrysolora; the second a white double, the Murillo, called a light pink. Then back of these is Keizerskroon, the tallest, a yellow shading to red. Next is a dark-red double, Rubra Maxima, followed by the Artus, a single of a lighter shade of red than the Maxima. These afforded one of the finest pictures of the year. The later varieties followed until on June 10 they presented a gorgeous sight, possibly the richest of all. At the rear is the Franz Hals (a blushed violet), tall and handsome. Then Don Pedro (coffee-brown), with fine large bloom. Then a Breeder tulip, the Jeane D'oeuf (heliotrope). Then the May-flowering Moonlight (sulphur-yellow), and La Mervielle (orange-red). These, combined with the Darwins, Fra Angelica (purplebrown-black), Isis (bright scarlet), and Gretchen (delicate pink), presented an harmonious sight of form and colour.

DAFFODILS unfolded their white and also yellow blooms by May 29 and claimed attention for a brief time.

IRISES.—Canary yellow, light yellow to cream, dark blue or purple, and light blue attained their acme of perfection in bloom on June 23.

PAEONIES.—Each year sees a greater development of the plants and an increasing quantity of bloom. Their colour first appeared on June 27 and was at its height on July 7 and gone by July 17.

SWEET PEAS.—On May 2 two rows 80 feet in length were sown on the level, in the one a superb collection from Robert Sydenham, Birmingham, England, and in the other an equally good collection from Burpee, of Philadelphia—in all forty-three varieties. On May 20 the following varieties were in the lead: Dorothy Eckford, Miss Willmott, Queen Alexandra, King Manoel, Daisy Bud, President Harding, Valentine, Wonderful, and R. F. Felton. The last-mentioned, a lavender-shaded amethyst, was first to bloom on July 13, and from this time on blossom after blossom unfolded until there was a riot of colour up to September 16.

The rows of sweet peas were supported by chicken-wire, which appears to be the most satisfactory support.

Paeony and iris in bloom, third year from planting. Apparently perfectly hardy at Beaverlodge.

GLADIOLI.—Seven varieties of these, together with smaller bulbs and bulblets, were planted on May 14. On August 20 Maiden Blush, with its fine tinge of pink, was first to bloom. On August 25 the Prince of Wales revealed its rich beauty. The bulblets are developing.

ANNUAL FLOWERS.—These were sown in the hotbed on May 6 and came on rapidly. Nineteen kinds were sown in the open on May 13 to compare with those to be transplanted. A row of sweet peas was sown in the centre, which, being supported by chicken wire, with stakes painted white, grew five feet high, and from this the rows of different flowers descended as to height in gradations to the outside row of Leptosiphon on one side and Sweet Alyssum on the other, 4 to 6 inches high.

The drouth caused tardy germination and growth in those sown in the open, while transplanting was discouraging, yet when the annual picnic was held on August 22 the whole presented results far beyond expectations. Nicotiana, Gaillardia, Stocks, Salpiglossis, Phlox, Nasturtiums, Candytuft, all bloomed well, but bloom was scant on Asters and Antirrhinum.

An embankment of earth was raised on the east and south sides of the Superintendent's residence, walled up by neatly-placed stones. On this bank at the back were the Virginia creepers, planted in 1924, stretching their dark foliage up the side of the stucco wall. Also in the background bloomed Stocks, Geraniums, and Antirrhinum, while in the foreground ran two rows of pansies.

TREES, SHRUBS AND VINES

The Manitoba maples when planted in 1916 were but single stems 9 feet apart. Now their branches so intertwine that it is difficult to pass through. They still make steady growth without recent signs of the winter-killing that some of them manifested in former years. They are now, in summer, like a

Common lilac in bloom at Beaverlodge.

green wall alongside the orchard. The green ash between the Manitoba maples and Russian poplar are making slow though steady growth. It is expected they will fill their places when poplar and Manitoba maple are gone. Decided development is observable in all the willows. The row of White spruce in the orchard

wind-break shows, each year, a very marked advancement. This year the growth in almost all of the evergreens, such as Scotch pine, Jack pine, and spruce is quite observable. The oak seedlings described in the 1924 report continue a healthy growth.

Caragana maintains its foremost place as a flowering shrub suited to the Peace River district. As an illustration of its hardiness, little seedlings were dug up beneath full-grown shrubs and a hedge of these planted 3 feet apart along the north side of the garden. This was on June 22 in the midst of the dry period and at last observation not one of them had died. The first bloom on the caragana was noted on May 27, a few days later than in 1924. By June 4 they presented a fine glow of yellow colour. The season of bloom was about a week shorter than in the previous year.

Chinese lilacs in bloom at Beaverlodge in 1925. These are now 9 or 10 feet high.

The flower buds of the Tartarian honeysuckle began to unfold on May 27. Full bloom was noted on June 16, and on June 22 their purple glory was declining.

The Common lilac comes into bloom earlier than the Chinese. On June 2 some bloom clusters of the common lilac were fully out, while the buds of the Chinese lilac were just appearing. Full bloom of the common was attained on June 6, but was not so abundant as in 1924.

On June 2, *Spiraea arguta* was arrayed in white, which it continued to wear till after the 10th.

A special attraction of the year which we may note under this heading was the lavatera, an herbaceous perennial of the mallow type of flower. Growing early from the root, it shot up until it attained quite a bushy form 5 feet in height. Unlike the foregoing shrubs, which began blooming in May, the lavatera flowers commenced to unfold in July. But though commencing later it continued to blossom from midsummer to the fall, for on September 14 its colour (a light pink) was still there.

Rosa rugosa continued its display of bloom through the summer.

The hop vine at the east end of a 35-foot building shot up with rapid growth, covering a great part of the wall and would almost have reached the peak had support carried that high.

Mountain ash, May Day tree, Siberian Almond, and hazelnut all are thriving. Of the two New Ulm walnut seedlings received in 1924 one has died and the other has only a precarious existence.

Of the eight Virginia creepers planted in 1924, two at least made splendid growth, reaching well up the side of the house. One other is a good healthy vine, growing slowly. A couple more have made little headway, while others are dead.

An interesting addition received from Morden was made to the ornamentals, as follows: Three Ginnalian maples, six basswoods, six elms, three Caragana pygmaea, three sumach, three Russian olive, three golden willow, three green willow, and three Britzensis willow. It is gratifying to note that every one of these was thriving. Many visitors were interested in the broad leaves the little basswoods developed, while the graceful leaves of the Ginnalian maple reminded one of the maple leaves of the East, when the frost had touched them. There was the same deep, rich, red colour.

EFFECT OF FROST ON VARIOUS GARDEN CROPS

Caged instrument registered 34 degrees Fahrenheit on August 23, and 33 degrees on the 24th. Ground temperatures not recorded on these dates.

The frost of August 24 affected, but not seriously, the following: Beans, corn, and all the tender vines. Those of September 12 and 13 nearly killed pumpkins, squash, beans, egg plant, and peanuts, while the potato tops were blackened.

A succession of low temperatures occurred from September 12 onward. During this time supplementary temperature readings were being taken. The ordinary meteorological thermometers are caged and hang 3½ feet above the ground. Outside this cage a second minimum-registering thermometer was hung after being first calibrated by the official one, the two, in fact, being sometimes interchanged for checking purposes. A third minimum thermometer was hung just clear of the ground level, next the close-cropped grass. Following are the readings and weather notes:—

Date	General state of weather	Caged instrument 3½ feet above ground level	Uncaged instrument 3½ feet above ground level	Uncaged instrument at ground surface
		Deg. F.	Deg. F.	Deg. F.
Sept. 12	Bright and clear	32	28	25
" 13	Bright and clear	32	29	24
" 14	Clear, but windy	34	32	28
" 15	Rain, turning to snow	32	32	30
" 16	Snowy and damp	25	25	25
" 17	" "	23	23	20
" 18	" "	29	29	28
" 19	Clear and bright	24	21	17
" 20	" "	35	31	26

It will be seen that the frosts were accompanied by snow. Notes were taken succeeding all these and it was found that all the vegetables mentioned were destroyed outright, as well as corn and tobacco. Spinach and artichokes were badly injured. Solanberry, Swiss chard, lettuce, and rhubarb were slightly injured. No effect was observable on onions, parsley, salsify, celery, carrots, parsnips, and the cabbage family.

RABBIT INJURY

On Manitoba maples, caragana, Tartarian honeysuckle and lilac no injury was observable after the winter of 1924-25. Currants have thus far been almost immune. Nigra plums, some sandcherries, and the green ash have the ends of their branches nipped off. A clump of Balm of Gilead, protected with building-paper wrapped to a height of two or three feet, were uninjured, but a row unprotected were girdled about a foot from the ground while intervening Manitoba maples escaped. Sandcherries in the orchard had their branches gnawed freely by the few rabbits that worked their way through the poultry-netting fence. The main hedges of saskatoons were uninjured, but a few bushes in a different situation were badly gnawed. The injury to raspberries was severe. Willow hedges were all nipped off to the snow line. Russian poplar, as usual, suffered severe girdling.

POTATOES

The established lines of potato experimentation were continued. The land for all but one test was a block ploughed out of grass and clover meadow plots in late July, 1924, and well worked both autumn and spring. Each potato plot, with certain specified exceptions, consisted of a row 10 rods long spaced on 3-foot centres and extending across the former sod plots so as to provide quite uniform conditions for the potato tests. The calculated area of each plot was $\frac{1}{88}$ acre. Most of the tests were at least in duplicate.

Between the middle and the twentieth of April the seed potatoes (except those reserved for certain special tests) were brought out of the root-cellar, treated with formaldehyde, and put in trays to sprout. There they were left until the end of May while other spring work was in progress. Most of the potatoes were planted May 26, 27 and 28. In some seasons such treatment, using sprouted sets, would produce nearly as good results as earlier planting of less strongly sprouted seed, but not so in 1925. Growing conditions in May and early June were exceptionally favourable, but soon after the potatoes were up, warm, dry weather set in, continuing until August, so that the late-planted crop experienced unfavourable conditions for root and vine growth. The average yields are, therefore, much lower than they would have been with more timely planting.

Each twelvemonth emphasizes the marked seasonal variation of the Peace River district, proving that no prescribed method can be depended upon to produce uniformly best results, but indicating the need of repeated experimentation to plumb the probabilities. Some practices meet with a better average success than others, but it takes many trials to determine the most likely chances.

Frost killed the tops on September 16 and 17, but digging did not commence until September 30 and before it could be completed a succession of low temperatures, occurring from the fourth to the eighth of October, injured a few of the exposed tubers. Thanks to hilling in wide, flat-topped moulds the percentage of loss was not large, though some inconvenience in sorting was occasioned.

VARIETY TESTS

Twenty-six varieties, as well as a strain test of Irish Cobblers, were compared in duplicate and carefully observed from planting to storing, with cooking trials, as usual, made by two families throughout the winter.

On August 5 and 6 the growing crop was inspected by H. S. MacLeod, District Plant Disease Inspector of the Division of Botany, C.E.F., Ottawa.

The result of inspection assists in the more intelligent roguing of future crops, in eliminating at once a few varieties which, if retained, might be a standing menace to the others. Early Bermuda and Morgan Seedling will be discarded, while Bovee and Gold Nugget will be confined to a supplementary test at a distance of 50 yards or more from the main area. Attempt will at the same time be made to establish healthy strains of some of these by means of tuber-unit propagation.

A problem is presented in the comparison of varieties; they fluctuate so much in quality from season to season. The Station is still unprepared to limit its recommendations closely. A few sorts have been definitely discarded for outstanding defects, notably lack of table quality. If a potato fails to satisfy in this respect it is not worth growing.

To the list of eleven varieties condemned in the 1924 report, viz., Cow Horn, Bluenose, Table Talk, Irish Cobbler (?) (Lacombe strain), Early Norther, Houlton Rose, Everitt Rose, Green Mountain, Iron Chief, American Wonder, and Manitoba Wonder will now be added the Agassiz Special, Early Bermuda, (Bliss Triumph), Morgan Seedling, and Red King. A few of these last-named possess merit and are favoured by certain growers, but as raised at Beaverlodge they have not proven outstanding and are finally rejected, in some cases because the seed stocks are not perfectly healthy.

Without attempting a final rating, the Station is inclined from its experience to date to recommend tentatively the following varieties:—

For early use and as main croppers in short-season districts:
Irish Cobbler (white).
Extra Early Eureka (yellowish-white).
Early Rose (red).
Early Ohio (red).

Medium Seasons:
Country Gentleman (red).
Bovee (red).
Gold Coin (creamy-white).
Carman No. 1 (white).
Wee McGregor (white).
Gold Nugget (creamy-white).

Late Seasons:
British Queen (white).
Netted Gem (russet-white).

This list may be radically revised by a few seasons' additional results and is offered, meantime, only as suggestive.

In the 1924 report of Beaverlodge Sub-station will be found a table giving figures for the variety-testing of potatoes for a period of seven years.

DATE OF PLANTING TEST

The date-of-planting experiment, inaugurated in 1918 and expanded three years later to include a supplemental sprouting test, was repeated in 1925, with results agreeing, for the most part, with the tenor of previous data. That is to say, early planting proved decidedly best when dormant tubers were planted, but not so important when sprouted sets were used, although even in this series the advantage of early planting was substantial in 1925.

From this general trend there were certain exceptions. The most striking one occurs in the fourth planting, where the non-sprouted row seemed to have out-yielded its companion, although in *percentage* of dry matter the results are consistent with those from the remaining dates. Experimental error is possible in spite of the care taken with all the work.

Excepting the fourth date, the percentage of dry matter exhibits an inclination to conform to the crop yields, allowing for the ruling principle that both early planting and sprouting tend to promote maturity and thus increase the dry-matter ratio. In years when growing conditions are very unfavourable during May the sets seem to make greater headway in trays than lying in the ground. In a favourable May, such as that of 1925, the reverse is the case. The early weeks of the past summer were favourable and the mid-summer weeks hot and dry. Grain, as well as potatoes, planted just prior to this period seemed to make poor growth. While sprouting in trays proved a partial compensation for deferred planting it was so to a less extent than usual in 1925.

The experiment was platted on ground occupied by corresponding test in 1923, vegetables intervening in 1924. Fertility and moisture conditions were good, though the subsoil moisture was not sufficiently deep to stand a prolonged drouth.

The first planting was made on April 25 when all the seed required for the test was treated with formaldehyde, one half being returned to the root-cellar to keep it as nearly dormant as possible, while the other half was put to sprout in trays. Thereafter, twin rows were planted at intervals, one with dormant seed and one with seed that had been sprouting in the interval.

At digging time samples of the crop were sent to the Division of Chemistry, C.E.F., Ottawa. Unfortunately, through an oversight, certain of the samples were during the interval exposed to a work room temperature for a few weeks while the others were stored in the root-cellar. The former were the samples from the fourth-date sprouted and from the fifth and sixth dates in both series. Dr. Frank T. Shutt, Dominion Chemist, was of the opinion that this had not affected them greatly, but they may have dried out to a slight extent. In reporting the dry-matter determinations Dr. Shutt commented thus:—

These data would indicate:

1. That in the case of the non-sprouted tubers the longer period between planting and harvesting (or perhaps, rather, the earlier the sets are planted) the higher the percentage of dry matter. In other words, late planting appears to reduce the dry-matter content.

2. That, in some measure, pre-sprouting offsets the effects of late planting. Comparing the tubers produced from sprouted and non-sprouted sets planted on the same date, those from the former are seen to contain the higher dry-matter content.

COMPARING yields of total crop and dry matter per acre in the Date of Planting Test, 1925.*

Variety: Country Gentleman.

Date of planting	Yield per aere		Dry matter per acre		Per cent dry matter	
	Non-sprouted	Sprouted	Non-sprouted	Sprouted	Non-sprouted	Sprouted
	lb.	lb.	lb.	lb.	p.c.	p.c.
April 25	24,130	.....	4,411	.....	18·28	.....
May 4	19,458	19,646	3,425	3,528	17·60	17·96
May 11	17,391	20,274	3,021	3,696	17·37	18·23
May 19	19,320	15,916	3,255	2,836	16·85	17·82
May 26	14,288	15,416	2,392	2,763	16·74	17·92
June 2	15,159	17,480	2,404	3,160	15·86	18·08

*Analyses by Division of Chemistry, C.E.F., Ottawa

As this experiment in its form as revised in 1921 has now run five years, attempt has been made to summarize the data. Difficulty has been experienced from the fact that the initial plantings have occurred on varying dates, ranging from April 20 in 1923 to April 26 in 1922 and 1924. There is also the irregularity in the number of plantings year by year.

The plan that has been adopted is to group together all the initial plantings and determine the average date thereof; thus with the second, and so on. Supplementary calculation was made by bringing together all the final plantings, likewise all the second-last, etc. Both tables support substantially the same deductions, but the former is selected as the more satisfactory presentation. In either case the first or else the last of the seven plantings in 1921 and 1923 would be excluded from the computations, and the summaries are to that extent incomplete. The final planting has in all five years been made in June.

TABLE presenting average results of the date-of-planting experiment during a five-year period, 1921-1925, inclusive. Non-sprouted and sprouted series presented comparatively, with total yields in pounds, percentages of dry matter, and pounds of dry matter per acre in each case.

Order of plantings	*Average date as calculated	Non-sprouted series			Sprouted series		
		Total yield	Yield dry matter	Per cent dry matter	Total yield	Yield dry matter	Per cent dry matter
		lb.	lb.	p.c.	lb.	lb.	p.c.
1st	April 24	22,464	4,539	20·20	.....	.....	.....
2nd	May 2	20,411	3,982	19·51	20,016	3,939	19·68
3rd	" 9	19,392	3,726	19·21	20,586	4,106	19·94
4th	" 15	18,305	3,433	18·75	18,768	3,826	20·38
5th	" 23	16,689	3,107	18·62	20,041	4,052	20·22
6th	" 29	16,920	3,092	18·27	22,052	4,251	19·27

(*) Calculated to the nearest day.

POTATO SPROUTS

Breaking off versus leaving cellar sprouts on at planting

A quadruplicate test in which four varieties were represented stands as another year's evidence against the practice of breaking cellar sprouts off sets at planting. The average loss in yield by so doing was 18.2 per cent in 1925. The four varieties employed were Country Gentleman, Early Rose, Irish Cobbler (Fawcett), and Wee McGregor. The largest difference (35 per cent) occurred with the Early Rose, possibly in part because this variety usually develops the strongest cellar sprouts and hence loses more when they are destroyed. Were the white sprouts of equal strength on all varieties it might be supposed the late kinds would be most benefited by their retention.

By way of supplement to the experiment a row was planted with white sprouts only (no flesh attached), using the sprouts discarded from the four varieties in the main test. The results from this row were irregular, the Wee McGregor sprouts yielding at the rate of 144 bushels 54 pounds per acre; the Early Rose 83 bushels 36 pounds; Country Gentleman 69 bushels 38 pounds, and the Cobblers nothing at all. The average was 24.2 per cent of a full crop. Over a period of years the results from these detached sprouts have been found to vary a great deal according to the soil and weather conditions at planting time. It is evident that the white sprout represents growth energy, which should be conserved if possible either by keeping the seed tuber dormant or by retaining the white sprout on the set in case one has formed. The serial-average gain in so doing during the past eight years has been 21.87 per cent, with never a reversal.

TABLE comparing results of breaking off versus leaving cellar sprouts on when planting. Average of a quadruplicate test in 1925, using four varieties, viz.: Country Gentleman, Early Rose, Irish Cobbler (Fawcett), and Wee McGregor.

Designation	Yield per acre	Per cent
	lb.	
White sprouts left on at planting	18,453	
White sprouts broken off at planting	15,087	
Advantage of leaving white sprouts on	3,366	
Per cent disadvantage of breaking off the white sprouts		18·2
Yield of a single row, average of the four varieties planted with white sprouts only (no flesh attached)	4,472	
Approximate percentage of a full crop produced by the white sprouts only, compared with average plots of above varieties		24·2

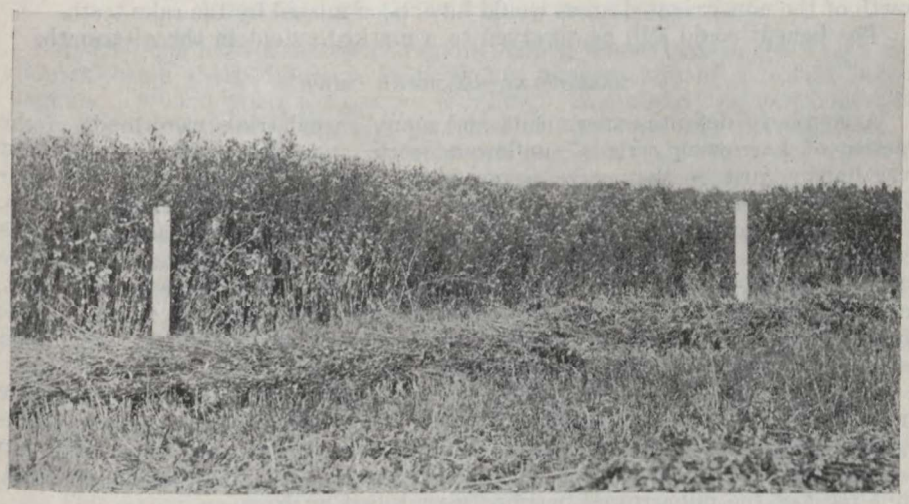
The eight years' chronological record of this experiment now stands:—

	Per cent
In 1915 loss from breaking off sprouts	15
" 1919 " "	18·4
" 1920 " "	33·8
" 1921 " "	21·0
" 1922 " "	27·8
" 1923 " "	18·9
" 1924 " "	22·3
" 1925 " "	18·2
Serial-average percentage loss from eight years' work	21·92

FIELD HUSBANDRY

IRRIGATION OF ALFALFA WITH SNOW RUN-OFF

The possibilities of utilizing snow-water run-off on long sloping fields by drawing plough furrows obliquely so as to lead streams of water from frost-bound draws up to dry ridges was tried out in quite a number of instances on the Station in the spring of 1925. The snow lay unusually deep and a great



Alfalfa plots irrigated with snow-water. The irrigated plots yielded nearly five times as much as the non-irrigated.

volume of water was released by the spring thaw. Before the water had ceased gurgling down the "draws" the ridges and knolls had thawed to a considerable depth and dried off on top, thus becoming receptive to percolation. It was

an easy matter to deflect and spread much water with a light plough furrow, supplemented by a little manipulation with hoe and shovel during the few days awaiting commencement of spring tillage. A great many acres of knolls and ridges were either partially or thoroughly soaked in this way.

The most marked benefits were obtained on alfalfa. Two knolls where the alfalfa (although healthy and well inoculated) had been exhibiting decidedly restricted growth as the result of three successive dry seasons, during which its deep-ranging roots had sucked the subsoil dry while the inadequate rainfall ran off its hard surface and most of the snow was swept away by the wind, were thus snow-irrigated on a part of their area and a third knoll of alfalfa, which had been dying out from the effects of drouth, was soaked over its whole area. On this knoll the alfalfa thickened up wonderfully and grew fully 2 feet tall, cutting a fine crop.

On the other two knolls the limits of spring saturation were carefully noted and it was soon observed that the alfalfa on the portions which had been irrigated grew right away from the surrounding crop. At haying time comparative yields were obtained from carefully measured representative areas, the plots being cut with a mower and all growth carefully gathered up. Following are the yields of cured hay per acre:

—	Yield of hay in pounds per acre	
	Irrigated	Non-irrigated
Knoll seeded 1921	3,699	731
Knoll seeded 1923	2,962	625
Average two tests	3,330	678
	Ratio 4·9 : 1	

The table shows that the irrigated areas yielded almost five times as much hay per acre as the non-irrigated. Had ordinary methods of hay-making been followed the contrasts would have been greater still, for much of the short, fine growth of the non-irrigated areas would have been missed by the rake teeth.

The benefit could still be observed to a marked extent in the aftermath.

HARROWING EMERGING CROPS

A couple of definite experiments and many casual trials were made of the practice of harrowing cereals, sunflowers, corn, and other crops with a light lever harrow just as they were peeping through the ground. The particular object is to destroy germinating weeds, which it does in considerable numbers. If the grain is in the stage where it is showing a single straight shoot and has been drilled at a reasonable depth; if the harrow is not too heavy and the surface is fairly free of trash, if the ground be dry on top and the day a bright, warm one, and particularly if a shower follow within a day or so, the immediate adverse effect on the grain is very slight, while, as a result of weed destruction the ultimate effect upon the crop is usually beneficial.

Even flax and buckwheat have thus been harrowed with but a moderate amount of injury. In one instance a stroke of the harrow across certain buckwheat plots was followed the next night or two by a frost. The harrowed lap was covered enough to protect much of it and about half a stand persisted, while most of the unharrowed portions were killed by frost.

In a forage-crop experiment to compare varieties of bald barleys with wheat and oats as annual hay crops an incidental experiment was introduced by harrowing one-half the area as the grain was emerging, while the other half was left unharrowed. None of these plots were hand-weeded. The experiment was not sufficiently extensive to be conclusive, but it would appear that none of

the three classes of grain sustained any net injury from the harrowing, for the aggregate yield of the harrowed portions exceeded the yield of the checks by more than 3 per cent.

The harrowed portions headed about one day later than the unharrowed, but only three plots, namely the oats and one plot of barley, showed any appreciable difference in the date of blooming. These plots were recorded as blossoming one day later on the harrowed than on the unharrowed portions. Evidently the ultimate retardation attributable to the harrowing was very slight.

—	Not harrowed	Harrowed
	lb. per acre	lb. per acre
Average three barleys	3,296	3,408
Ruby wheat	3,390	3,659
Banner oats	4,062	4,110
Quantitive average 5 varieties	3,468	3,599

RAPE—BROADCAST VERSUS DRILLS

An unduplicated test of rape broadcast versus drills, platted on a good piece of summer-fallow, yielded substantially more from the rows, although the difference was not so great as is sometimes the case.

—	Yield per acre	
	Green weight	Absolute dry matter
Broadcast	17,320	3,211
Drills	23,830	3,892

INFLUENCE OF TOPOGRAPHY UPON TEMPERATURE

It has long been a matter of remark among the settlers in the Peace River district that a sharp difference in minimum temperatures often occurs between high and low land where the contour is rolling. The lesson has been inescapably impressed by frosted grain and scorched potato tops. In driving, too, one encounters, even in summer, currents and pools of cold air from which one emerges into a gradually rising temperature when ascending the slopes. In winter the difference is still more marked. On a still, clear night the traveller leaving a slough and climbing a rise of one or two hundred feet may feel at times almost as though leaving a winter for a summer climate.

It is a well-understood principle that, in the main, the atmosphere becomes rarer and the temperature lower as one climbs a mountain. But, modifying this and more than counteracting it within certain limits of local topography, is another principle—the tendency of cold air to settle and to drain to the lower levels as water drains down hill. On a cold, clear, still night the cold air settles to the surface then flows in streams to the lower ground, where it collects in pools, soon there reaching a temperature that may spell frost on a summer night or intense cold on a winter night.

This second principle is again modified by a third, viz., the radiation of heat from bodies of open water, so that low ground near a river or lake is generally safer from frost than higher ground not so protected. In the winter when the river or lake is frozen over this radiation largely ceases and the river valley or lake basin may become an exceedingly cold place, although highly favoured for summer vegetation. The narrow valley of the Peace river is an example.

The whole subject of climatology is rather complex and merits fuller study. But a particular phase of it is the bearing of local topography, or contour. It had been impressed upon the Superintendent not merely by his personal experience and observation but also by the significant and very common remark, that there seemed to be a great difference between the temperature of high and low land in the Peace River country. As the settlers making this observation came from many provinces, states, and countries, it seemed to indicate very clearly that, in their opinion, the condition was particularly aggravated in the Peace River district. If so, why, and what were the governing factors?

In reading weather records attention was often drawn to the wide spreads between the minimum temperatures recorded by the Station instrument and another official one on lower ground 3½ miles away, as much as 15 degrees divergence being once recorded. The Superintendent also observed that while frosts struck very much harder on an adjacent slough than at his residence, on certain occasions during muggy weather or during a rainy period, the temperature at the farm might hang for twenty-four hours witin 2, 3 or 4 degrees of freezing, yet on those occasions there would be no frost either at home or at the slough. Evidently such weather conditions did not conduce to sharp or ready stratification of temperature.

In the winter of 1924-1925 one evening when a temperature of 20 degrees was registered at the Station the minimum instrument was carried to the slough and registered 15 degrees colder. On another occasion when it was 25 degrees at the Station it read 42 below on exposure at the slough. Evidently the colder the weather, other things being equal, the greater the spread in temperature between the two levels.

Two atmospheric thermographs and eight self-registering minimum thermometers have been installed at the Station. Levels were taken with a view to placing one thermograph at the Station beside the soil thermograph, the other at the slough, and the thermometers at equal successive rises between. As the intervening half-mile was an almost perfectly regular slope, the situation was favourable for such a study.

Preliminary Studies—However, a number of practical questions presented themselves. The soil thermograph (alongside which it was proposed to install one air thermograph) was on fallowed ground; the air thermograph at the slough would be on sod. Would this affect comparisons? Again, the air thermographs and the regular meteorological thermometers were caged. Would the intervening thermometers require to be caged also? What other complications, if any, might there be?

To obtain some data on the foregoing points and at the same time to ascertain to what extent temperatures at ground level might vary from those at the 3½-foot height of official thermometers, a series of observations was undertaken.

First of all, the instruments were carefully compared to ascertain their accuracy, and as an additional precaution they were afterwards, from time to time, interchanged. One of the air thermographs gave trouble for a time and stopped in cold weather until a new mechanism was substituted by the manufacturers. Occasionally wind would spoil the reading of uncaged thermometers until the precaution was adopted of attaching them firmly by leather bands. When snow came and covered the ground-level thermometers, this sometimes reversed the regular behavior, so that only partial records are available to date. The plan has been followed of rejecting any reading concerning which there was any known cause for doubt. After eliminating all these doubtful readings some very significant spreads appear and have been tabulated.

When the thermographs have been working they have pretty well tallied in their registers with the calibrated thermometers, except in one respect. The

thermograph has not responded to sudden changes of temperature so promptly as the thermometers, hence it is clear that a thermograph may not be used as a substitute for a thermometer in taking comparative readings.

It has also been noticed that caged instruments do not always register so low as uncaged ones at the same level. It would appear that when momentary dips of temperature occur, radiation of heat from the material of the cage, or perhaps partial protection from the warming or cooling effect of passing air currents, may prevent the caged instrument from responding so readily as the uncaged. When the dip is sustained for a sufficiently long time, doubtless the disparity is overcome, but observation of thermometers shows that sometimes the dips are of very brief duration. It stands to reason, therefore, that to obtain true comparative data all one's instruments should be either caged or uncaged, and in either case firmly held to protect from vibration.

It has not yet been determined conclusively to what extent readings above fallow and those above sod land may vary. This is a delicate determination to make, since it is not easy to keep all other factors constant.

In the tables presented are recorded day by day the Station's official minimum temperature as an indication of the degree of severity of the weather. In parallel columns we have the degrees of spreads exhibited by self-registering minimum thermometers variously placed. For the purpose three comparative readings are taken daily at the Station and three at the slough half a mile distant and 109 feet lower in elevation. At the farm there is (*a*) the official minimum temperature in a caged instrument three and one-half feet above the level of sod ground; (*b*) the minimum temperature shown by a thermometer at the same level but fastened to the outside of the cage; (*c*) the minimum temperature recorded by an uncaged instrument at the ground level.

Corresponding readings are taken at the slough, the caged thermometer there being enclosed in the latticed structure provided for the air thermograph, beside which it hangs.

An attempt has also been made to record notes on the character of the weather each night, but these observations have been very incomplete. Observations made at 10.30 p.m. and 6 a.m. may fail to note governing conditions that occur between these hours, hence these observations do not always lend themselves to reliable deductions. There have, however, been occasions when a certain type of weather would remain constant and from such occasions it may be said with confidence that at certain times, particularly during murky weather, there is often little or no spread among any of the six readings, while on clear, calm nights sharp differences occur between corresponding instruments. For instance, as much as 20 degrees difference was twice found between the thermometer at the farm and the corresponding one at the slough—this, too, in an exceptionally mild winter—while as much as 7 degrees difference was found between the two uncaged instruments at the farm, one at ground level and the other three and one-half feet off the ground, the lower instrument, of course, registering the colder. Differences of 3, 4, and even 5 degrees were not unusual. In general, the conditions which favoured such stratification of temperature also brought about wide spreads between the temperatures on hills and hollows, though a considerable erraticism occurred in the respective degrees of difference. Wind reduced but seldom eliminated the spreads between high-land and low-land temperatures. "Falling weather" or murky atmosphere seemed more effectual than wind in preventing stratification of the air into layers of varying temperature.

THE PRACTICAL SIGNIFICANCE.—Apart from its scientific interest and its value in establishing safeguards for further investigations, the outstanding practical significance of these tests is an emphasis of the fact that in utilizing northern latitudes the elevated slopes and water-protected areas should be chosen

for frost-susceptible crops, such as wheat, flax, barley, and potatoes, while the lower levels are reserved, during the early days at least, for production of hay, pasture, and "green feed." The value to new settlers of having such information available in concrete form is considerable.

Another point suggested by the data is that weather records should be published with cognizance of the local conditions under which they are obtained. If one observing station has its instrument on a hill and another, 100 or 200 miles farther south, has its instrument in a hollow, it is easily possible for the latter to record the more extreme temperature. Isothermal lines drawn accordingly may be very erratic.

Agronomists are warned, too, that temperature figures obtained in caged instruments at 3½ feet off the ground are a very untrustworthy index of the temperatures to which plants may be actually subjected. It is not uncommon to find crops covered with frost when the caged thermometer is several degrees above freezing point.

COMPARISON of minimum temperatures at various elevations. Posts at Farm and at a slough one hundred and nine feet lower and half mile distant. Readings in each case at three and one-half feet caged, three and one-half feet uncaged, and round level (uncaged).

MONTH OF SEPTEMBER, 1925

Date	Official minimum at farm	Spread between the two caged instruments (farm and slough)	Spread between the two ground instruments (farm and slough)	Spread between caged and uncaged instruments at farm 3½ feet	Spread between uncaged 3½ and uncaged ground at farm
	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.
6th	33	1	2	0	2
7th	42	6	6	2	2
8th	39	7	3	1	6
9th	44	0	2	−2	2
10th	40	−1	−2	2	2
11th	36	0	2	−1	1
12th	32	10	7	4	3
13th	32	8	4	3	5
14th	34	9	5	2	4
15th	32	−1	0	0	2
16th	25	2	3	0	0
17th	23	3	2	0	3
18th	29	0	0	0	1
19th	24	6	3	3	4
20th	35	9	4	4	5
21st	40	10	6	3	4
22nd	50	17	6	5	7
23rd	45	8	9	2	3
24th	43	6	10	0	2
25th	30	6	4	1	5
26th	23	7	5	3	2
27th	32	4	3	1	2
28th	30	5	3	1	3
29th	30	0	−1	1	1
30th	28	1	2	3	5
Average 25 days	34·04	4·92	3·52	1·52	3·04

NOTE.—In all cases positive figures represent the number of degrees by which the instrument in the lower position read lower than the other. Minus figures represent converse readings.

COMPARISON of minimum temperatures at various elevations. Posts at Farm and at a slough one hundred and nine feet lower and half mile distant. Readings in each case at three and one-half feet caged, three and one-half feet uncaged, and ground level (uncaged).

MONTH OF OCTOBER, 1925

Date	Official minimum	Spread between the two caged instruments (farm and slough)	Spread between the two uncaged instruments at 3½-foot level (farm and slough)	Spread between the two ground-level instruments (farm and slough)	Spread between caged and uncaged instruments at farm 3½-foot level	Spread between caged and uncaged instruments at slough 3½-foot level	Spread between uncaged 3½ and uncaged ground-level at farm	Spread between uncaged 3½ and uncaged ground-level at slough
	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.
1st	23	7	.....	4	3	.....	4	.....
2nd	27	9	.....	6	3	.....	3	.....
3rd	38	4	.....	4	2	.....	0	.....
4th	23	2	.....	3	1	.....	0	.....
5th	20	0	.....	1	−1	.....	2	.....
6th	20	0	.....	2	1	.....	2	.....
7th	17	2	.....	−8	7	.....	6	.....
8th	22	−1	.....	1	0	.....	1	.....
9th	42	0	.....	1	1	.....	2	.....
10th	34	4	.....	2	2	.....	2	.....
11th	32	2	.....	2	1	.....	3	.....
12th	32	9	.....	4	2	.....	6	.....
13th	32	9	.....	5	2	.....	6	.....
14th	42	10	.....	6	2	.....	6	.....
15th	37	7	.....	6	2	.....	3	.....
16th	31	3	.....	2	1	.....	4	.....
17th	30	10	.....	7	2	.....	5	.....
18th	24	4	.....	2	0	.....	4	.....
19th	37	9	.....	4	5	.....	6	.....
20th	47	7	.....	3	2	.....	6	.....
21st	39	−2	−1	0	0	1	1	2
22nd	27	7	7	4	4	4	5	2
23rd	24	2	3	1	3	4	3	1
24th	25	−4	2	4	−5	1	0	2
25th	12	−4	0	4	−2	2	0	4
26th	0	0	0	2	0	0	0	2
27th	0	10	10	12	4	4	2	4
28th	−11	13	14	14	3	4	2	2
29th	6	16	12	6	6	2	8	2
30th	33	−3	2	2	1	6	4	4
31st	30	7	5	5	2	0	4	4
Averages 11 days.	16·81	3·81	4·91	4·91	1·45	2·54	2·63	2·63
Averages 31 days.	25·64	4·48	.....	3·58	1·74	.....	3·22	.....

MONTH OF NOVEMBER, 1925

COMPARISON of minimum temperatures at various elevations. Posts at Farm and at a slough one hundred and nine feet lower and half mile distant. Readings in each case at three and one-half feet caged, three and one-half feet uncaged, and ground level (uncaged).—*Con.*

Date	Official minimum	Spread between the two caged instruments (farm and slough)	Spread between the two uncaged instruments at 3½-foot level (farm and slough)	Spread between the two ground-level instruments (farm and slough)	Spread between caged and uncaged instruments at farm 3½-foot level	Spread between caged and uncaged instruments at slough 3½-foot level	Spread between uncaged 3½ and uncaged ground-level at farm	Spread between uncaged 3½ and uncaged ground-level at slough
	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.
1st	31	7	8	7	1	2	3	2
2nd	8	−2	0	1	0	2	1	2
3rd	−8	1	1	4	1	1	1	4
4th	4	4	4	2	2	2	6	4
5th	3	1	0	0	1	0	0	0
6th	3	3	−1	0	6	2	3	4
7th	0	4	8	4	0	4	2	.....
8th	24	14	15	10	1	2	5	0
9th	21	17	18	12	1	2	8	2
10th	14	14	14	11	2	2	4	1
11th	16	14	14	12	2	2	4	2
12th	22	14	16	13	2	4	4	1
13th	18	18	16	13	4	2	4	1
14th	20	20	20	13	2	2	8	1
15th	22	16	14	12	4	2	6	4
16th	20	10	12	14	2	4	4	6
17th	21	17	18	14	3	4	6	2
18th	22	2	0	2	2	0	0	2
19th	28	12	14	12	2	4	2	0
20th	22	12	12	11	2	2	4	3
21st	15	15	16	14	3	4	4	2
22nd	28	.....	8	6	2	.....	4	2
23rd	30	2	2	2	2	2	4	4
24th	10	−4	0	0	0	4	0	0
25th	−5	5	4	6	5	4	0	2
26th	−10	12	16	.....	2	6	.....	4
27th	−9	.....	14	16	1	.....	2	4
28th	10	.....	18	14	4	.....	6	2
29th	18	−2	4	3	−2	4	2	1
30th	26	2	4	3	0	2	4	3
Averages 30 days.	14·13	.....	9·63	.....	1·90	.....	.....	.....
Averages 25 days.	16·20	8·48	9·00	7·64	1·92	2·44	3·48	2·12

MONTH OF DECEMBER, 1925

COMPARISON of minimum temperatures at various elevations. Posts at Farm and at a slough one hundred and nine feet lower and half mile distant. Readings in each case at three and one-half feet caged, three and one-half feet uncaged, and ground level (uncaged).

Date	Official minimum	Spread between the two caged instruments (farm and slough)	Spread between the two uncaged instruments at 3½-foot level (farm and slough)	Spread between the two ground-level instruments (farm and slough)	Spread between caged and uncaged instruments at farm 3½-foot level	Spread between caged and uncaged instruments at slough 3½-foot level	Spread between uncaged 3½ and uncaged ground-level at farm	Spread between uncaged 3½ and uncaged ground-level at slough
	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.	Deg. F.
1st	25	7	4	8	3	0	2	6
2nd	10	16	16	16	4	4	2	2
3rd	10	20	20	.....	4	4	6	.....
4th	23	3	0	0	1	−2	0	0
5th	38	4	2	2	2	0	0	0
6th	38	0	2	4	0	2	0	2
7th	34	2	2	2	0	0	0	0
8th	26	1	1	3	0	0	0	2
9th	30	10	10	8	0	0	2	0
10th	28	8	8	6	0	0	2	0
11th	25	7	8	8	1	2	2	2
12th	26	12	12	9	2	2	4	1
13th	15	7	6	6	3	2	2	2
14th	15	13	10	10	3	0	2	2
15th	19	9	7	6	3	1	2	1
16th	24	2	4	4	0	2	2	2
17th	21	1	4	3	−3	0	1	0
18th	10	0	0	0	0	0	0	0
19th	5	14	18	20	−2	2	.....	.....
20th	−9	10	7	9	4	1	.....	.....
21st	2	0	0	0	0	0	.....	.....
22nd	8	0	0	0	0	0	.....	.....
23nd	6	0	1	.....	0	1	.....	.....
24th	7	1	2	.....	0	1	.....	.....
25th	8	2	1	.....	1	0	.....	.....
26th	6	1	2	.....	0	1	.....	.....
27th	−2	6	15	.....	−8	1	.....	.....
28th	3	8	9	.....	0	1	.....	.....
29th	4	9	9	.....	1	1	.....	.....
30th	18	17	17	.....	0	0	.....	.....
31st	21	1	0	.....	−1	2	.....	.....
Averages 31 days.	15·93	6·16	6·35	.....	0·58	0·90	.....	.....
Averages 17 days.	23·94	6·00	5·64	5·58	1·11	0·76	1·35	1·29

NOTE.—In all cases positive figures represent the number of degrees by which the instrument in the lower position read lower than the other. Minus figures represent converse readings.

METEOROLOGICAL RECORDS AT BEAVERLODGE, 1925*

Month	Temperatures—Degrees Fahrenheit							Precipitation			Evaporation	Total sunshine	Sleighing
	Highest	Date	Lowest	Date	Average monthly maxima	Average monthly minima	Average monthly mean	Rainfall	Snowfall	Total precipitation			
								inches	inches	inches	inches	hours	days
January	38	18	−29	23	9·93	−7·11	1·41	.....	12·7	1·27	.....	73·3	31
February	35	5	−33	1	17·57	−0·57	8·50	.....	17·9	1·79	.....	101·2	28
March	50	27	−21	13	31·41	11·41	21·41	.....	17·0	1·70	.....	163·1	31
April	69	29	11	1	49·33	28·93	39·13	.....	1·3	0·13	.....	236·3	15
May	81	17	26	3	67·22	38·58	52·90	0·93	.....	0·93	**4·23	358·2	0
June	85	26	36	19	70·46	44·86	57·66	1·23	.....	1·23	4·44	299·9	0
July	90	31	38	15	75·84	49·74	62·79	1·38	.....	1·38	5·15	302·3	0
August	84	12	33	24	67·74	45·87	56·80	3·50	.....	3·50	3·63	193·0	0
September	81	23	23	17	57·10	35·53	46·31	1·81	6·4	2·45	2·00	176·7	0
October	63	13	−11	28	44·96	25·64	35·30	0·21	14·0	1·61	†0·19	131·4	8
November	50	18	−10	26	33·50	14·13	23·81	.....	20·5	2·05	.....	111·8	30
December	48	9	− 9	20	30·09	15·93	23·01	0·06	24·5	2·51	.....	39·1	31
Totals	.....	.....	.....	.....	.....	.....	.....	9·12	114·3	20·55	‡19·64	2,186·3	174
Averages	.....	.....	.....	.....	46·26	25·24	35·75						

Highest temperature for year 90 degrees Fahrenheit.
Lowest " " −33 " "

** From May 7th. † To October 3rd.
‡ From May 7th to Oct. 3rd.

—	Mean annual temperature Deg. F.	Snowfall inches	Rainfall inches	Total Precipitation inches	Sleighing days
Totals 10 years	.....	685·60	93·81	162·37	1,337·0
Average 10 years	34·67	68·56	9·38	16·24	133·7

* NOTE.—Detailed tables showing precipitation and temperatures at Beaverlodge for the years 1916–1924 will be found in the report for 1924.

SOIL TEMPERATURES

The Friez soil and water thermograph was continued in position summer and winter with the bulb buried three inches beneath the surface of summer-fallowed land. The soil temperature ran rather higher than usual during the dry weather of June and July, there being eleven occasions throughout the summer when it exceeded 70 degrees Fahrenheit as compared with one such in 1924. It is not surprising that corn and beans should have done exceptionally well. The highest soil temperatures, 79 degrees, occurred on July 28 at 4 p.m., being within three degrees of the maximum atmospheric temperature on that date. The highest atmospheric temperature for the twelvemonth was 90 degrees, on July 31.

Some very interesting observations are made during the winter. It is remarkable to find that in a latitude above 55 degrees the lowest temperature recorded by a bulb buried only three inches beneath the surface of the ground should be 18 degrees Fahrenheit, which was touched on February 1 at 2 p.m. Deep snow protection is the undoubtable explanation. Whereas in summer the graph on the chart will fluctuate sharply, responding to the complex influence of day and night, sun and shade, dry weather and rain, in winter it is not uncommon to find an almost level line varying sometimes but a degree or so in a whole week. The insulating effect of winter snow is one of the important factors of successful agriculture in a climate where the mean annual temperature stays close to the freezing point. But for snow, the winter frost would penetrate so deeply that too much of the summer heat would be required to thaw it out and too little would be left for vital energy. Seen in this light, the snow appears a blessing.

BEES

THE APIARY

Of the four colonies wintered in the cellar of the Superintendent's house only two remained after uniting weak and queenless stocks. Both these colonies were made strong in bees. One, unfortunately, was headed by an inferior queen, whose weakness was not discovered until well on in the building-up season.

On June 13 two Jumbo colonies were obtained from the Dominion Experimental Station, Lethbridge. These colonies covered six and eight frames, respectively. The smaller stock, headed by a vigorous queen, far outyielded the larger, which, in addition to a failing queen, was also handicapped by an attack of bee paralysis during the honey flow, which attack persisted till after requeening.

THE HONEY FLOW

The season commenced with the blooming of the willow about the end of April, after which a steady flow was maintained till midsummer, sufficient for the requirements of the brood-nest. The sources were dandelion and small fruits, both wild and cultivated. While alfalfa and sweet clover were freely worked in the latter part of June no surplus was deposited then. About July 10 the first fireweed honey came in, although the plant had been in bloom for some time previous. This honey flow continued till the end of August, but much of the interim was unfavourable for nectar-gathering. After the cessation of the fireweed honey flow the bees became again active on the second cutting of alfalfa and sweet clover without any apparent results, although doubtless a subsistence was obtained.

THE SEASON OF 1925

The warm, sunny days of May and June were ideal for brood stimulation, though perhaps a greater rainfall would have increased the influx of nectar. In the latter part of July a few wet days materially depleted the honey flow, then at its peak. The autumn, while not perfect, was at least very favourable and the bees continued to fly freely up till the end of September. On October 17 eight colonies were placed in quadruple wintering-cases packed with pea straw.

From the four producing colonies a total surplus of 280 pounds was obtained, as well as a small amount carried over in the comb. The largest yield from a single colony was 100 pounds, in addition to which surplus the same colony gave two healthy nuclei taken off on June 13 and August 1. From the other over-wintered colony a nucleus was taken on July 25 jointly from the two colonies received from Lethbridge. It is worthy of note that the 2-frame nucleus taken on June 13 and given a mated queen and a frame of honey on June 18, built up so rapidly that in addition to looking after its own winter requirements a surplus of 12 pounds was produced. With the exception of three frames this colony has been supplied only foundation.

As to the quality of the honey, there were two distinct samples. Number one, an almost colourless honey, was taken to be from fireweed. Number two was a "white" honey and is thus commented upon by the Dominion Apiarist:—

The 1925 honey has a very delicate flavour that would suggest alsike clover, with a slight touch of sweet clover mixed.

EXTENSION WORK

Correspondence showed a 21 per cent increase over 1924. Letters received numbered 1,439. Letters despatched totalled 1,568, not counting 339 circulars. Material was sent out for five co-operative experiments in the inoculation of alfalfa; and 226 packets of small fruit stock and seeds were distributed to points throughout the Peace and Athabasca watersheds.

In co-operation with the Provincial Department of Agriculture short-course meetings were addressed at Lake Saskatoon and Valhalla. Exhibits were made at two local fairs. A week was spent inspecting seed grain for the Dominion Seed Branch, and a couple of days with a plant-disease inspector of the Division of Botany, C. E. F. A number of general and special articles were written for the press, all having to do either exclusively or in part with the Station work. A number of interviews were given and a radio-talk broadcast.

OTTAWA: Printed by F. A. ACLAND, Printer to the King's Most Excellent Majesty, 1927.