Agriculture Canada

1906·1976
The Lethbridge Research Station

to serve Agriculture

Cover picture
A four-horse team at the Lethbridge Experimental Station about 1935. The horses were named Blue, Rock, Belle, and Doc. Photo courtesy of N. E. Kloppenborg.

to serve Agriculture

Alex Johnston
Research Station, Lethbridge, Alberta

The Lethbridge Research Station 1906 - 1976

On September 11, 1908, Mr. W. Poland, farm foreman, went into Lethbridge to get 'a portable gasoline engine', a 20-horse International gasoline tractor engine. It was the first tractor on the Station.

The 1976 farm 'team'—a 224-kW (300-horsepower), four-wheel-drive tractor with articulated frame steering.

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Finally, I would be remiss if I did not acknowledge my indebtedness to Dr. J. E. Andrews, Director of the Lethbridge Research Station. Without his support and encouragement, this history would not have been written.

Alex Johnston
November 5, 1976

FOREWORD

The Lethbridge Research Station, which has become the largest Station in the Research Branch of Agriculture Canada, was established in 1906 to provide much-needed technical information for the growing but economically unstable agricultural industry in southern Alberta. 'The Station' evolved, expanded, and was reorganized in response to the changing needs of that industry and as new scientific principles and disciplines were developed to serve a progressively more technical agriculture. In turn, the agricultural industry of southern Alberta expanded, evolved, and became more stable, more specialized, and more profitable as new technology was made available through research at the Station.

In addition to its internal growth and subdivision into specialized groups, the Station has taken on its present form as a result of amalgamation or absorption of previously independent units serving agriculture. An important amalgamation occurred in 1959 when the Experimental Farm, which was involved largely with production research on crops and animals, was joined by the Science Service laboratories, which were concerned with the more basic sciences and with research on protection of crops and animals from diseases and insect pests. This made it possible to reorganize research, in the late sixties, into mission-oriented programs. Groups of scientists in complementary fields of specialization could then apply their research expertise toward a common goal or agricultural product. Another very important amalgamation or, at least, close association has been planned and will take place after the new office-laboratory complex has been completed at the Research Station in late 1976. In this building, offices and research facilities are provided not only for the scientists of the Research Station, but also for staff of the Production and Marketing Branch of Agriculture Canada, and the Regional and District staffs of the Extension Division and Irrigation Division of Alberta Agriculture. This will enable close association and cooperation among all government agencies serving agriculture in southern Alberta, and allow the people who use their services to find them all at one location. It should improve efficiency and reduce the time lag between the development of new technology and its application by the agricultural industry.

Dr. T. H. Anstey, Director of the Lethbridge Research Station, 1959-1969.

Dr. J. E. Andrews, Director of the Lethbridge Research Station, 1969 to present.

Throughout the 70 years of its service to agriculture, the Research Station has made its results available to other scientists, to agrologists, to agribusiness, and to farmers through technical and semitechnical publications, bulletins, press releases, speeches, demonstrations, and committee discussions. The newest technology and the unique discoveries of one generation are superseded by even newer technology and the unique discoveries of the next. These contributions slowly fade from memory as scientists and leaders retire and are replaced by others. The younger scientists may fail to realize that their modern, highly specialized research is only possible because it has been built on the technology of the past. Similarly, when the major farm problems of the past, such as drought, erosion, insects, and diseases, have been overcome through the application of new technology developed by research, they, too, fade from memory as new generations of farmers and agriculturists replace those of an earlier day. Yet we should remember the problems that have faced agriculture during the past 70 years, during its development from a rather primitive to a highly specialized and productive industry. We should recognize the research that has greatly assisted its evolution, and the scientists and other staff who have contributed to the new technology. For this reason, Dr. Alex Johnston, who has attained recognition as a scientist and historian, was asked to write a brief history of the Lethbridge Research Station. The chapters that follow provide a historical record for future generations and will be interesting reading for those who have been involved in or wish to understand the development of agriculture in Alberta.

J. E. Andrews, Director
Research Station
Lethbridge, Alta.
November 12, 1976

Chapter 1. The Lethbridge Research Station

In 1976, the Research Station of the Canada Department of Agriculture at Lethbridge was the largest regional agricultural research establishment in Canada in terms of staff, area, and budget. With its substations at Onefour (Manyberries), Vauxhall, and Stavely, it was at least twice as large as any other Station. The Station itself occupied 436 hectares, or 1,077 acres, of dry and irrigated land on the eastern outskirts of the City of Lethbridge. It employed about 300 people during the winter months and 30 more during the summer months. About 80 of those people were highly trained professionals, and about 50 of them had the degree of Ph.D. The Station's appropriation for 1976 was $5.6 million, $4.4 million of which was spent directly on wages and salaries.

Research work at the Station was organized into six sections and was divided among 29 programs. The programs were further divided into about 150 projects, the level at which the actual research work was done. A project was not complete until results had been made available to interested people. Therefore, the Station published about 80 research papers a year, many of which were of interest to agriculturists throughout the world. The Station also published about 40 miscellaneous papers annually, mostly bulletins, semitechnical papers, and popular articles of regional or national interest. Various press releases, weekly letters, newspaper or magazine articles, personal contacts, radio talks, and television appearances took the results of research directly to the man on the land.

The objective of the Lethbridge Research Station has been, and is, to serve agriculture. But its aim has always been to help the urban dweller also. Station programs, in addition to a host of studies on soils, crops, insects, livestock, and poultry, included such subjects as ornamental plants, turfgrasses, pollution, sewage disposal, and pesticide residues.

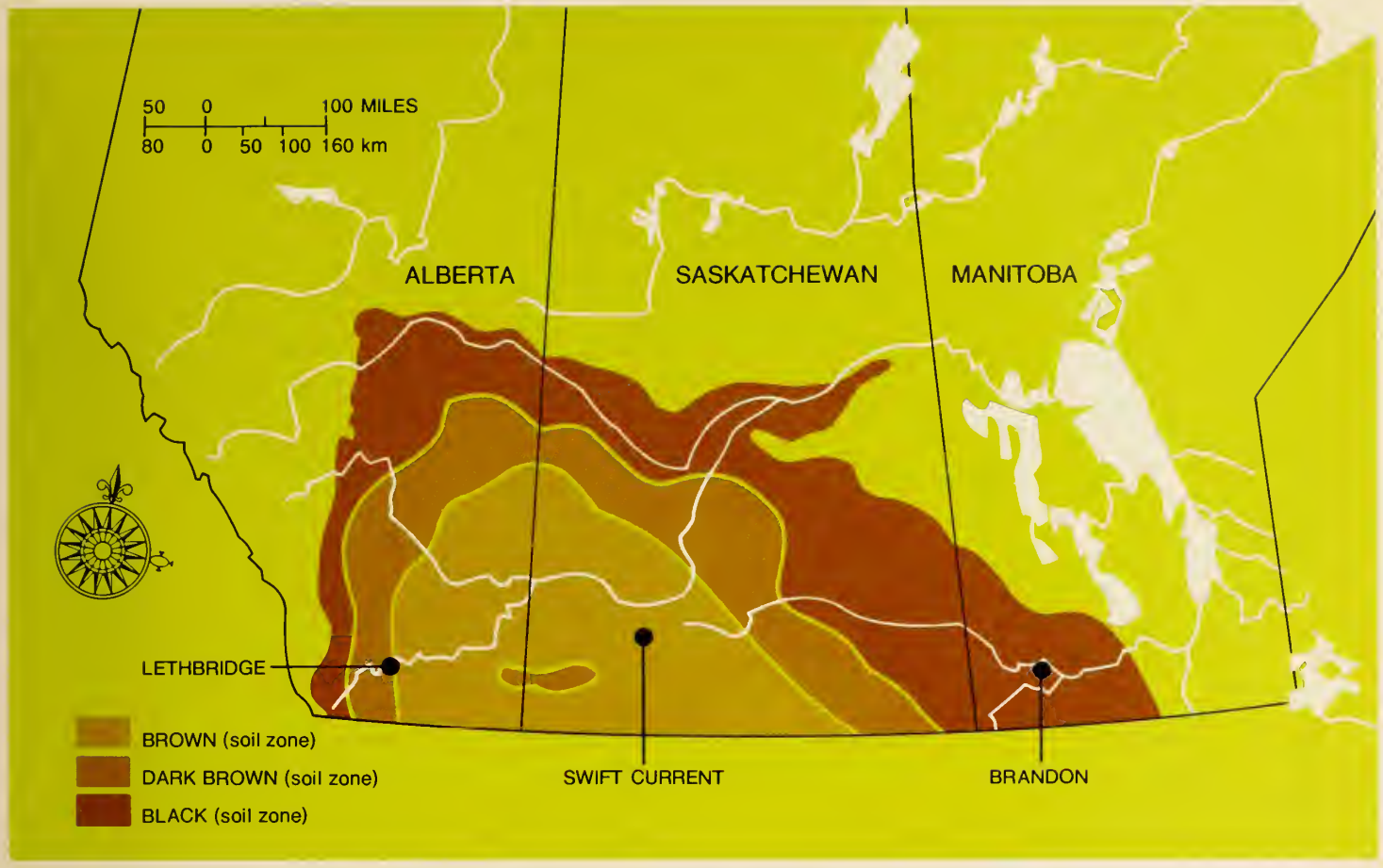
The Lethbridge Research Station began as a small branch station of the Experimental Farms Service. It grew because it was located in southwestern Alberta, in what is probably the most diversified agricultural area in Canada. This can be explained if we examine the climate and geography of the western plains and relate them to southwestern Alberta.

The Prairie region contains the largest tract of agricultural land in Canada, about 53 million hectares (ha), or 131 million acres. The land is made up of 30.3 million ha (75 million acres) of cropland and summerfallow, 17.8 million ha (44 million acres) of native rangeland, and about 4.8 million ha (12 million acres) of pasture and hay land. The region supported about 7,739,000 beef cattle, 325,000 sheep, and 175,000 horses.

This is the dry region of settled Canada, but only in recent decades have farmers managed to develop a distinctive dryland agriculture. Two factors are of great importance to crop production: First, most of the rain falls during the growing season of crops so that farmers can usually produce good harvests in regions with as little as 355 mm (14 inches) of precipitation a year. Secondly, summer temperatures are higher than in regions to the east and west, so that plants receive the warmth they need for growth. But the summer growing season is rather short and successful crops must be able to mature early; this emphasizes the common cereals. Winters tend to be long and cold. Some of the cereal and forage crops may winterkill, and most cereals can be damaged by spring and fall frosts. Even the Chinook winds, welcome as they bring warm weather in winter, may cause hardship to plants and animals during the winter months and lead to droughts during the summer.

On the map, the Prairie region looks roughly like three distorted triangles, set one within the other, with their base on the border between Canada and the United States.

The innermost triangle, the semiarid Brown soil zone, is the driest of the three. Its annual precipitation averages about 355 mm (14 inches). It is here that the 'rain shadow effect' of the Rocky Mountains is most apparent. The mountains take moisture from the air as it comes from the Pacific Ocean, so that areas 240 km (150 miles) east of the mountain front are almost deserts and receive only 280 to 305 mm (11 to 12 inches) of precipitation a year. It is a region of extremes. At Medicine Hat, records show a range in temperature from -46 C (-51 F) in January to 42 C (108 F) in July, and in annual precipitation from 150 mm (6 inches) in 1910 to 710 mm (28 inches) in 1927. The frost-free period ranges from 110 to 140 days. Because the whole region has been scoured by glacial ice, it has an immature drainage pattern: tens of thousands of temporary ponds or 'sloughs' collect water, which evaporates and often leaves the white alkali that is so characteristic of the



Soil zones of the prairie region of Western Canada.

dry plains. The original prairie vegetation, much of which is still used for grazing, is classed as Mixed Prairie and is a complex mixture of shortgrasses, midgrasses, forbs, and shrubs. Except along the rivers and among sand dunes, trees do not grow naturally in the Brown soil zone.

The second triangle contains the Dark Brown soil zone. The climate is less extreme than in the Brown soil zone; annual precipitation averages about 405 mm (16 inches), and the growing season ranges from 100 to 120 days. The original prairie vegetation of the Dark Brown soil zone is classed as Mixed Prairie also, but it contains more midgrasses and tallgrasses than does the Brown soil zone.

The irrigated lands of Western Canada are located mainly in the Brown and Dark Brown soil zones, because irrigation is most successful where the difference between natural rainfall and the maximum water requirement of crops is greatest. Together, the Brown and Dark Brown soil zones more or less make up the region known as Palliser's Triangle.

The third triangle is the Black soil zone. Annual precipitation ranges from 455 to 510 mm (18 to 20 inches) and the growing season from 90 to 110 days. The original prairie vegetation is classed as Fescue Grassland and is a complex mixture of tallgrasses, forbs, shrubs, and trees. The area has been protected from prairie fires since settlement, so the cover of trees has increased throughout the Black soil zone, and there is a distinctive mosaic of prairie patches and aspen groves called the Parkland. Beyond the Black soil zone lie the mountains to the west and the Boreal Forest to the north.

The impact of geography and climate on the Lethbridge Research Station may be summed up in this way:

- The Station is located in an area of irrigated and dryland agriculture.
- About 55% of the region is rangeland, where livestock production is the rule; and 45% is cultivated land, where many different crops are grown.
- The Station is in the transition zone between the Brown soils of the semiarid plains and the Black soils of the moister foothills, between the Mixed Prairie of southeastern Alberta and the Fescue Grassland - Aspen Parkland to the west and north.
- The Station is in the region where the fairly level plains of Western Canada give way to the Rocky Mountains.
- Added to the variety of agricultural problems that all these characteristics imply are short summers of intense agricultural activity and long winters of agricultural dormancy.

Elliott T. Galt, General Manager of the Alberta Railway and Irrigation Company, who donated the land that made up the original Lethbridge Experimental Station.

The Lethbridge Research Station was organized in 1959, when several smaller institutions were amalgamated. These were the Dominion Experimental Station, Lethbridge, founded in 1906; the Dominion Entomological Laboratory, Lethbridge, founded in 1913; the Livestock Insect Laboratory, Lethbridge, founded in 1946; and the Science Service Laboratory, Lethbridge, founded in 1949. Later additions to the Station were the Dominion Range Experiment Station, Manyberries, founded in 1927, and the Prairie Farm Rehabilitation Administration Drainage Division, Vauxhall, founded in 1949. The Dominion Experimental Station was the oldest of these institutions and, hence, formed the bond that tends to unify the history of the Research Station.

Why was Lethbridge chosen in 1906 as the site for a new Dominion Experimental Station?

Part of the answer lies in the history of prairie settlement. The prairies were settled at roughly the same time in two general areas. In one, a farming front became established in Manitoba and gradually advanced westward. In the other, a ranching front became established in the foothills of the Rocky Mountains and moved slowly eastward. Farming, which started in earnest about 1871, was based on the methods practiced in Ontario. But, as time was to show, the techniques suited to the forest-oriented culture and the 645- to 805-mm (40- to 50-inch) rainfall zones of the humid east were not suited to the semiarid to subhumid climate of the western plains. Ranching, which started in earnest about 1880, was developed from the methods practiced in the plains of the United States. Ranching techniques were fairly well suited to conditions in the southern part of the region, but they were to change radically when the railways were built and the region was opened to homesteaders.

The coal resources of the Lethbridge area were being exploited. Elliott T. Galt, General Manager of the coal company, began by building river steamers and barges to take the newly mined coal to Medicine Hat. This was not successful, so the company built a narrow-gauge railway between the two points, and later another to Great Falls, Montana. As a reward for their railway-building activities, the Galts received about 450 000 ha (1 million acres) in land grants; the land had to be sold to settlers if a profit was to be realized. Therefore, Elliott Galt organized an irrigation company to bring water to the semiarid plains.

Canals were built and water arrived at Lethbridge on September 4, 1900. Irrigation had come to the area, and the Galts could begin to sell some of the land that they had received as grants. Mormons had already settled at Cardston, Magrath, and Stirling and were in a position to take advantage of the new irrigation technique. Other immigrants bought land and settled the area immediately southeast of Lethbridge.

It was a new kind of agriculture, even to the Mormon settlers who had previous experience of irrigated farming in Utah. Much new information was needed; many problems had to be solved. As early as January 10, 1901, an editorial appeared in *The Lethbridge News* and said in part: 'An Experimental Irrigated Farm is Wanted. There are experimental farms in various portions of the Dominion but the results obtained will be entirely inapplicable to the irrigated portions of Alberta.' (Alberta became a provisional district of the Northwest Territories in 1882 and a province in 1905.)

Previously, in 1884, a Select Committee of the House of Commons had been appointed to inquire into the best means of encouraging and developing the agricultural interests of Canada. The next year, one of its recommendations was implemented when steps were taken to set up an Experimental Farms system. In 1886, Parliament passed an Act providing for a Central Experimental Farm at Ottawa and four branch farms across the country. In 1888, two experimental farms were located on the prairies, one at Brandon to serve the Province of Manitoba and one at Indian Head to serve what was then the Northwest Territories.

The Irrigation Company at Lethbridge, reorganized as the Canadian North-West Irrigation Company, did what it could to provide reliable information to settlers. In March 1901, Manager Charles A. Magrath hired Professor William Harmon Fairfield, Superintendent of the Experiment Station, University of Wyoming, Laramie, to come to Lethbridge and operate a Model Farm. The farm was featured in *The Lethbridge News* of October 1, 1903, in an article that stated: 'The Model Farm was originally set apart by the Irrigation Company, shortly after its formation [in 1899], for the purpose of demonstrating the most up-to-date methods of irrigation and experimenting along lines that might prove useful to other settlers in the district. W. H. Fairfield of the

Wyoming Experiment Station was put in charge with the assistance of his brother.'

It was in 1903 that Mr. Fairfield made one of his most important contributions to western agriculture. He showed the farmers of the irrigated lands, and of the prairie region of Western Canada generally, how to grow alfalfa successfully.

It is common knowledge now that alfalfa, a legume, can take nitrogen from the air and convert it to a form that plants can use. The process, known as nitrogen fixation, is accomplished for the alfalfa plant by bacteria that live in nodules on the roots. When Mr. Fairfield arrived in the area, he noticed that alfalfa did not do well, and he was unsuccessful in his attempts to grow it in 1901 and 1902. He wrote to Laramie and asked for a bag of soil from an established alfalfa field to be sent to him at Lethbridge. This was done, and the Wyoming soil with its nitrogen-fixing bacteria was scattered carefully on a small field newly planted with alfalfa on the model farm. The new stand was successful, and soil from the model farm was scattered, in turn, on other farm fields throughout the region. Soon the bacteria, which we now call *Rhizobium*, were present everywhere in soils of the irrigated areas of Alberta, and alfalfa culture was assured.

Agitation for experimental farms continued. In March 1904, *The Lethbridge News* reported that '. . . the question of an experimental farm for Alberta is constantly cropping up at points farther north and resolutions are being forwarded to Ottawa asking for its location at different points.' The suggestion was made that it would be well for Lethbridge residents to keep their claim before the government. And in May, *The Nor'West Farmer* said: 'We wish that the Dominion Department of Agriculture could be induced to see what a splendid field for agricultural investigations exists in the irrigated sections of the Territories.'

Throughout 1905 and into 1906, various towns advanced reasons as to why an experimental farm for southern Alberta should be located in their particular community. By this time, a large number of farmers had settled on dry farms in the south, and *The Lethbridge News* recognized that they needed help in solving problems just as much as farmers with irrigated land did.

The town of Macleod (now Fort Macleod) wanted the new experimental farm, and at various times the editors of *The Macleod Gazette* and *The Lethbridge News* abused each other at length. In May 1905, *The Lethbridge News* reported: 'In an editorial blizzard of about a column's length, *The Macleod Gazette* goes after us for saying that Lethbridge is entitled to a government experimental farm. In the course of its pathetic pleadings for poor old Macleod [and] in order to prove that the Macleod district is just the place to experiment with irrigation, our contemporary adds, "There is only one place drier than Macleod and that isn't Lethbridge." We wonder where he means.' Later, Macleod's Agricultural Society drafted and circulated a petition and interviewed their Member of Parliament in an effort to get the experimental farm. Resentment reached a peak when *The Macleod Gazette* printed a blistering editorial two columns long, headed 'Government Neglect of Macleod', that went on to say: 'Our grounds for complaint are too numerous to mention but among them are: The proposed experimental farm which it is now generally admitted is going to Lethbridge, a place where everyone knows it will be absolutely useless and worthless to ninety percent of the farmers of southern Alberta, notwithstanding the foolish and silly statements of the Lethbridge papers to the contrary.'

Medicine Hat followed the example of Calgary, Red Deer, Edmonton, and other places and sent a deputation to Ottawa to ask for the experimental farm. Claresholm put forth its claims and, in answer to a lengthy article in *The Claresholm Review*, *The Lethbridge News* had this to say: 'The *Review* feels that Claresholm is just the place for the proposed southern Alberta experimental farm and makes a weak endeavor to give us and irrigation a black eye. If the truth must be told, God simply neglected to make arrangements for rain all through this south country. Fortunately, however, some of us are favored with rivers of water from which, by irrigation, we can more than offset this handicap. But some cannot. Claresholm cannot.'

Left
Dr. William Saunders, Director of the Experimental Farms Service from 1886 to 1911.
Right
Dr. W. H. Fairfield, Superintendent of the Lethbridge Experimental Station, 1906-1945.

Above
Dr. A. E. Palmer, Superintendent of the Lethbridge Experimental Station, 1945-1953.
Below
Mr. H. Chester, Superintendent of the Lethbridge Experimental Farm, 1954-1959.

Rumors abounded during 1905. There were to be three experimental farms, one in the south, one in the north, and one in central Alberta. Innisfail was to be the location of the last. Great indignation was aroused by a rumor that there were to be two experimental farms in Alberta, to be managed by the Experimental Farm at Indian Head. Letters to the editor began to appear in the Lethbridge papers calling for the establishment of an irrigated experimental farm.

A meeting involving Elliott T. Galt and Charles A. Magrath took place in the spring or early summer of 1905. At that meeting, a decision was made to offer to the Dominion Department of Agriculture, for an experimental farm, 130 ha (320 acres) of unbroken prairie land, together with water rights, located about 5 km (3 miles) east of the city. The land was 'on the ditch' (it was bisected by the main canal of the irrigation system) and was divided by the Canadian Pacific Railway track, this being an important consideration at a time when rail transport was essential. This offer to donate land may have been the factor that tipped the scales and caused the government to choose Lethbridge over other contenders, particularly Calgary, as the location for southern Alberta's experimental farm.

Another factor must have been the generally high opinion of the Canadian North-West Irrigation Company that seemed to prevail. For example, a sugar beet industry had been established and in 1904 produced 326 900 kilograms (kg), or 720,000 pounds, of sugar. Its development was credited to cooperation between Jesse Knight, an early southern Alberta entrepreneur, and the Irrigation Company. The company's enterprise in various other activities was lauded in House of Commons debates, in the agricultural press, and in local newspapers and was praised by the Dominion Minister of Agriculture, among others. And although we tend to forget it now, it was a major undertaking to finance and construct the irrigation system, one of the largest in North America at the time, and the enterprise was much admired in official circles.

Still another factor must have been the high opinion of the Mormon settlers that was held by Dr. William Saunders, head of the Experimental Farms Service. He was impressed by their industry and by their progress. He was also impressed by the winter wheat farming that had developed in the Pincher Creek - Cardston area. Dr. Saunders undoubtedly had considerable influence on the location of the experimental station, although it is likely that the final decision was a political one.

By March 8, 1906, *The Lethbridge Herald* felt able to report that the Dominion Department of Agriculture intended to establish an experimental farm east of the city. And on April 6, Senator L. G. DeVeber announced at a meeting of the Board of Trade that Lethbridge had been chosen as the site for southern Alberta's experimental farm. On July 6, the *Herald* printed an item under the heading 'We Get It!' that read: 'W. C. Simmons received a letter from Hon. L. G. DeVeber announcing that Dr. Saunders, Superintendent of the Experimental Farm at Ottawa, had been instructed by the Minister of Agriculture to proceed to Lethbridge at once to expedite the starting of the experimental farm at this point . . . It is understood that W. H. Fairfield will be offered the position of Superintendent of the new farm. No better choice could be made. The new experimental farm will be a big thing for southern Alberta and great credit is due Senator DeVeber for securing its location at this point.'

Some disappointment was expressed. *The Claresholm Review* said, 'We congratulate Lethbridge on securing the experimental farm, but we sincerely regret that it was not placed in our locality as we believe our district is more suitable to such an institution.'

Mr. Fairfield began work on August 1, 1906, at a salary of $1,500 a year. His first task, with Dr. Saunders and Mr. Magrath, was to inspect the property and get an idea of the land involved. To their disappointment, they found that only about 25 ha (60 acres) of the original donation could be irrigated and that was not enough. Dr. Saunders contacted the Hon. Sidney Fisher, Minister of Agriculture, who wrote to Elliott Galt, then in Montreal, to ask for additional 30 ha (80 acres). Mr. Galt approved the request by telegram on August 9, 1906.

The farm was virgin prairie when Mr. Fairfield took possession. Because of the dryness of the soil and the lateness of the season, only about 4 ha (10 acres) were broken during the fall of 1906. The farm was fenced during the fall and winter.

The Dominion Experimental Station, Lethbridge, was the sixth research facility of the Experimental Farms Service.

Chapter 3. Beginning of The Experimental Station

The boardinghouse in 1908, with Mrs. Frank Steedman on the porch. This building was still standing in 1976.

In 1906, the Dominion Experimental Station at Lethbridge consisted of 160 ha (400 acres) of land located 1.6 km (1 mile) east of the corporate limits of the City of Lethbridge and crossed by the Crow's Nest branch of the Canadian Pacific Railway. The land, together with water rights, was donated to the Dominion government by the Alberta Railway and Irrigation Company. A strip of land on the eastern side of the Station, running north and south and containing 40 ha (100 acres), was irrigable; the remaining 120 ha (300 acres) could not be irrigated, and most of that land was eventually devoted to experimental work for dryland farming.

The first task of W. H. Fairfield as Superintendent was to organize the work, to sort out the various crops and cultural methods available to the farmers of southern Alberta, and to determine which ones were best suited to the region. The many new farm homes then springing up throughout southern Alberta received attention also, and farmstead beautification, orchards, and gardens were emphasized.

During the autumn of 1906, about 4 ha (10 acres) were broken along the eastern side of the Station. The next spring, 1.2 ha (3 acres) of this land were prepared as well as circumstances permitted, and apples, plums, raspberries, black currants, red currants, white currants, and gooseberries were set out. Ornamental trees and shrubs and peonies were put in as well. Several hundred small elms, ashes, Manitoba maples, and cottonwoods, used later in general plantings throughout the Station, were transplanted into nursery beds. In the fall of 1907, hardy perennial plants were received and planted, and several hundred cuttings of poplar and willow were heeled in ready to be transplanted in the spring.

During the spring and summer of 1907, 60 ha (145 acres) of land were broken. Of this, 19 ha (47 acres) were on the irrigated portion and the remainder on the nonirrigated part. In August, the land was backset except for about 6 ha (15 acres), which were reserved so that a test could be made to show the effect of backsetting on grain crops and compare it with the effect of merely breaking the land. This was the start of cultural experiments. In the fall, 1630 kg, or 60 bushels, of Kharkov and Turkey Red No. 389 winter wheats were purchased from the Kansas Agricultural College, and hand-picked. Three hectares (8 acres) of each variety were planted beside 3 ha (8 acres) of the best Alberta-grown Turkey Red that could be found. A date-of-seeding experiment was set up for winter wheat: 0.05-ha (⅛-acre) single plots were sown at 2-week intervals between August 15 and November 30.

Irrigators of the region needed information on the actual amount of water required to irrigate various crops. To gain this information, all water used by the Experimental Station was measured over a weir and amounts were recorded. Arrangements were made with the Lallie Surveying Instrument and Supply Company of Denver, Colorado, for one of their water registers. It proved to be unsatisfactory, and a Friez water register was obtained.

On April 10, 1907, Mr. Fairfield visited the new Station with Mr. Patterson, the carpenter foreman, and selected a site for the barn. This was a spacious structure, measuring 11.6 by 21.9 m (38 by 72 feet). Most of the ground floor was occupied by stalls for the workhorses, but one end was partitioned off for carriages. On the second floor was a room for feed bins, and the rest of the space was used as a hayloft.

Patterson next built an implement shed two stories high. The ground floor was used to store implements and tools, with sufficient space at one end to operate a small threshing machine. The upper floor was used as a general workroom and storage space for grains. There was a lean-to on the north side of the building to accommodate wagons and other gear.

Dr. William Saunders, Director of the Experimental Farms Service, Ottawa, visited the Station on June 1, 1907. On June 3, he and Mr. Fairfield selected the site for a cottage, and its cellar was started the next day. The six-roomed, story-and-a-half cottage was used as a residence by

The first buildings on the Station, about 1908. Left to right, the implement shed, the horse barn, and the boardinghouse.

Superintendent's house about 1909. The doorway at left opened into the first office, used from 1908 to 1919. Beth Fairfield is seated on the steps to the office.

the Fairfields from August to December 1907, then as a boardinghouse. The first stenographer and first woman to be employed by the Station was Miss Hatch, daughter of George Hatch, an early mayor of Lethbridge. She began work on July 8, 1907, in a temporary office in the new cottage.

The Superintendent's residence was started on July 5, 1907, and was completed about the end of the year. It was three stories high and contained nine rooms, one of which was given a separate entrance and fitted out as an office.

Mr. Fairfield was a very busy man during the period. As well as supervising the work of the new Station and overseeing its building program, he found time to judge at seed fairs, speak at meetings, and help organize, attend, and present a paper at an Irrigation Congress in Calgary. His diary for that year mentions meetings at Raymond, Magrath, Cardston, Macleod, Granum, Claresholm, Gleichen, and Medicine Hat. He usually traveled by train.

The building program continued into 1908 with the construction of an ice house early in the new year. A foreman's house must have been built in late 1907 because W. C. (Chad) Poland, the farm foreman, started work on January 6, 1908, and on January 13 there is a notation that 'hands are hauling belongings from old boarding place to foreman's house.' Granaries were built and board fences were put up at the back of the foreman's house and the Superintendent's residence. A chicken house and root cellar completed the immediate program. South and north bridges were built over the irrigation canal in March and December 1908, respectively.

The 1908 annual report of the Station began a practice that continued for many years: results were published separately for the nonirrigated or 'dry' farm and the irrigated farm. Mr. Fairfield pointed out that, in practice, two experimental farms were being operated. The intention was not to compare the two systems, but rather to study their individual problems.

Much effort in 1908 was devoted to planting trees, particularly during April, May, and June. Daily journals for the period contain numerous comments such as: 'Lining up and staking out for trees', 'planting cottonwoods, elms, and trees in orchards', 'planted box elders, poplar trees, evergreens, willows, and elms north of railway', 'set sighters for elms along fence', 'set out ash and cottonwood trees along ditch', and 'set out willow slips'. Special permission had to be obtained from the Alberta Railway and Irrigation Company to set out trees along the main canal. Trees were planted around the outside border of the Station and on both sides of main drives. (The road from the building area to No. 3 highway was still known as Elm Drive in 1976.)

Mr. Childs, whose wife ran the boardinghouse, died in February 1908, and Mr. and Mrs. Frank Steedman, who had recently arrived from England, took over.

The season of 1909 saw increased expansion of both dry and irrigated orchards where permanent plantations of gooseberries, raspberries, and red, black, and white currants were set out. Windbreaks were found to be essential in the Lethbridge region before any fruit could be grown.

The Provincial Department of Agriculture arranged for an excursion to the Station on July 23, 1909. A special Canadian Pacific Railway train was run from Calgary, and special rates were obtained over the Alberta Railway and Irrigation Company's lines. this was the first excursion of its kind to the Station, and many farmers took the opportunity to visit the place.

Tree planting continued in 1910. Plum trees, birch, balsam poplar, maple, larch, cottonwood, and creeper vines were planted around the Superintendent's residence. Blue spruce trees were transplanted to the south lawn, also Manitoba maples. An entry in Mr. Fairfield's diary lists trees used by the City of Lethbridge, as follows: 'elm, streets—1,750; elm, parks—2,200; and elm, ash, cottonwood, parks—1,000.' This entry, and others, reflected Mr. Fairfield's great interest in tree planting throughout southern Alberta. By example, exhortation, and suggestion, he probably did more than any other person to transform the region from a treeless plain to its present state.

By 1911, results of experiments had shown that, because of the light rainfall in southern Alberta, cultural methods needed special attention to get maximum yields. Specifically, it was found that a farmer had to keep one-third of his land in summerfallow each year. The main purpose was to conserve moisture. The need to summerfallow occasionally made it difficult to determine suitable rotations. As a result, a number of rotations were started in the spring of 1911. (Most of them were still maintained in 1976.) Those on dry land ranged from rotation A, continuous wheat, to rotation T, a 10-year rotation including forage crops and a hoed crop.

It was also found that to make an irrigated farm profitable, most of it had to be used for hay, and preferably alfalfa. Because of this discovery, in 1911 a new rotation was set up on irrigated land (rotation U); it included 6 years for alfalfa hay, 3 years for grains, and 1 year for a hoed crop.

The Station began its first experiment with livestock during the fall of 1911 with a test on feeding lambs; Frank S. Grisdale, a graduate of MacDonald College and the first assistant superintendent, was placed in charge. Up to this time, no stock of any kind had been kept, except for the animals needed to operate the Station. The lamb-feeding experiment was started to find out the value of alfalfa as the only feed, and its value in various combinations with roots and grains.

In 1911, also, the Provincial Jail was built on adjoining property about 0.8 km (½ mile) east of the Experimental Station. This made it possible for the Station to receive water and power in 1913. Power was supplied from a generator at the Jail by way of a power line that crossed the yard of a neighboring farmer, C. R. Daniels. It

First sheep shed, about 1911-1912.

was on for a few hours in the morning and cut off about 11:00 a.m.; on again for an hour or two in the afternoon and for most of the evening hours; then off for the night about 10:00 p.m. Water was first received by way of a small pipeline from the Jail Lake. In 1912, City of Lethbridge water was piped to the Exhibition Grounds, and the Jail arranged for the line to be continued to its own location. The Station, in turn, tapped the new line.

The International Dry Farming Congress was held in Lethbridge on October 21, 1912. Arrangements for the Congress had begun in 1908 when Mr. Fairfield took 27 kg (1 bushel) of Alberta Red wheat from Lethbridge to the Dry Farming Congress in Cheyenne, Wyoming. To his surprise, and to the surprise of southern Alberta farmers, the sample won first prize. The message to the farmers was clear and unmistakable—they could grow wheat along with the best in North America. That was the start of a campaign to bring the Dry Farming Congress to Lethbridge.

The 7th Session of the International Dry Farming Congress caused a great stir in Lethbridge. Many streets of the city were paved. The coming of the Congress speeded up the installation of a street railway system, which was completed in September. Three new buildings and a grandstand were built at the Exhibition Grounds to house the Congress.

Mr. Fairfield, who had so much to do with bringing the Congress to Lethbridge, was chairman of awards. He was referred to in reports as 'the local agricultural encyclopedia', 'the original farmer of the Lethbridge district', and 'the final authority on matters pertaining to the agriculture of southern Alberta'. Representatives of 14 nations attended the Congress, including many noted agriculturists. Many took the opportunity to visit the Dominion Experimental Station. A sample of Marquis wheat, grown at Raymond by Henry Holmes, won the top prize at the Congress.

Steer-feeding experiments were started in the fall of 1912. These were supervised by Victor (Vic) Matthews, Frank Grisdale having left in midsummer. The steer-feeding experiments were designed to find a profitable use for alfalfa hay by marketing it through cattle. Alfalfa hay was fed in combination with oat hay and alone. All feeding was done in the open and the only shelter provided was open sheds.

The Steedmans left the boardinghouse, and that job was taken on by Mr. and Mrs. A. N. (Andy) Maloney. After inspecting the boardinghouse, Mrs. Maloney refused to move in. The place was badly infested with bedbugs, as transient help then stayed in rooms there in the absence of a bunkhouse. It proved to be difficult to eradicate the pests so Mr. Fairfield ordered that the inside of the boardinghouse be relathed and replastered. With the crude insecticides of the day and some labor, this proved to be effective and the infestation was cleared up.

Mr. Maloney was taken on as a general handyman and drove a team into Lethbridge once a day for mail, supplies, and other necessities. Also, he drove the Station children to and from school. On Sundays, there was the official trip to town to take people to church.

George B. McMillan was the farm foreman in 1912, W. C. Poland having resigned. R. J. C. (Dick) Paris was the

The Coaldale Road, about 1912. On the left is the C. R. Daniel home and the Experimental Station; on the right is the Provincial Jail. Source—T. L. Ferguson; Photographer—A. Rafton Canning.

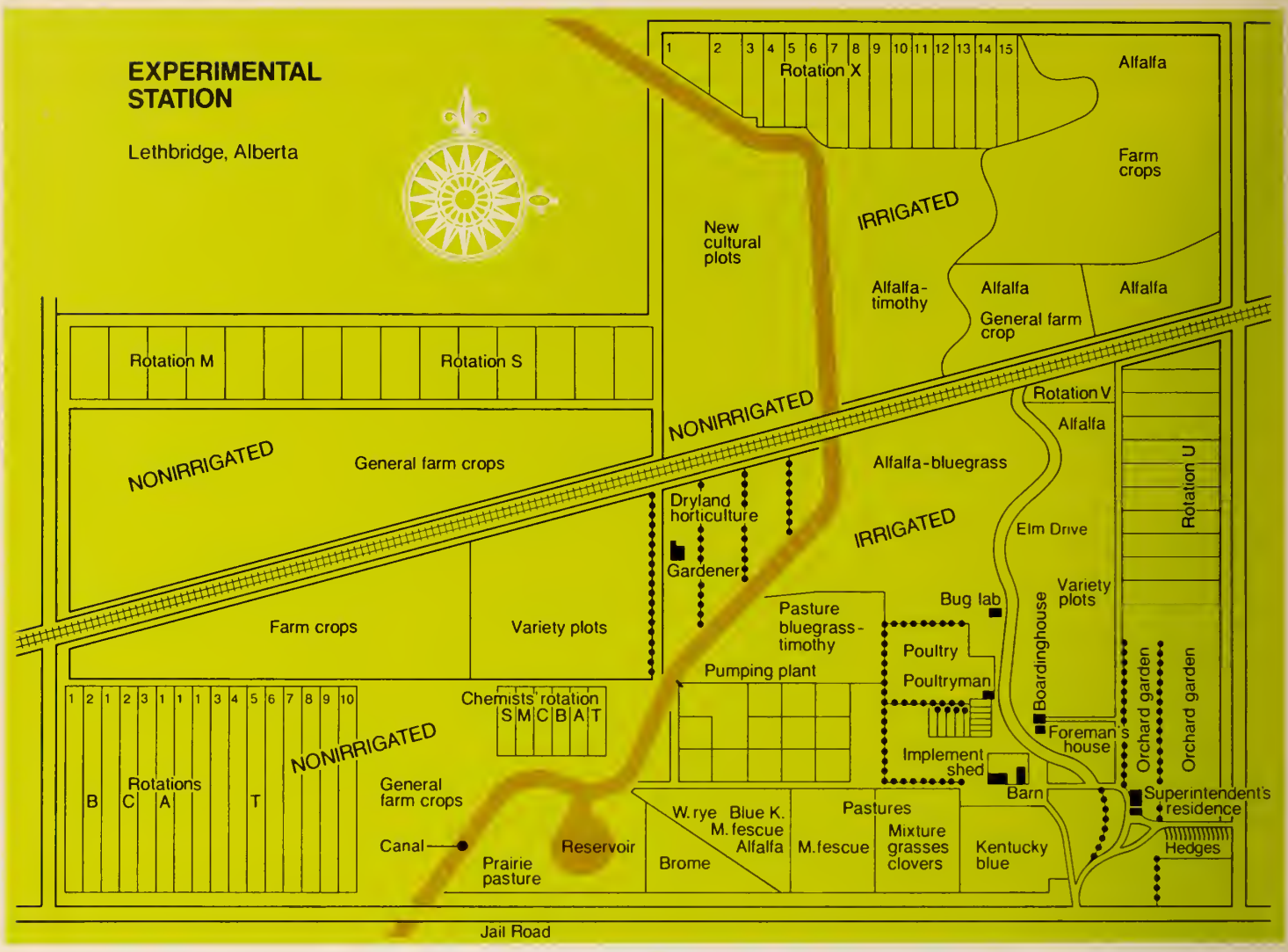
Steers fed in winter, 1912-1913.

Looking northwest from top of Superintendent's house in 1913. Buildings are, from left to right, the implement shed, horse barn, steer- and sheep-feeding sheds, and boardinghouse.

head gardener. John R. (Jock) Coyle, a young man recently arrived from Scotland with his parents, was taken on that summer at the going rate of 18¢ an hour. Like other Station employees, he worked 10 hours a day, and 9 hours on Saturdays; he walked back and forth between the Station and his home in North Lethbridge. (Sixty-four years later, men worked 8 hours a day for 5 days and earned $5.25 an hour.) Erle E. Eisenhauer was secretary to Mr. Fairfield and the office clerk. Charles Griffin, the irrigationist, had been working for the Station for 3 years. One of the workmen drowned in Fairy Lake, as the willow-fringed reservoir was then called. A redheaded Scotsman, John Milroy, formerly employed on a sheep ranch in Wyoming, was taken on in 1913. He was made farm foreman shortly after his arrival.

The Station's report for 1913 began the practice of recording the results of experiments in separate sections. Under Animal Husbandry, there appeared reports of the experiments on feeding steers and lambs. Cereals work was reported for the dry farm and the irrigated farm and included data on growing wheat, oats, barley, flax, peas, and buckwheat. Field Husbandry, also reported for the dry and irrigated farms, included data on rotations, date-of-seeding experiments, rate-of-seeding experiments, and soil cultural experiments.

The volume of work was a reflection of the homesteading then proceeding apace throughout southern Alberta, and of the pressing need for new agricultural information.



The Lethbridge Experimental Station, about 1918.

The slogan during the Great War of 1914-18 was 'Patriotism and Production'. It governed the activities of the Lethbridge Experimental Station, as it did other branches of government and the public. At first, the war had little effect on the Station except that the Public Works appropriation was halved and spending even the amount voted was questioned. Construction of buildings by tender ended, although some small projects went ahead using day labor. As time went on, men enlisted and experimental studies were disrupted or canceled.

However, there was some expansion at the Lethbridge Station in 1914. Bees had been kept for home use for several years but, in 1914, two hives were obtained for experimental purposes. Lethbridge was not looked upon as a good location for bees because of the strong westerly winds, the dry climate, and the almost total dependence upon a single crop—alfalfa—for bloom. Nevertheless, one of the two hives produced 45 kg (100 pounds) of honey, the third best of all yields at experimental farms or stations in Canada.

In 1912, the Poultry Division at Ottawa had been reorganized and a Dominion poultry husbandman, Dr. E. C. Alfred, appointed. As a result of the reorganization, poultry work started at Lethbridge in 1914. Also, it was demonstrated early in the war that no other livestock could respond as rapidly as poultry to the demands for increased production. Early in the year, three incubators were purchased and installed at one end of a dugout root cellar. Eggs for hatching were obtained from the Central Experimental Farm in Ottawa, the Experimental Farm at Agassiz, and the Experimental Station at Lacombe. Two breeds, Barred Rock and White Leghorn, were kept.

During the summer, five poultry buildings were constructed: an administration building of one and a half stories, a brooder house, a 100-hen permanent house, and

two 50-hen portable houses. About 1.2 ha (3 acres) of land were fenced with woven wire for runs. Notes were taken on trap-nesting, feeding, incubation, and winter survival; the entire program was designed to help the farmer who kept a small flock of hens.

The building program continued with the construction of a herdsman's cottage in the area just west of the boardinghouse. Then a gardener's cottage was erected on dry land near the railway track, near the dryland orchard for security. R. J. C. Paris, the head gardener, who had lived in Lethbridge since about 1912, moved into it as soon as it was finished.

The total area of irrigated land on the Station was increased in 1914. Some land, which was supposedly 'below the ditch', was too high to be irrigated from the Canadian Pacific irrigation lateral that ran through the Station. By using a pump to lift the water 1.8 to 2.1 m (6 to 7 feet) higher, about 40 ha (100 acres) more land could be irrigated than was possible by ordinary gravity methods.

In October 1914, Mr. Fairfield accompanied Dr. J. H. Grisdale, Director of the Experimental Farms Service, Ottawa, on an inspection trip to select sites where illustration stations could be established.

Dr. Grisdale, who was Dr. William Saunders' successor, had considered the establishment of such stations for several years. He pointed out that the Dominion experimental farms had accumulated much information and knowledge but the information was not reaching farmers, particularly the poor ones. He conceived the idea of establishing demonstration farms (actually, they were called illustration stations) at various places to practice crop rotation, soil cultivation, and soil improvement under the direction of an agricultural officer. The intention was to secure the cooperation of a farmer of good repute whose farm was located on a well-traveled road and within easy walking distance of a central town or village. About 12 ha (30 acres) of his farm would be rented by the government, and as many 2-ha (5-acre) fields as there were years in the various rotations would be farmed under direction.

In April 1915, illustration stations were established at 13 locations in Alberta: Bow Island, Carmangay, Empress, Foremost, Grassy Lake, Jenner, Macleod, Magrath, Manyberries, Medicine Hat, Milk River, Pincher Creek, and Whitla. In July, two more stations were established, at High River and Munson. Mr. J. F. Irwin, a graduate of Manitoba Agricultural College and a practicing farmer, was appointed assistant in charge of the illustration stations in Alberta. He was stationed at Lethbridge.

By 1915, Mr. Fairfield was the oldest Superintendent in the Dominion from the standpoint of service. This was brought out at a conference of experimental farm and station superintendents at Ottawa in January. The conference did much to systematize the work on the experimental farms and stations. Also, it focused attention on topics that should be studied because of the war.

One of those topics was production of seed of roots, grasses, and leguminous forage plants. The Lethbridge Station was not very interested in seed production of root crops, although some experiments were undertaken. Of more concern was seed production of grasses and alfalfa; the possibilities for commercial production of alfalfa seed in southern Alberta had been demonstrated during the previous 6 or 7 years. Also, Mr. Fairfield had kept closely in touch with the industry that produced timothy seed, then centered on Pincher Creek. Studies at Lethbridge had shown that row seedings produced more and better seed than broadcast seedings.

The experimental plot system was revised about 1915. Since 1907, results at Lethbridge had been based on data from single plots, usually from 0.004 to 0.01 ha (1/100 to 1/40 acre) in size. The variability of the land was recognized as a serious problem, but there was little that the practical experimenter could do about it except to select uniform areas for his tests. Starting about 1915, the duplicate plot system was used at Lethbridge and the check plot system was considered. In the latter, standard or check varieties were sown in every fifth, tenth, or twentieth plot depending upon circumstances. A map of the field was prepared, and plots were grouped around a check plot according to their nearness or, where the soil was very variable, according to the character of the soil. The average yield of all check plots was determined; then, additions were made to below-average check plot yields to bring them up to the average, and subtractions were made from above-average yields. Corresponding additions or subtractions could then be made to yields of each test plot in the group. This led to the major objection to the check plot system—that, because of these adjustments, the results published in reports were corrected ones and not the actual data obtained from the tests.

Conditions were so favorable in 1915 because of generous rains and ample soil moisture that irrigation was not required. This was the first time that Station yields had not been improved by the application of irrigation water. Mr. Fairfield pointed out that there was only one other year, 1902, when crops of the Lethbridge district did not benefit from irrigation.

Another research program was started to determine the prospects for tobacco growing in southern Alberta. Growth of filler, binder, and pipe tobaccos was assessed. Tobacco leaf was hung up to cure and dry in the implement shed; combustibility and percentage nicotine were determined at Ottawa. But the yield was unsatisfactory, growing conditions were not suitable, and the experiment was soon discontinued. (Tobacco was grown experimentally on plots at Taber during World War II, but again results were disappointing.)

As in 1915, irrigation was not required for general farm crops in 1916. Hay and pasture crops were greatly improved in yield by irrigation in early May, however.

Although the hog industry of the prairies had expanded slowly, a great demand for bacon and hog products arose about 1915 and caused a sudden increase in the number of hogs kept in Alberta. The Lethbridge Experimental Station responded to this new agricultural need early in 1916 and acquired hogs for experiments. Lumber was purchased for 'hog cabins', which implies that several animals had to be housed.

J. F. Irwin, the inspector of illustration stations for the Province of Alberta, made 101 visits to station operators during the season. A special feature was introduced in 1916: extension meetings were held on the farms where the illustration work was being done.

R. J. C. Paris, Victor Matthews, A. T. Kemp, and E. H. Strickland enlisted in 1916, the latter two in the University of Alberta Battalion.

By 1917, labor problems on the Station had become acute. An assistant, G. S. Hirst, arrived in May and left for the war in November. Alice Fairfield, daughter of Mr. Fairfield, maintained the weather records because no one else was available. High-school students were employed during summer holidays, as were university students. Jail prisoners were used as much

as possible. But results of poultry experiments, for example, were not satisfactory because of the changes in the staff.

The Maloneys bought a Model T Ford, the first car on the Station. Later, Mr. Fairfield purchased a car, and both he and Mr. Maloney learned to drive by climbing aboard their acquisitions and driving home. On his first trip out from Lethbridge, Mr. Fairfield passed Mr. Maloney but was so engrossed in driving his new car that, later, he had no recollection of ever seeing or passing anyone on the road.

Although 1915, 1916, and, to a lesser extent, 1917 were wetter than normal, 1918 turned out to be very dry. Problems of irrigation were compounded because the irrigation company's main canals had been allowed to silt up during the wet period and so could not carry sufficient water until dredged. Fortunately, the water shortage did not become acute until after the hay crop had developed, and yields were normal. But elsewhere, the only crops produced were on summerfallow.

The Spanish influenza epidemic of 1918 affected the Station as it did the remainder of the country. Fear of the disease was great, and steps were taken where possible to avoid it. On the Station, one of those steps was to wear gauze face masks, which were sterilized by heating in ovens between wearings. Those living on the Station were more or less isolated as there were no assemblies, church services, or other organized gatherings. Mrs. Maloney, the boardinghouse keeper, was convinced that all food should be cooked as an aid in avoiding the 'flu', and she stopped serving raw vegetables, fruits, and similar materials. Whatever the merits of these preventative measures, no one living at the Station contracted influenza during the epidemic, a remarkable record in view of the virulence of the disease. One of the teamsters, who lived in town, died.

With the close of the war, several lines of work, such as the production of seed of root crops, were discontinued and others of more lasting benefit were started. Extensive work in sheep raising under range conditions began; in October 1919, the Lethbridge Experimental Station purchased 800 Merino ewes. They were used in an experiment to determine if growers of alfalfa on irrigated land could maintain commercial-sized flocks of sheep on their farms and use the forest reserves in the Rocky Mountains for summer pasture.

Studies with sheep on irrigated pasture emphasized the finding that when alfalfa was added to a pasture mixture, the carrying capacity of the pasture more than doubled. It was also demonstrated that, where a good grass turf existed, cattle or sheep could graze on mixtures of grass and alfalfa without bloating.

Interest in irrigation was keen in 1919 because of the previous dry season. Mr. Fairfield attended many farmers' meetings and spoke on matters concerning irrigation. Data kept from 1908 to 1919 showed that irrigation increased yields over dry farming as follows: wheat, 77%; oats, 53%; barley, 81%; and potatoes, 105%. These results had a great influence on the farmers of southern Alberta and on their attitude toward irrigation.

Up to 1919, irrigation in southern Alberta had developed in three phases. At first, many small projects were built by individuals in the late eighteen seventies and eighties. Later, large company projects were constructed during the period from 1898 to 1915. And finally, irrigation districts developed, beginning with the Taber Irrigation District in 1915 and a reconnaissance survey of what became the Lethbridge Northern Irrigation District in 1918. The Experimental Station's findings greatly encouraged further development of irrigation districts.

A surplus Army Reo truck was purchased in 1919. It had a canvas top with long benches across the back and had been used to transport troops. It took the place of a surrey that, for several years, had been used to transport the Station children to and from school in Lethbridge. Andy Maloney was the driver. A Ford truck also was purchased for Station use.

A lambing shed was started in 1919 and completed early in 1920. It was a gable-roofed structure with sliding doors at each end to permit a team and rack to drive through the building. The shed was suitable for lambing 1,000 head. A silo was erected at one end of the lambing shed—or as it was more commonly called, the Sheep Shed.

A new office building was constructed; the weather station was moved to accommodate it. Since 1907, a single room in the Superintendent's house had been used as the Station office. Money was voted for a piggery or hog barn in 1919 but, after due thought, Mr. Fairfield decided to use the funds to construct a new office. (Authorities in Ottawa, except for the Treasury Board, were well aware of what was going on.) It included a full basement, Superintendent's office, general office, assistant's office, and toilet on the first floor, and three bedrooms and a bathroom on the second floor. Bedrooms were intended for use by students, office staff, or an assistant, as such accommodation was very limited at the time. The flagpole was moved from its original location at the north end of the lawn to a place in front of the new office. Because of the source of the funds used in its construction, the new office building was referred to for several years as the Hog Barn.

Chapter 5. The Twenties

The main canal about 1920 with Station buildings in the background. From left to right, buildings are the sheep shed, horse barn and implement shed, and main office.

Soil drifting throughout southern Alberta was reported with increasing frequency during the twenties. Soil drifting had plagued the prairies periodically from the time the first sod was broken. It was noted by Mennonite settlers in Manitoba in the 1880's and by Angus McKay, Superintendent of the Experimental Farm at Indian Head, as early as 1900.

Some of the first serious drifting in the Chinook belt of southern Alberta occurred in 1911 when fields south of Raymond blew out. There was more drifting from 1912 to 1914, but real trouble did not develop until after the heavy crops of 1915 and 1916. Severe drifting occurred from 1918 into the 1920's, and farm after farm was blown out down to the plow sole. Fence lines and road allowances of the region were piled high with drifted soil.

Two factors led to the serious drifting. Early settlers had brought to the semiarid west the farming techniques of the humid east. Also, the dryland farming methods that did develop in Manitoba and the western United States involved deep plowing, bare soil surfaces, and a dust mulch, conditions that almost invited wind erosion and soil drifting. The 'Ten Commandments' of dry farming were: (1) plow deep; (2) keep the surface soil loose and level and the lower soil compact; (3) keep down the weeds; (4) add organic matter to the soil; (5) summerfallow when annual rainfall is less than 380 mm (15 inches); (6) grow corn or a cultivated crop every 2 to 5 years; (7) grow clover, alfalfa, or some leguminous crop every few years; (8) grow early-maturing crops; (9) keep livestock; and (10) plant trees. The theory of dust mulch farming was publicized by Professor W. H. Campbell of South Dakota and was widely accepted by farmers during the early years of the twentieth century.

The problem was particularly acute in southern Alberta. Every year was a soil-drifting year in the Chinook belt, and nowhere else did the winds play as important a part in the farming operation. The limited snowfall usually disappeared once or more during the winter and again early in the spring, leaving the soil bare and open to wind erosion. During October and November before snowfall, high winds often caused much damage. Also, soils of the region tended to be fine textured, especially the easily eroded silty loams and fine sandy loams of the Monarch-Nobleford area.

The dryland soils of the Experimental Station had drifted occasionally during drought years. But a 32-ha (80-acre) tract of land to the northwest of the Station had suffered badly from drifting during these periods. In about 1920, this land was rented by the Station from the Department of Natural Resources of the Canadian Pacific Railway at a cost of $280 a year for experiments on control of soil drifting.

Rotations J and Z were added to the dryland rotations. Both were for 5 years and included summerfallow, wheat, oats, and 2 years in hay. In rotation J, western ryegrass was seeded with the oats to help control soil drifting and in rotation Z sweetclover, then a fairly new crop, was used. However, it proved to be nearly impossible to establish stands of either the grass or the legume because of drought.

In 1920, for the first time, sheep were 'taken to the mountains', a practice that was to continue until the forties. As Mr. Fairfield pointed out in his report, some farmers on irrigated land kept a few sheep and others would have liked to do so if they could provide cheap summer pasture. But no readily accessible prairie range remained within reach of the irrigated farms of the Lethbridge district. Therefore, the suggestion was made to use some of the mountain pastures, which were then unoccupied. The idea was that a few neighboring farmers could combine their flocks after shearing, ship the sheep by rail to the mountains, and pool the cost of herding for the 3½ to 4 summer months. The Experimental Station undertook to test the idea. (Although it proved feasible, the idea never really caught on with the sheep producers.)

Cultural work begun in 1912 was ended in 1920, and a revised set of experiments were started on newly broken land. Although the work was severely criticized in about 1915, some conclusions were drawn from the experiment. For example, the most profitable way to handle prairie sod was to break it the first year and let it stand over until the next season before sowing a crop; shallow plowing and backsetting were more successful than deep plowing in breaking prairie sod. Plowing summerfallow to a depth of 20 cm (8 inches) gave higher yields than plowing to either 10 or 15 cm (4 or 6 inches). Fall harrowing of summerfallow gave higher yields than omitting the harrowing. When rape was sown as a summerfallow substitute and pastured off, wheat yields

Visitors at a short course on irrigation farming, Lethbridge Experimental Station, January 29 to February 8, 1924.

were reduced by 605 kg/ha (9 bushels per acre) and oat yields by 150 kg/ha (4 bushels per acre). (The depressing effect of rape was found by Dr. J. S. Horricks in the early seventies to be caused by a poisonous substance washed from the rape plant into the soil.) Fall cultivation before the summerfallow year was not a profitable practice. Seeding wheat 5 to 6 cm (2 to 2.5 inches) deep gave the best results over 7 years of experiments.

By 1921, weather records were becoming sufficiently reliable that climatic differences could be distinguished in different areas of southern Alberta. It was recognized that the frost-free period increased from about 104 days at Lethbridge to about 123 days at Medicine Hat. Total precipitation increased from east to west across southern Alberta. Wet and dry cycles had been experienced, and the extreme variability of precipitation in southern Alberta had become apparent.

In November 1921, A. E. Palmer came to the Station as an assistant superintendent. Mr. Palmer was given responsibility for irrigation investigations and bee- and poultry-keeping, the last because he was able to get along with Charles A. Crossfield, the head poultryman, who had an abrasive personality.

The experiments on 'duty of water' started in 1922. In the early stages of an irrigation project, Mr. Fairfield pointed out, the engineering features of canal and field construction received the most attention. As development proceeded, these problems were solved. Attention then turned to problems of production, or the strictly agricultural features of the industry. Thus, on irrigated land or dry land, satisfactory kinds and varieties or crops had to be selected, proper cultural methods had to be established, and the marketing of products, by feeding or otherwise, had to receive attention. But one feature of irrigated farming was different from all others: the proper use of irrigation water.

Crops included in the investigation were wheat, alfalfa, timothy, brome, mixed pasture grasses, sunflowers, and potatoes. Duplicate 0.02-ha (1/20-acre) square plots were used, and each plot was made into a kind of basin by constructing a surrounding

ditch and dike. The time and depth of application of irrigation water could be varied to suit each plot treatment. Soil moisture was determined at 25-cm (1-foot) intervals to a depth of 1.8 m (6 feet) in the spring and fall; other determinations were made before and after each irrigation. The experiment, which went on for 17 years, was the most elaborate on the Station at the time and was under Mr. Palmer's direction. Details of these investigations, and recommendations drawn from the results, were reported by Mr. Palmer in a bulletin entitled *Use of Irrigation Water on Farm Crops*. The bulletin was well received and went through five reprintings.

A discovery of great significance to the poultry industry was made by Mr. Palmer and John Dykes, poultryman. It was that humidity in artificial incubators played an important role in hatching a high percentage of the eggs set and in producing large, vigorous chicks. Previously, it had been difficult to obtain large early hatches of chicks and experiments proved that the dry climate was responsible. Provision of adequate humidity paved the way for a commercial poultry industry in Western Canada.

W. D. Hay, who started work with the Station in January 1924, was placed in charge of cereals, forages, and special crops. The special crops had become important because of the interest in new irrigation districts in 1924. Another aspect of this interest was the 2-week course on irrigation farming that was held at the Station from January 29 to February 8.

The use of alfalfa hay, oat hay, and screenings was emphasized in cattle-feeding tests until 1921. Beginning in 1921, and continuing until 1925, corn silage, sunflower silage, and corn fodder received attention. All rations were fed with alfalfa hay. Generally, steers went on feed at about 500 kg (1,100 pounds) and came off at 590 to 635 kg (1,300 to 1,400 pounds). In 1922, a group of steers fed on alfalfa hay with corn silage gained 1.1 kg (2.4 pounds) a day, the best average daily rate of gain recorded up to that time, and came off feed at 700 kg (1,540 pounds). The various studies showed that corn silage provided an excellent supplement to combine with alfalfa for fattening steers. The feed provided more and cheaper gains and gave a better finish in a shorter time than other feeds. It was followed in order of preference by sunflower silage, then corn fodder.

The main office and assistant superintendent's house, about 1926.

In 1923 to 1924, a movement was started to reopen a sugar beet factory at Raymond. The area of irrigated land had increased and specialty crops were required, better varieties of sugar beets had become available, more was known about sugar beet culture, and ammonium and phosphate fertilizers had been introduced. In 1925, a plant was moved to Raymond from Sunnyside, Washington, and Canadian Sugar Factories Limited came into being. Although not included in Experimental Station annual reports, the development was aided by tests of sugar beets and assays of sugar at the Station. Sugar beets, for example, were used as the hoed crop in rotation U from 1923 onwards.

In June 1925, the first dairy cattle were received from the Holstein-Friesian herd of the Central Experimental Farm in Ottawa. There were three mature cows, one 2-year-old heifer, two yearling heifers, two heifer calves, and a 7-month-old bull. A few weeks later, this herd of nine head was supplemented by a shipment from the Experimental Station at Lacombe of eight animals: three mature cows, two 2-year-old heifers, two yearlings, and one heifer calf. The herd thus contained 17 purebred Holstein-Friesians, all from accredited herds. Eight of the cows were soon placed on an experimental feeding test, to determine the economy of milk production when a home-grown ration was fed as compared with a ration supplemented by purchased concentrates high in protein.

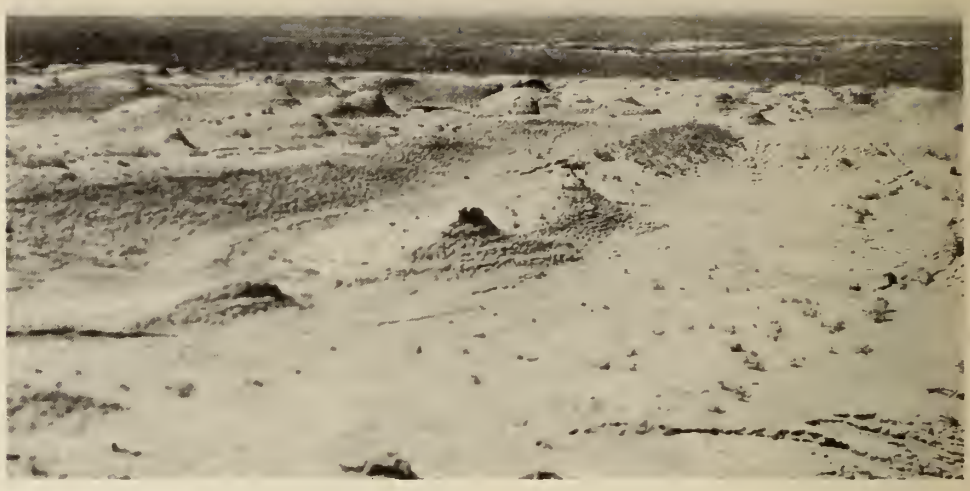
The 'rod-row' method of testing cereals was adopted in 1924 and, by 1926, had replaced the old system of duplicate 0.007-ha (1/60-acre) plots. Each plot consisted of three rows 18 cm (7 inches) apart and 5.6 m (18½ feet) long. Plots were sown side by side as they would be in a farm field. At harvest time, 25 cm (12 inches) were cut off each end so that conditions at the border would not affect results. This left plots 5.1 m, or 1 rod, long (hence the name). Average yields were determined from the center row of each plot. Plots were seeded in quadruplicate but were not randomized. Data were averaged.

In 1927, yearling steers and spayed heifers were placed in feeding trials for the first time, instead of the 2- and 3-year-old steers of former years. It had been recognized in about 1924 that the range areas of Western Canada were the logical place to breed and produce feeder cattle at low cost. It was essential to protect the ranching industry and make it a dependable source of supply of high-quality, young feeder cattle. This meant that ranchers could no longer afford to market 3- and 4-year-old steers off grass as overweight and half-finished cattle. Instead, they were forced to feed calves

and market them as yearlings. Also, a grading system was introduced and adopted at a National Beef Cattle Conference at Winnipeg, whereby best-quality beef was to be graded and sold under 'Choice' (Red) or 'Good' (Blue) brands. The immediate result of the new system was to give the production of well-bred, properly finished, young cattle the recognition it deserved in the marketplace. The system required a steady supply of 230-kg (500-pound) carcasses, which meant that cattle had to be finished as yearlings. A problem at the Experimental Station was to devise rations that would stimulate fattening rather than growth of these young cattle.

Additional land for experimental purposes had been rented from the Canadian Pacific Railway throughout the twenties, but it was not until 1927 that land was purchased. In that year, 41.7 ha (103.1 acres) of the land immediately south of the Station were obtained from the railway company at a cost of $15,000. The land consisted of unbroken prairie oversown with timothy and irrigated for several years, and it was needed by the Station to grow feed for the expanded livestock program.

Experimental work with swine expanded considerably during the late twenties. Feeding swine with protein supplements was studied, and grain requirements for winter and summer feeding were compared. Use of cheap straw houses had been investigated early in the program and, in 1927, an elaborate piggery was constructed. Problems arose immediately among litters farrowed in the cement-floored piggery, as suckling pigs died of anemia and half-grown pigs of rickets. In 1929, preliminary trials were undertaken with pastures and corn and peas for hogging off, advanced registration of swine was investigated, and observations were made on anemia in suckling pigs and rickets in half-grown pigs. A breeding herd of 25 Yorkshire sows was maintained, and the total herd numbered 224 hogs.



The decade ended as it had begun with emphasis on measures to control soil drifting. Important developments had taken place in southern Alberta during the twenties. Strip farming started near Monarch where the Koole Brothers grew strips of wheat alternating with summerfallow to decrease wind velocity and to protect the topsoil.

The introduction of plowless fallow or shallow tillage was an even greater adaptation to western conditions than was strip farming. The basic idea was to use an implement that did not bury all plant residue but left some on the surface for protection. But reports of severe drifting on shallow-tilled fields began to come in. Investigations by Mr. Palmer showed that farmers had burned the weeds and stubble to make the fields easier to work. It was obvious that, if shallow tillage was to be used, the trash had to be left on the surface.

When plows were no longer used, there was an urgent need for an implement that could penetrate unplowed ground, kill weeds without burying the stubble, and operate in heavy trash without clogging. The idea of a sliding-blade type of cultivator occurred to several farmers, including John Turner and Otto Wobick of Barons. C. S. Noble started work on his blade, getting the basic idea from potato diggers in fields in California.

As well as shallow tillage, strip farming, and blade cultivation, other methods were tried. Ed Hodges of Magrath attached small lister shovels to his cultivator and ridged his fields, a technique that had originated in Kansas. Farmers around Raymond scattered straw on their fields in a successful attempt to stop isolated areas of drifting soil. Norman Grier of Macleod seeded a cover crop of oats on summerfallow in late summer to protect the soil against drifting in fall, winter, and early spring.

Thus, most of the practices for control of soil drifting that were later used during the thirties were in wide use and their effectiveness had already been demonstrated in southern Alberta. The basic recommendations were to break the velocity of the wind by strip farming; to keep the soil covered by living or dead plant material; to keep bare soil lumpy or ridged; and to stop active drifting immediately by whatever means available.

These control measures, and the development of suitable machinery, all began as innovations on the farm. The professional agriculturists at the Lethbridge Experimental Station recognized what was under way on the farms of the region. They worked with the more inventive farmers and gradually provided the scientific foundation needed for wider application of the methods or machines. The result was that, when the drought years of the thirties came along, southern Alberta had 15 to 20 years of farmers' experience and 10 to 15 years of sound experimental evidence on methods of combating soil erosion by wind.

It was an excellent example of teamwork between science and the farm. And it was to save Western Canada in the decade ahead.

Above
Wind erosion.

Chapter 6. The Dirty Thirties

The thirties opened with the Wall Street crash of October 1929, and ended with the invasion of Poland by Germany in September 1939. The era had profound effects on the type of agriculture practiced in Western Canada and left invisible scars on the people who experienced it. As early as 1930, a well-defined drought area began to appear in southeastern Alberta and southwestern Saskatchewan, culminating in the total crop failure of 1937. Soil drifting was widespread and uncontrolled. Depending upon one's location, the period was variously known as the Depression, the Great Depression, or, in the drought area, the Dirty Thirties.

But in 1930 on the Experimental Station, few of these influences could be detected. Work went on as it had during the twenties. On dry land, the work was concerned with cultural practices as they affected crop yields, moisture conservation, soil drifting, and the use of commercial fertilizers. On irrigated land, studies included application of water to various crops, the value of legumes in rotations and as green manure, management of pastures, and the effect of fertilizers on yield of sugar beets.

The main office was the nucleus of the Station. Arthur Jones, an Englishman, presided over it, then Elizabeth (Beth) Fairfield in the early thirties, and Jean Ringland after August 1938. Here Dr. Fairfield had his office, the fireplace of which was usually filled with burned wooden matches from the repeated lighting of his pipe. (W. H. Fairfield had received an honorary LL.D. degree from the University of Alberta in May 1930.)

Karl Rasmussen, a young animal scientist, arrived at the Station in December 1930 to replace Arthur Newman. He completed his M.Sc. and Ph.D. degrees while employed there, the first scientist to do so. His interest was in sheep, and he began quickly to effect changes in the animal husbandry program. Steer-feeding experiments were discontinued in 1934 and were not resumed until 1946. The swine program was beset by an infestation of roundworms in 1930, serious outbreaks of disease in 1934 and 1935, and financial

Dust storm near Pearce, Alberta.

problems caused by the depression. It was, therefore, discontinued and the herd sold in 1936. The horse program continued, as these animals provided most of the motive power on the Station, and a superior stallion, Chief Laet, was purchased from Michigan State College in East Lansing, Michigan.

In February 1931, a fire of mysterious origin destroyed the horse barn and partly destroyed a granary. Five teams of horses were in the barn at the time of the fire and were saved only after they were blindfolded and led out. Boy Scouts of McLean's School, one of whom—A. Douglas Smith—was later employed by the Station, did valuable work in carrying harness and other accessories from the burning structure.

As early as 1929, Dr. C. H. Goulden, then a young researcher at Winnipeg, began to advocate replication in plot experiments and more sophisticated mathematical analyses. The only person at Lethbridge with the inclination to understand the new techniques was Jacob Witrofsky, a member of the Cereal Section under W. D. Hay since 1934. It was he who introduced statistics to the Station in the mid-thirties. Mr. Witrofsky was not satisfied with averages, which were then the usual way of presenting data. He wrote to his brother, a mathematician in Austria, for help in statistical analysis. The brother sent an example of an analysis of variance, which Mr. Witrofsky applied to plot data. At first, his calculations were done by hand or with the aid of a slide rule. But, eventually, a small, hand-operated Monroe calculator was purchased and, still later, a small electrically operated Facit.

In 1934, Herbert Chester was transferred to Lethbridge when the Experimental Station at Windermere, B.C., was closed. With Harry J. Mather he became a supervisor of the illustration stations, which then operated from Lethbridge. He succeeded R. E. Everest, who had been transferred to Ottawa.

The Prairie Farm Rehabilitation Act (PFRA) was passed by the Dominion Parliament and received Royal Assent on April 17, 1935. On that same day, Dr. E. S. Hopkins of the Central Experimental Farm wrote to western superintendents and said: 'It is expected that a considerable amount of the work in connection with the new Prairie Farm Rehabilitation Act will devolve upon the Dominion Experimental Farms. The Act is designed to learn methods of combating drought and soil drifting in the prairie provinces.'

Field Day during the thirties; the speaker is A. E. Palmer.

Drifting soil.

Left
Ridging a summerfallow field in the winter to prevent wind erosion.
Center
Leaving a good cover of trash with a one-way disc.
Below
Strip farming.

PFRA ushered in a time of excitement and expansion at the western stations, especially Swift Current and Lethbridge. The Lethbridge Station appropriation more than doubled and, for the first and probably the only time in its history, the Station had all the funds that it could effectively spend.

Later in April, Dr. Fairfield was appointed to a water development committee, of which L. B. Thomson was chairman and W. L. Jacobson was secretary. For the next several years, Dr. Fairfield and Mr. Palmer were much in demand as consultants to PFRA on irrigation schemes. In June, W. L. Jacobson was officially seconded from his position as irrigation officer with the Experimental Station, which he had accepted in 1932, to the position of secretary of the Water Development Committee, PFRA. He was located first in temporary offices in Medicine Hat and later in Swift Current; in 1936, he was transferred to Regina, where he remained for 13 years. Mr. Jacobson was noted for having started the Experimental Station Weekly Letter on November 24, 1934, with an article entitled 'First Anniversary'. He continued it for a time, even after his transfer to the Water Development Committee; he was asked to write the second anniversary issue and did so with an article on the Prairie Farm Rehabilitation Act. At the time of writing, the 2,231st issue of the Weekly Letter had been released.

PFRA was based on three objectives: water conservation, community pasture development, and a soil erosion control program. The agency was never able to reach an agreement with Alberta's Social Credit government and there was no PFRA community pasture development in the province. But the other objectives were met.

PFRA activities at Lethbridge in 1935 were concerned with farming practices and soil reclamation in the drought areas of Alberta. The main task was to establish district experiment substations, to determine and demonstrate the best means of controlling soil drifting. The use of strip farming, preservation of trash cover, and planting of cover crops where needed were the basic methods.

Six illustration stations were converted into district experiment substations. These were located at Bindloss, Castor, Cessford, Pincher Creek, Whitla, and Youngstown. Two new substations were established, one at Lomond and the other at Foremost. All substations were private farms operated by agreement under the direction and supervision of Experimental Station officials. They were designed to demonstrate to farmers of a district that soil drifting could be controlled and crops could be grown in spite of adverse conditions.

To this end, the substation supervisor arranged with the farmer concerned to farm his land in strips and to follow a rotation of grain and fallow to prevent soil drifting. If necessary, part of the land was seeded in the fall with a cover crop to prevent drifting during winter or early spring. Excessive pulverization of the soil was avoided, and as much of the stubble and trash as possible was left on the surface. In short, it was the application of the hard-won lessons of the twenties to a wider region of Western Canada. Results were often dramatic and, even as early as 1935, success in controlling soil drifting was achieved on several substations.

Another area of concern was a large part of eastern Alberta, where much of the land previously farmed had been abandoned and ranching or a combination of ranching and farming had developed. It was found that natural vegetation returned very slowly on abandoned farmland, and it was decided that much of the land would have to be reseeded if it was to provide good grazing again. In August 1935, a party consisting of Dr. S. E. Clarke, Dr. Fairfield, Mr. Palmer, and Mr. Mather surveyed the region from Medicine Hat north to Hanna. They found widespread land abandonment, and farming confined to pockets of better soils. Much of the prairie was covered with sage and Russian thistle as a result of abandonment. The group recommended that the main project on reclamation areas in southern Alberta should be to find out how to reestablish grass on abandoned lands, particularly in areas that were obviously better for range than for farmland. They also suggested that six regrassing stations should be established, at Bowell, Cessford, Hutton, Naco, Stanmore, and Sullivan Lake, and that experiments should involve mostly crested wheatgrass, a species that had already found wide acceptance in the dry areas of the United States.

Another important activity of PFRA was to help organize agricultural improvement associations (AIA), groups of farmers united to help themselves. The government contributed advice and assistance through AIA supervisors, helped in laying out fields in strip-cropping patterns, provided free grass seed, supplied trees for home shelter, made available engineers to design water development schemes, and gave grants for postage.

Still another PFRA activity was water development. Assistance was given to farmers and ranchers for the construction of dugouts, stock-water dams, and small irrigation projects. Officers of the Lethbridge Experimental Station acted as consultants to PFRA on irrigation schemes, but the Station took very little part in such activities as dugout construction.

An early model of the Noble blade cultivator.

Nevertheless, a D-4 Caterpillar tractor and 'tumble-bug' were purchased and dugouts were constructed on a number of the regrassing stations. George Ellis was the tractor operator.

An indication of conditions was obtained in the fall of 1936 when Mr. R. W. Peake inspected lands in east-central Alberta. He estimated that 4860 ha (12,000 acres) were in serious condition, with active drifting. He proposed a scheme for stopping the soil drifting. Spring rye was to be seeded in the spring to establish a cover during the season of greatest rainfall and least wind, then crested wheatgrass seeded in the rye stubble. The method proved to be very successful and was widely used throughout the region in ensuing years.

An addition to the main office was constructed in 1937 to accommodate increased staff and to relieve overcrowding.

Herbert Chester, as well as serving as supervisor of illustration stations and district experiment substations, was much involved during the mid-thirties in investigations of municipalities applying for inclusion in the Relief Feed area under a Dominion-Provincial agreement. By January 1937, he had inspected about 1,400 applications for free freight and had approved about 65% of them.

The Chedderville Illustration Station attained a measure of fame in 1937 when it was conclusively shown that sulfur added to the Gray Luvisol (Grey Wooded) soil of the Station dramatically increased yields of legumes. The initial discovery was made by Dr. Fairfield and R. E. Everest. These men suspected that a sulfur deficiency was the cause of poor clover yields in the region. They went to the local drugstore, purchased a quantity of flowers of sulfur, and spread it on a small plot seeded with a mixture of red clover and timothy. The red clover on the unfertilized portion remained stunted, which was normal for the region, but the treated area produced a rank green growth of grass and legume. It was obvious that sulfur was essential to the successful growth of legumes on Gray Luvisol soils.

About 1938, Barred Rock pullets disappeared from poultry houses near the dryland orchard: 100 the first night, 75 the next. The Royal Canadian Mounted Police were called in and fingerprinted all Station employees. However, no prints were found on the poultry house locks except those of the poultrymen and no one was ever arrested for the theft, although there were rumors that the pullets had been sold in Edmonton.

Insects did great damage during the thirties. According to the Report of the Minister of Agriculture for 1938, 'As has been the case each year since 1932, the grasshopper outbreak in the Prairie Provinces was the most serious threat to field crops in the Dominion.' At Lethbridge, studies continued on the pale western cutworm, wheat stem sawfly, Say's grain bug, and the potato psyllid. Work on the wheat stem sawfly was considerably expanded in an attempt to produce a sawfly-resistant wheat and to protect crops on the infested territory that came under the strip-farming program.

Dr. C. W. (Chris) Farstad and Mr. Peake cooperated in the program of protection of crops from the wheat stem sawfly. They selected the Grasswold Municipality at Rockyford as the location for their studies. Then they explained to municipal authorities that, because of the egg-laying habits of the wheat stem sawfly, control might be achieved by seeding trap strips of bromegrass along all roads crisscrossing the municipality. A strip of oats could be seeded around each wheat field as additional protection. Dr. Farstad and Mr. Peake offered to provide the grass seed and supervise the seeding if the municipality would prepare and seed the roadsides. The proposal was accepted, and soon the roadsides were converted into strips of bromegrass and the sawfly infestation was controlled. But the grassed roadsides also controlled weeds, looked attractive, and resisted erosion. Other municipalities saw the benefit of the practice, and the seeding of roadsides became common and widespread.

Recreational activities during the thirties included swimming in the Jail Lake; tennis on a court next to the Fairfield residence and later on a court located west of the Entomology Laboratory; softball and soccer on the dryland prairie north of the railway; dances at McLean's School; and darts and boxing in the bunkhouse. It was during one of the boxing matches that C. D. (Butch) O'Brien got his nickname. A slightly built youngster when he joined the Station irrigation crew in 1934, he was called Butch after he decked a much larger opponent with one punch.

Runaways often occurred, because horses provided the main motive power. The Station kept well-bred, high-spirited horses, and they were always in excellent condition. But unusual happenings sometimes made them run away, breaking equipment and damaging fences. L. A. Jacobson remembered being in the Entomology Laboratory one day when James Black came down Elm Drive with a four-horse team on a binder. Mr. Jacobson opened a lab window, shouted 'Hello, Jim!', and away went the team. The binder soon struck a tree and stopped the horses, but the machine was wrecked.

Experimental Station office staff, about 1939. From left to right: Beth Fairfield, Arthur Jones, and Jean Ringland.

A 32-ha (80-acre) parcel of land was purchased from the Canadian Pacific Railway in 1939 for $55 a hectare ($25 an acre). The parcel was on the northwest corner of the Station, on dry land, and it had been rented from the railway for several years. The area was known as the North Forty and the Cultural Plots. It had been blown out badly in the twenties and proved to be very useful in soil-drifting studies during the thirties.

Above
Back row, left to right: Thomas Hall, James Black, W. Norman McNaughton, W. R. Watts, Neils E. Kloppenborg. Front row, left to right: W. (Bill) Milroy, Freddy Anderson, Frank M. Smith, A. H. (Art) Woolliscroft. Photograph taken at the Beaver Club, London, England.

Right
Back row, from left to right: W. D. Hay, W. Norman McNaughton, H. Chester, Jacob Witrofsky, Dr. W. H. Fairfield, Neil Bosomworth, and G. F. Manson. Front row, left to right: J. R. McFall, K. W. Hill, L. A. Jacobson, and A. E. Palmer.

Opposite page
Among the many famous personages who visited the Lethbridge Research Station was Professor Dr. N. I. Vavilov. Dr. Vavilov died about 1942 in one of Stalin's prisons, to which he had been sentenced for his opposition to the theories of T. Lysenko.

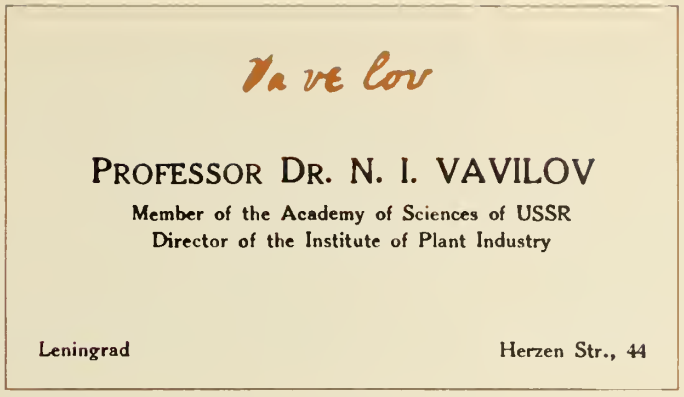
The slogan during World War II was, 'Eliminate Waste'. It governed the activities of the Experimental Station as well as the activities of the Dominion Entomological Laboratory at Lethbridge. A series of Wartime Production publications and leaflets called for increased production of fiber flax, flax seed and other oil seeds, barley, and sheep and wool. Other publications outlined methods to control warble flies in cattle and described the efficient feeding of cattle and sheep. Still others described how to grow a wartime garden. These publications had to be written, and answers to questions provided, by scientists from the various agencies.

Gasoline rationing was imposed soon after the outbreak of hostilities and lasted for the duration of the war. Tires were difficult to obtain. Cars and trucks could not be purchased, and those on inventory early in the war had to last until it ended. Fortunately, in 1941, two Ford cars were obtained in Regina and helped considerably to maintain adequate transportation. Nevertheless, travel was cut to essential trips throughout the war years.

P. H. (Pat) Walker was one of the first staff members to join up, leaving the Station soon after the outbreak of war. Thus began the disruption of work caused by changes in staff that characterized the Station program throughout the war years. Also, appropriations were reduced, construction was stopped, and research programs were curtailed.

Western Canada was selected almost immediately as the most suitable region in which to locate air training fields of the British Commonwealth Air Training Scheme. The region was chosen partly because of its flat terrain, but especially because of the long hours of sunshine and, hence, of good flying weather. Adequate security, yet relatively easy access to the conflict in Europe, were other considerations. R. W. Peake worked with Air Force contractors to ensure that soil drifting was kept under control during construction and that airports were revegetated as soon as possible.

Throughout the war years, demonstrational and research work—the cultural phase of PFRA—continued to give guidance on moisture conservation and control of soil drifting. Public contacts were made largely through agricultural improvement associations, 32 of which were supervised from the Lethbridge Experimental Station by J. R. McFall in 1941, or the district experiment substations,



10 of which were operating under the supervision of H. Chester in 1941.

At Rolling Hills, PFRA brought in settlers from Saskatchewan and gave them irrigated land in exchange for the blown-out dryland farms they had left. Land leveling was an essential first step in the new irrigated area, and a program was begun under J. Carol Johnson, who worked out of the Lethbridge Experimental Station. Equipment used was provided by the Station and PFRA, and the Eastern Irrigation District at Brooks cooperated where possible.

Weed research, paid for from PFRA funds in the early forties, was conducted by J. J. P. Sexsmith. Experiments included the testing of ammonium sulfamate as a herbicide to control field bindweed and leafy spurge, and seeding of grasses and legumes to control leafy spurge and hoary cress on road allowances. Other weeds that caused concern included hedge bindweed and Russian knapweed.

The Dalroy Substation was set up by Mr. Sexsmith as the place to study control of hoary cress under farm conditions. Studies were held in abeyance from 1943 to 1946 because of the war. Then a 32-ha (80-acre) portion of the Dalroy farm was rented from the Canadian Pacific Railway, and cultural operations were carried on by Experimental Station crews under Mr. Sexsmith's direction. The appearance of 2,4-D in 1945 revolutionized weed control. By 1975, some 60 chemical compounds were recommended for various weed and crop situations in Alberta.

Horticulturists came and went during the war; they included Neil Bosomworth, Roma Ballhorn, and Emil T. Anderson.

By late summer of 1943, thought was being given to the postwar period. The Director of Experimental Farms, Dr. E. S. Archibald, circulated a memorandum to his superintendents asking them to consider postwar needs. Some superintendents treated the memorandum very casually and outlined requests for more machinery, a building or two, or minor additions to the staff. Dr. Fairfield, of the Lethbridge Station, took the memorandum very seriously indeed and arranged for a series of staff meetings to discuss postwar needs thoroughly. The memorandum that resulted was largely the work of Dr. Fairfield, Dr. Rasmussen, and Mr. Palmer, but other staff members contributed.

In a covering letter dated September 29, 1943, to Dr. Archibald, Dr. Fairfield stated:

'Attached is a memorandum summarizing ideas presented at several staff conferences in recent days dealing with the future development of the Lethbridge Station. This will serve as a basic outline of the form we think research should take and is being enclosed as it may provide the necessary justification for acquiring the C.P.R. [Home] farm at the present time.

'In the memorandum we have gone into considerable detail as we felt that generalizations would not serve the purpose. We have attempted to show the need for increased research in the area and some of the main problems that await solutions. We have also outlined our personnel and laboratory requirements to indicate that we are ready to go ahead with development as soon as funds and personnel become available. It is obvious that a major increase in appropriation will be necessary if the proposed program is to be carried out.

'With reference to staff increases we would like to emphasize that most of the new men cannot be cheap men or new graduates but must be well trained men on a substantial salary. At this point we would like to reiterate our conviction that one of the weaknesses in our present organization is the lack of men with advanced training and this in turn reflects the relatively low salary scale which is in effect.'

H. L. Seamans, Officer-in-Charge of the Dominion Entomological Laboratory, submitted a similar memorandum at about the same time in which he called for the establishment of a Cereal Breeding Laboratory at Lethbridge.

In 1944, a committee consisting of Dr. Rasmussen, Mr. Palmer, and Mr. Chester was set up to consider the problem of former employees who might soon return to the Station as war veterans seeking reemployment. The committee felt that former professional staff would probably want to return but thought that many former subprofessionals would seek other opportunities. Plans were made to absorb these men and women as they were discharged from the Armed Forces.

The purchase of the C.P.R. Home Farm was the last land acquisition to be conducted by Dr. Fairfield and was designed to accommodate the expansion he knew had to come. Earlier, in 1927, he had negotiated the purchase of the 42-ha (103-acre) parcel lying north of the Jail Lake and, in 1939, the purchase of 32 ha (80 acres) at the northwest corner of the Station that were known as the Cultural Plots and the North Forty. Both were purchased from the Canadian Pacific Railway.

The parcel in question was known as the C.P.R. Home Farm and was kept to overwinter horses that were used during the summer on various parts of the irrigation project. It comprised 175 ha (435 acres) and was all used for hay. There were some buildings on the property: a residence, barn, two-car garage, storeroom, granary, bunkhouse, boardinghouse, ice house, and machine shop.

The initial offer to sell appeared in a letter from the Canadian Pacific Railway to the Station on January 6, 1937. In it, railway officials explained that they intended to sell their irrigated land in the Lethbridge region and wanted to give the Experimental Station the first chance at refusal.

The matter seemed to remain dormant until September 1942 when the railway company received a definite offer from a Mr. Hunsaker to purchase the entire property. Dr. Fairfield was told of this and in reply on April 13, 1943, stated: 'I would say that we are even more anxious than ever to purchase the Home Farm as an extension of our work here. As irrigation develops in the province the importance of carrying on livestock experiments is becoming more and more apparent.'

Dr. Fairfield went on to say, 'Two or three months ago the possibility of obtaining a small ranching area for our sheep experiments was brought to our attention. It is a 5,000-acre [2025-ha] tract on the broken land on the river front southwest of Rainier in the E.I.D. I think this deal is about concluded but while it is pending I was rather on the spot in pushing arrangements for a deal for the Home Farm. The little ranch is a minor matter because it will only involve about $12,000 for the purchase and it contains a 200-acre [80-ha] water right in addition to other lands that can be irrigated. The big advantage of obtaining this acreage of ranch land is that we can carry out sheep breeding experiments under ranch conditions rather than under semi-farm and ranch conditions as we have been doing in the past, utilizing the forest reserve as we have for our summer pasture.' The property was to become the Scandia Sheep Station.

Correspondence among representatives of the Canadian Pacific Railway, the Experimental Station, and the Ottawa headquarters continued. In August 1943, Dr. E. S. Archibald conceived the idea that the Veterinary Research Station, Science Service, located on the river bottom land west of Lethbridge, might want to move onto the C.P.R. Home Farm property if it were purchased by the government. Science Service officials were receptive to the idea, and this became a major reason for the purchase of the property.

On September 12, 1944, word was received from Ottawa that an Order-in-Council had authorized purchase of the C.P.R. Home Farm at a price of $30,000. Transfer of title appears to have taken place in March 1945.

About 1944, Dr. T. M. Stevenson, Dominion Agrostologist, and Dr. L. H. Newman, Dominion Cerealist, began to insist that more forage and cereal research should be conducted at the Lethbridge Station. Previously, both of these areas of research were the responsibility of W. D. Hay, who also studied various specialty crops. It was decided in 1944 to combine the PFRA Regrassing Program with the forage studies and to create a new Forage Crops Section. R. W. Peake was placed in charge, assisted by N. A. Skoglund, who had recently transferred to Lethbridge from Manyberries.

Ram sale at the Lethbridge Experimental Station in 1942. Dr. K. Rasmussen is at the back of the pen in breeches; next to him is J. R. McFall.

Office staff, about 1942. From left to right: Jean (Scotty) Watson, Leone McClellan, Jean E. Buchan, and Marion Hammond.

Regrassing studies entered a new phase with the setting up of a grazing study with cows and calves on crested wheatgrass pasture at Cessford. Eventually, the results showed that crested wheatgrass produced about three times as much animal gain as native range, the first time that this had been demonstrated in Western Canada. The experiment was not well designed, however, and results were never adequately reported or publicized.

Work with bees was discontinued in 1945 when Harry T. Luther retired. The first experimental bees, two colonies, had been obtained in 1914. The aim was to determine the feasibility of keeping bees in the Lethbridge region and to work out elementary problems of management. By 1945, beekeeping was an established industry in the region. The main reason for discontinuing the work was the difficulty of getting a trained entomologist to conduct the type of research that was needed.

Labor problems plagued the Station during the war as men were continually leaving for service in the Armed Forces. Effective use was made of women, both in the office and field. Jean Ringland and Beth Fairfield were the only ladies working at the Experimental Station during the thirties, but women were employed in increasing numbers during and immediately after the war.

The close relationship that existed between the Experimental Station and the Provincial Jail seemed to end about the mid-forties. It was based originally on the personal friendship between Dr. J. H. Rivers, first Warden of the Jail, and Dr. Fairfield, Superintendent of the Station; and between Thomas Smith, the Jail foreman, and John Milroy, the Station foreman. The Station tapped the Jail's water supply and used its electricity. The establishments exchanged equipment. For many years, a substantial part of the Station's hay requirements were purchased from the Jail. When work was pressing on the Station, gangs of prisoners from the Jail were always available to help. Many routine tasks, such as cleaning Station ditches in spring or cultivating among trees in summer, were performed by prisoners. In retrospect, it was probably a form of exploitation of people who were powerless to resist it, but prisoners were treated with respect and usually earned themselves a few cigarettes.

Dr. Fairfield resigned on V-J Day, August 14, 1945. He dictated his letter of resignation to his daughter, Beth, as soon as he heard the news. He had been asked to stay on as Superintendent during the war although, at 70, he was past the normal retirement age. He was tired and ill at war's end and, after 39 years as Superintendent, he was glad to give up the command of the Experimental Station to his successor. His resignation took effect immediately, and he was granted a 6-month leave of absence, going on superannuation in February 1946. Mr. A. E. Palmer, assistant superintendent in charge of Field Husbandry, was appointed Officer-in-Charge to succeed Dr. Fairfield and was later confirmed as the second Superintendent of the Lethbridge Experimental Station.

Dr. Fairfield was the 'Father of the Lethbridge Experimental Station'. He was a practical visionary who saw the potential of southern Alberta, recognized the problems that required solution, and guided the staff toward effective approaches to those solutions. He had the rare ability to develop men and to give them leadership, encouragement, and quiet direction when it was needed.

Employees of the Dominion Experimental Station and Dominion Entomological Laboratory who served with the Canadian Armed Forces during World War II were:

Allen, T. D.
Anderson, D. T.
Black, James
Boulton, R. H.
Buchan, Jean E.
Callahan, C.
Chapman, Frank
Coyle, Helen B.
Coyle, J., Jr.
Currie, Alex
Gurr, A. F.
Hagell, G. E.
Hagell, R. A.
Harrison, C. G.
Hendrick, L. J.
Holmes, N. D.
Hurtig, Henry
Irwin, D. H.
Johnston, Alex
Kloppenborg, N. E.
Krogman, K. K.
Maloney, A. J.
Milroy, William
MacNaughton, W. N.
McFadden, A. R.
McVeeters, J.
McVeeters, R.
Neilson, C. L.
Noss, N. H.
O'Brien, C. Delmar
O'Brien, Clayton P.
Phalen, S. W.
Reid, J. L.
Robins, G.
Sexsmith, J. J. P.
Smith, A. Douglas
Smith, Albert D.
Smith, Frank M.
Smith, J. Douglas
Smith, Percy
Smith, Richard T.
Smith, William C.
Thorpe, G. R.
Walker, P. H.
Watts, W. R.
Winters, D. R.
Woolliscroft, A. H.
Woolliscroft, H. G.

Chapter 8. Entomology

In 1944, the idea of a large Science Service research facility at Lethbridge was discussed. It was to include the Dominion Entomological Laboratory as well as new sections of plant physiology, plant pathology, chemistry, and other disciplines. L. A. Jacobson became actively involved in the program and visited laboratories in Canada and the United States to get ideas for the Lethbridge establishment. Because the creation of the Science Service Laboratory in 1949 marked the end of the Dominion Entomological Laboratory as a separate entity, this seems a fitting place to discuss Entomology at Lethbridge.

In 1913, the first laboratory for investigating insect problems in Alberta was established in Lethbridge, and was housed in a corner room on the second floor of an implement shed on the Dominion Experimental Station. It was one of a series of small laboratories established in all provinces except Prince Edward Island between 1911 and 1919 by Dr. Charles Gordon Hewitt, Dominion Entomologist. There was no equipment although there were plenty of problems. For example, the first serious outbreak of the pale western cutworm occurred in southern Alberta in 1911. Ottawa entomologists recommended that farmers cultivate out all weeds before moth flights. But the pale western cutworm lays its eggs in loose soil and not, like related insects, on the leaves of plants. The Ottawa recommendation was disastrous, making it obvious that studies were badly needed in the regions where insect problems were located. The Dominion Entomology Laboratory, Lethbridge, was one answer.

Mr. E. H. Strickland was sent out from Ottawa and appointed Officer-in-Charge of the new laboratory on March 18, 1913. He was supplied with a twin-cylinder Indian motorcycle and within a year had traveled 16 000 km (10,000 miles). In 1915, he obtained a second motorcycle complete with a sidecar. His estimates that year

The 'Bug Lab', Dominion Entomological Laboratory, about 1920.

amounted to $990, which included $525 for construction of a two-roomed laboratory that was built on the grounds of the Experimental Station. It was completed by mid-June and was for many years the permanent research establishment of the Division of Entomology in Lethbridge.

One of the first problems to be encountered by Mr. Strickland was 'an eelworm [nematode] attack on winter wheat' in the Cowley - Pincher Creek district. It had first become serious in 1908 and had been very severe in 1912. He devised control measures in 1913 but, by 1914, concluded that the causal organism was not a nematode. He did find mites on affected plants. The condition grew less serious in 1915 and had disappeared by 1916. Forty years later, the disease was to be rediscovered, identified as wheat streak mosaic, and shown to be transmitted by a species of mite. The controls then advocated were identical to those that Mr. Strickland had recommended in 1913.

His next problem was the pale western cutworm. The first recorded outbreak occurred in 1911 and, in 1912, 16 200 ha (40,000 acres) of wheat were destroyed in southern Alberta. Cutworm damage was worse in 1914, and Mr. Strickland observed that, 'Where there is much summerfallow, such fields suffer first.' While stationed at Lethbridge, he visited Mr. F. Hova Wolley-Dod of Midnapore who had an excellent collection of noctuids, the family to which the cutworm belonged. Poison baits were tested, but the cutworm's habit of feeding below ground defeated those efforts except when bait was harrowed in on small patches. Mr. Strickland did develop a trap for adult cutworms and devised a chart that showed when it was safe to reseed.

Mr. Strickland joined the Canadian Army in late summer of 1916 and served in France with the University of Alberta Battalion. He returned to Canada in the spring of 1919 and resumed his study of the pale western cutworm. But, by 1920, Mr. Strickland was so discouraged that he would '. . . have acted as assistant to anyone with the necessary experience and ability to find a control for the cutworm, which brings so much personal ruin to many farmers.'

Fortunately, a person with the necessary ability appeared in H. L. (Hod) Seamans, who had studied the pale western cutworm in Montana. Mr. Seamans was appointed Officer-in-Charge of the laboratory on March 28, 1921, after Mr. Strickland had accepted a position with the University of Alberta as professor of entomology and head of the new Entomology Department. Mr. Strickland stayed in Lethbridge during the summer of 1921 to help combat a grasshopper outbreak that had been serious since 1919. This experience prompted Mr. Strickland and Mr. Seamans to pressure the Alberta Government into passing the Pest Control Act, now the Agricultural Pests Act.

Dr. E. H. Strickland, first Officer-in-Charge of the Dominion Entomological Laboratory, Lethbridge, 1913-1921.

Dr. H. L. Seamans, Officer-in-Charge of the Dominion Entomological Laboratory, Lethbridge, 1921-1944.

The Entomological Laboratory moved from the Experimental Station to the Post Office about this time, because personnel needed more space than was available in the two-roomed facility built in 1915.

Mr. Seamans, more than Mr. Strickland, left his imprint on the nature of the Entomological Laboratory and set the style of excellence and informality that it never lost. He came to Lethbridge to seek a solution to the problem of the pale western cutworm, then menacing prairie farmers. He developed methods of forecasting outbreaks and cultural methods of control. His solution, devised in 1921, was for farmers to stay off summerfallow during the insect's egg-laying season of late summer and early fall. This let the soil form a crust, which adult females of the pale western cutworm could not penetrate; hence, they could not lay their eggs. For this contribution, Mr. Seamans was lauded on the floor of the House of Commons in Ottawa and, 17 years later, was presented with the Gold Medal of the Professional Institute of the Public Service of Canada.

In 1927, the wheat stem sawfly project was started. The Gilbert strawburner was tested at Rockyford, but without much success. Trap crops were assessed, the effect of weather on sawfly activity was studied, and a parasite that affected the sawfly was investigated in the laboratory.

Early workers noted that thick-walled durum wheats were less severely damaged by sawflies than were hard red spring wheats. H. J. Kemp of Swift Current, in 1929, obtained 38 bread wheats from New Zealand; one of these was S-615, which he found to be highly resistant. Mr. Kemp crossed S-615 with the rust-resistant variety Apex, a cross that led eventually to the variety Rescue. In 1932, a meeting was held at Saskatoon between the entomologists at Lethbridge and the cerealists from Swift Current. Dr. C. W. Farstad, who had been conducting sawfly research since 1930, became responsible for the entomological aspects.

Wheat stem sawfly laying eggs in a wheat stem.

A. W. Platt was placed in charge of the sawfly-resistant wheat breeding project in 1938. He made crosses similar to those of Mr. Kemp as well as others, including S-615 with Thatcher. In 1946, the first sawfly-resistant wheat was released and by 1951 it was grown on nearly 3 million ha (7 million acres). This was Rescue, so named after a drunk in a hotel corridor was heard singing 'Rescue the Perishing'. The cross of S-615 with Thatcher was released in 1952 as Chinook.

Grasshoppers, another subject of investigation, had been crop pests in Alberta since settlement of the region. Starting in 1932, systematic surveys were carried out, first under the direction of R. M. White from 1934 to 1946, then under L. G. Putnam from 1946 to 1949, and later under D. S. Smith from 1949 onward. Since 1969, the survey has been conducted by provincial government personnel in each municipality or county, with some assistance from the Lethbridge Research Station.

In 1934, laboratory personnel involved in grasshopper control investigated the use of aeroplanes for spreading poison bait more quickly and more efficiently than ground rigs did. It was concluded that aeroplanes were not yet mechanically reliable.

In 1935, the grasshopper program was reorganized at a meeting of the Entomological Branch Committee on Grasshopper Research; the purpose was to try and discover what caused outbreaks of the insects. At the time of writing, the causes had still not been found. In 1948, a Cooperative Grasshopper Conference held in Saskatoon debated whether control products should be shifted from poison bait to sprays. Chlordane was available, heptachlor had been tested, and DDT had been on the market since 1946. Sprays were decided upon, and the era of poison baits for grasshopper control ended.

Even in the early years of the laboratory, the research involved many phases of entomology. Various formulations of baits were tested against grasshoppers and cutworms. A fungus disease was tested for control of cutworms in 1923, and control by trapping adults with baits and lights was attempted as early as 1921. In 1921, the attractiveness of various colored lights to the moths was tested. In 1925, a colony of bumble bees was studied in an artificial domicile.

In 1932, other projects were taken up. The nutritional values of various plants for cutworms, the relation of soil acidity to

Left
Mr. G. F. Manson, Officer-in-Charge of the Dominion Entomological Laboratory, Lethbridge, 1944-1948.
Right
Dr. C. 'W' Farstad, Officer-in-Charge of the Dominion Entomological Laboratory, 1948-1949.

selection of egg beds by grasshoppers, and the lack of predation on grasshopper eggs by crickets were all reported in 1933. The effects of temperatures on diapause in the sawfly were studied in 1930 and in 1934. In the same year, L. A. Jacobson began research on the Say stink bug, a new pest of wheat. Control of the pale western cutworm by starvation was tested in 1936. The cold hardiness of a few insects was tested, and the effects of defoliation of wheat by grasshoppers were studied by 1938.

The greatest changes in entomology at Lethbridge occurred in the decade starting in 1940. By the end of that period, seven of the prewar staff had either resigned or been transferred and 17 new entomologists had been appointed. Statistical analysis came into use, and the research became less subjective. Specialized fields such as cytogenetics and insect physiology received more emphasis. In 1944, Paris green was still being recommended for control of the beet webworm but, in the same year, DDT was tested on aphids, cabbage worms, flea beetles, and lygus bugs.

In the next decade, new insecticides proliferated. The entomologists appeared to have been so successful that they were no longer needed. The work on alternative methods of control continued, however, and it was later to receive more public acceptance when Rachel Carson aroused the public to the dangers of chemical residues. The role of stem solidness in sawfly resistance was disputed and confirmed. The possibilities of increased legume seed production came closer to realization.

The research of the laboratory was not limited to the empirical or the applied. It provided important new knowledge on the life history, ecology, and habits of many insects, on insect nutrition, on diapause, on pollination, on the nature of cold hardiness, on the cytogenetics of wheat, on resistance of plants to insects, on bioassay of insecticides, and on sex attractants.

The late forties was the start of a golden age for entomology in the Department of Agriculture. The number of entomologists at Lethbridge reached a peak in about 1949 when 20 were on staff. This was due to the influence of Dr. K. W. Neatby, Director of Science Service, who had the ability to persuade people of the value of science in agriculture. The aim of the expansion at Lethbridge was to develop teams to conduct research in depth.

The laboratory entered a new phase in May 1949. At that time, it was transferred to new quarters next to the Experimental Station, and became a part of the new Science Service Laboratory. The transfer was made physically by the younger entomologists, who loaded the furniture and moved it to the new quarters. The last to leave the Post Office building was L. A. Jacobson, who finally accepted the move he had helped to instigate, when his desk was moved out from in front of him.

Chapter 9. Postwar Expansion

Above
Mr. R. H. Painter, Officer-in-Charge of the Livestock Insect Laboratory, 1946-1951.
Below
Dr. W. C. Broadfoot, Director of the Science Service Laboratory, Lethbridge, 1949-1959.

The expected postwar expansion actually began in late 1944, when it became obvious that the end of the war was in sight. The predicted depression failed to materialize. Dr. W. H. Fairfield was still Superintendent but he was soon to be replaced by Mr. A. E. Palmer, head of Field Husbandry, who had come to the Station in 1921. Expansion occurred in three main areas at Lethbridge. First, it was necessary to house and find more staff for the newly created Livestock Insect Unit of the Dominion Entomological Laboratory, later known as the Livestock Insect Laboratory. Second, plans had to be made to house and staff the proposed Science Service Laboratory. And third, veterans had to be reemployed upon their return to the Experimental Station, and more personnel had to be appointed and accommodated.

The Livestock Insect Laboratory

The warble fly control campaign started by the Dominion Department of Agriculture in 1942 was indirectly responsible for the establishment of the Livestock Insect Laboratory at Lethbridge. Before the war, although controls for livestock insects were available, producers were lackadaisical in applying them because losses were of an intangible nature. The war brought higher prices for livestock, and the warble fly campaign convinced producers that losses, though intangible, were important and that more attention should be given to the control of livestock pests. The result was a demand for more information on control measures.

To keep abreast of the increased interest of producers, the Division of Entomology had to expand research and experimental studies. To do this, a laboratory for livestock pests was needed in the prairie region. Lethbridge was selected as the best location and the Experimental Station offered a portion of the C.P.R. Home Farm, including the buildings, for the establishment of a new laboratory. Thus, the Division of Entomology acquired some 15 buildings and 60 ha (150 acres) of land.

In 1947, the buildings at No. 8 Bombing and Gunnery School, Royal Canadian Air Force, at Lethbridge were turned over to Crown Assets Corporation for disposal. Negotiations were started immediately to secure two buildings, known as H huts, to be used as a laboratory and housing at the Livestock Insect Laboratory.

The laboratory was ready for occupancy in the spring of 1948 and the suites were finished by the fall. In the meantime, PFRA had fenced the entire holding, cross-fenced it to provide small pastures for experimental stock, and constructed a five-pen pole corral and chute. Mr. R. H. Painter was placed in charge.

Assembling the staff was a difficult problem. Mr. J. J. R. McLintock was secured in May 1948 from the Manitoba Department of Health and Public Welfare, where he had been working on western equine encephalitis, and he was placed in charge of the research program. W. A. Nelson was transferred in 1948 from the Dominion Entomological Laboratory and was assigned to biological studies on sheep keds. K. R. Depner, a recent graduate from the University of Alberta, was assigned to biological studies on horn flies in 1950.

In a short time, much was accomplished. Excellent research was done on the warble fly, particularly in relation to activities of the grubs, distribution of species, the importance of parasites and predators, and fundamental studies on pupation periods. Studies were carried out on adult behavior of sheep keds and the effect of the insect on the host, particularly in relation to nutrition. In horn fly studies, fundamental preliminary work was carried out on behavior, diapause, and bacterial symbionts, the last in cooperation with the Department of Bacteriology at the University of Alberta.

Problems arose in the administration of the new laboratory. At first, Mr. Painter was given a free hand. Then, in late 1950, F. Grant Wagner was appointed as an administrative officer, and it was decided that he would administer the Livestock Insect Laboratory jointly with the Science Service Laboratory, under Dr. W. C. Broadfoot's direction. In 1952, the Livestock Insect Laboratory was renamed the Veterinary-Medical Entomology Section of the Science Service Laboratory. Dr. W. O. Haufe was brought in in 1953 as coordinator of the livestock insects research program. Later, he became head of the Veterinary-Medical Entomology Section when Mr. Painter became liaison officer (livestock insects) to the four western provinces.

The Science Service Laboratory

The idea of a large Science Service research facility at Lethbridge was discussed, and briefs and memoranda flowed back and forth between Lethbridge and Ottawa from 1944 until about 1946. It was not until the appointment of Dr. K. W.

Construction of the biology building, Science Service Laboratory, in 1948.

Neatby as Director of Science Service that the concept began to receive the support it deserved. Dr. Neatby believed in cooperative research and saw an opportunity at Lethbridge to bring together a group of agricultural scientists to solve common problems efficiently.

Sod was turned for the new Science Service Laboratory, later called the Biology Building, at Lethbridge in late March 1947.

Dr. W. C. Broadfoot arrived during the summer. He had served as a plant pathologist at the Dominion Plant Pathology Laboratory at Edmonton from 1928 to 1946, when he was placed in charge of the Seedborne Disease Laboratory in Ottawa. He left the position to become Officer-in-Charge of the Science Service Laboratory at Lethbridge.

By fall of 1948, buildings were all on their foundations, space had been allocated, partitions constructed, light, gas, and water installed, and a start made on applying plaster and stucco. A heating boiler had been obtained from the airport at Bowden and was in operation for the first cold weather.

A front wing of the building was rushed to completion to accommodate the Plant Pathology Laboratory under Dr. M. W. Cormack, who had been in Lethbridge since July. Dr. Cormack and his staff, consisting of J. Eric Moffatt and later of Dr. M. N. Grant and Frank R. Harper, moved in during early December and began to organize the laboratory. The Cereal Breeding Laboratory of the Experimental Farms Service under A. W. Platt was transferred from Swift Current to Lethbridge in November 1948 and occupied another front wing of the main building. (It should be explained that the term 'Laboratory' became a fad at Lethbridge in the late forties and fifties. Although most units known by that name were simply sections of the Science Service Laboratory or the Experimental Station, some men in charge seemed to think their Laboratory was, or might become, a separate facility.)

The Field Crop Insects Laboratory (formerly called the Dominion Entomological Laboratory), under Dr. C. W. Farstad, moved into the new building in May 1949. Thus it finally vacated the upper floor of the Post Office building, which had been headquarters for entomological research in southern Alberta since shortly after World War I. Later in the spring, Dr. D. W. A. Roberts arrived from the University of Toronto to take charge of the Plant Physiology Laboratory. Preliminary studies were started in the field and greenhouse on growth relationships in winter wheat. In 1950, a Chemistry Laboratory was organized with Robert Kasting in charge.

In 1950 also, a regional library was organized under Miss Bertha M. Pehrson, who was transferred to Lethbridge from Ottawa. It was designed to serve both Science Service and the Experimental Station as well as other agricultural research institutions throughout the region.

A joint Experimental Station - Science Service Photographic Laboratory was organized and housed in a couple of basement rooms of the new building. It was headed by N. E. Kloppenborg, who had been the unofficial Experimental Station photographer from 1934 to 1941 and its official photographer from 1946 to 1949.

A bus was purchased to transport employees of the Experimental Station and Science Service Laboratory to and from the city. The first operator was G. D. (Jack) Parker, followed by Tom Forth. These men acted also as couriers, picking up mail and local purchases and doing other tasks as required.

Lethbridge Experimental Station

There was considerable expansion of the Lethbridge Experimental Station in the immediate postwar years.

A Wool Laboratory was started in 1944 and, with the help of German prisoners of war from the nearby internment camp, was completed in 1946. S. B. Slen arrived in January 1946 to take charge of the new laboratory.

In 1945, Frank Whiting arrived at the Station to take charge of a proposed Animal Nutrition Laboratory. For various reasons, the laboratory was not completed until 1948. With his own experiments and the additional data from animal husbandry files, Dr. Whiting began a prolific publishing career. Later, he and Dr. Slen cooperated in conducting and publishing a variety of studies. Drs. Slen and Whiting were the first scientists at the Experimental Station to take research publication seriously and to turn out any appreciable volume of work. Before their time, the publication of anything except extension types of information was actively discouraged by Ottawa officials.

A Plant Processing and Sugar Beet Laboratory, later called the Food Processing Laboratory, was completed in 1950. It was established in response to a greatly increased interest in vegetable, canning, and other specialty crops throughout the irrigated areas of southern Alberta. I. L. Nonnecke arrived to take charge of horticulture, assisted by W. E. Torfason. G. A. Kemp, plant breeder, and George C. Strachan, food technologist, arrived later and completed the horticulture complement.

Above
Barn dance at opening of the new dairy barn, 1951. Dr. Ruby I. Larson is preparing to milk the 'cow' while Dr. D. W. A. Roberts is holding its tail.
Center
The forage crew harvesting alfalfa plots, about 1950. James Black is operating the mower and Dr. M. W. Cormack is taking notes in the background.
Right
An entry in the Lethbridge Exhibition parade in the early fifties; teamster is Tom Zubach.

A Forage Crops Section was organized in 1944. Personnel occupied a couple of rooms in the main office and maintained a room in the PFRA building for seed stocks and equipment. These quarters became inadequate after the war, and R. W. Peake, the section head, cast about for additional space. By this time, the Station horses, which had been the main motive power, were being replaced by tractors and the horse barn was partly vacant. It was divided in half by a partition so that the Forage Crops Section occupied the south end and the remaining horses the north end. An in-joke at the time was that the horses' heads had been removed from the south end of the barn. Work on the Forage Crops Laboratory, as it was called, was supervised in part by James Black, formerly a teamster but taken on as plot foreman by the Forage Crops Section on his discharge from the Canadian Army. Eventually, the horses were removed completely and the forage crops staff took over the entire building. A lean-to was constructed to store and dry samples. A major project at the time was to breed an alfalfa that was resistant to bacterial wilt.

Work of the Forage Crops Laboratory expanded after World War II when it was decided to undertake grazing studies in the Fescue Grassland vegetation area of southwestern Alberta. In 1949, the Alberta government leased to the federal government 390 ha (960 acres) of range for a token $1 a year. The new substation was called the Stavely Grassland Substation and Alex Johnston was placed in charge. Fields were fenced, stock watering dams constructed, and headquarters built in 1949 and 1950, and 52 yearling heifers were obtained on loan from the Burns Company Flying E Ranch for use on experimental fields. Carrying capacity and other studies were started. When the Flying E Ranch was sold in about 1951, the cattle on the Substation were purchased by Warren C. Cooper of Nanton. Mr. Cooper's cattle have been used on the Substation since that time. About 1965, the name of the Substation was changed to the Range Research Substation, Stavely, Alta.

The Maloneys retired in 1946 after having served an estimated 700,000 meals to Station employees over 34 years. They were succeeded by Mr. and Mrs. John Peebles; Mrs. Peebles operated the boardinghouse while Mr. Peebles acted as Station courier. The bunkhouse was enlarged in 1948 to accommodate the large number of subprofessional employees then being taken on. In 1948, also, the Station obtained natural gas and replaced the various coal and oil stoves and furnaces that had been used in its buildings.

W. L. Jacobson, who had been seconded to PFRA in 1935, returned to the Station in 1949 to take charge of irrigation investigations. One of his first steps was to obtain a lease on 8 ha (20 acres) of irrigated land at Taber, where he set up the Taber Irrigation Substation.

Soon, it was found that the experimental area at Taber was too small. Also, the high water table there could distort results of the studies on consumptive use of water, which were an important part of the experimental program. And, finally, it was concluded that irrigation studies should be done in the driest area available, and that Taber was borderline in this respect. As a result, in 1953, the Substation was moved to Vauxhall where it occupied quarters with the PFRA Drainage Division under E. A. Olafson, and later Dr. C. D. Stewart. The new Substation was equipped largely with buildings and material from the Scandia Sheep Station and the Taber Irrigation Substation.

The machine shop in the back of the PFRA building at Lethbridge proved completely inadequate after the war. D. T. Anderson, agricultural engineer, assisted by E. W. Thurston and others, asked for better accommodations and, in 1951, a shop of cinder brick construction was built. The new shop included stores, space for a plumber and electrician, a carpentry shop, and a machine shop. It was enlarged considerably in 1962.

As early as February 1948, Mr. Palmer took steps to acquire more dry land for experimental plots. A tract of land lying to the northwest of the Station had been acquired early in the war by the Dominion government and used for a prisoner-of-war camp. Some 15,000 German prisoners of war were interned there. Dr. V. A. Wood, Director of Lands for Alberta, said in a letter to Mr. Palmer in February 1948 that the land would be retained by the province until buildings and equipment were disposed of; then it would be sold. In 1950, 38.8 ha (95.76 acres) of this land were purchased by the Experimental Station. First known as the North West Hundred, it soon acquired the name, The P.O.W.

Hours of work for prevailing-rate employees were changed after the war. The practice since 1906 had been to work 10 hours a day, with 9 hours on Saturdays. After 1946, hours were changed to 10 hours daily and 5 hours on Saturdays. The Horticulture Section argued against this, claiming that they could not complete their program of work with the shortened hours. And, in fact, they continued to work a 9-hour Saturday for another year or so. By the mid-fifties, the Station was on an 8-hour day with 4 hours on Saturdays and, by the late fifties, the 5-day, 40-hour work-week was instituted. These figures are, however, approximations because the Station staff has always been plagued by the problem of having different hours of work for different classes of employees. Generally, the lower the classification, the longer the hours of work.

A. E. Palmer guided the Experimental Station through the exciting postwar expansion period and directed its research program for 8 years. During that time, he was involved in the expansion of irrigation in the region, particularly in an assessment of the abortive Red Deer diversion scheme, the successful St. Mary River development project, and the Vauxhall-Hays expansion. He retired from the Lethbridge Experimental Station in 1953 and was succeeded by Mr. Herbert Chester, who had come to Lethbridge as illustration stations supervisor in 1934.

Mr. Palmer was internationally known as an agricultural scientist. He possessed compassion, tact, and patience and was well suited to direct research scientists. His speciality was irrigation, yet his fame lay in his contribution to dryland agriculture. Unlike many people he retained an unshakable faith in the future of Canada's Palliser Triangle during its most difficult period, and was credited with being one of the six men who did most to save the agriculture of the western prairies during the thirties. As James H. Gray pointed out in his book *Men Against The Desert*, Mr. Palmer had a respect for the soil that bordered on reverence. He had, Mr. Gray went on to say, a sense of serving God by his husbandmanship of the earth.

Chapter 10. The Manyberries Range Experiment Station

The Manyberries Range Experiment Station throughout most of its history was more closely linked administratively to the Swift Current Experimental Station than to the Lethbridge Experimental Station. Yet the relationships among scientists at Manyberries and Lethbridge were always close. In 1964, when it was decided to unite the Manyberries Station with a larger facility, the Lethbridge Research Station was considered to be the appropriate one.

Before 1912, the beef industry on the open range was thriving, but little information had been recorded about the best methods of using rangeland. When the range became overgrazed in one place, ranchers could simply move their cattle to a new area. Once settlers arrived, however, and the open range was split up into closed lease-lands, some areas became overgrazed. By 1925, a demand arose for experimental work. After a series of meetings between personnel of the Experimental Farms Service and representatives of stockmen's associations, it was decided to undertake experiments to obtain information on how to improve the carrying capacity of the range.

The Experimental Farms Service ordered L. B. Thomson and S. E. (Doc) Clarke, stationed at Swift Current, to make a reconnaissance survey of the rangelands in southern Alberta and southern Saskatchewan in 1926. They studied conditions on the various ranches to learn what steps might be taken to help solve the problems in the various grazing areas.

Dr. L. B. Thomson, Superintendent of the Manyberries Range Experiment Station, 1927-1935.

They found that problems were more acute in the drier parts of the range than in the moister parts. They decided that experimental work should concentrate on the dry area, with the idea of branching out to other grazing areas as work progressed. As purchasing and equipping an Experimental Ranch appeared to be too costly a venture, they decided that it would be more economical and more useful to cooperate with some rancher of long experience. Gilchrist Brothers Limited of Vidora, Sask., offered their cooperation.

The area selected was 6315 ha (15,590 acres) in Township 2, Range 4 (west of the 4th meridian), in Alberta, where there were suitable sites for watering facilities. The Experimental Farms Service agreed to pay for the lease; to construct all necessary corrals, fences, and buildings; and to provide scales and other equipment. The Gilchrist brothers agreed to provide the cattle for the experimental work, to undertake the work on cattle management, and to winter the cattle. The agreement, signed early in 1927, marked the birth of the Dominion Range Experiment Station, Manyberries, the first of its kind in Canada.

A small laboratory for range forage supplies and equipment, and a cookhouse, were built. An old house from the Blacktail Ranch was moved in and became the combined office and staff living-quarters. Two old homesteader shacks were moved in for use as bunkhouses.

Mr. Thomson started investigations into continuous, rotational, and deferred grazing systems; the behavior of cattle, as an aid to encouraging uniform grazing; the development of stock watering facilities, notably the building of earthen dams to store spring runoff; the measurement of gains of different classes of livestock; the preservation of fence posts; the initial cost and upkeep of fences; and the reseeding of abandoned cultivated lands. Meanwhile, Dr. Clarke began studies on native vegetation; the effects of various grazing practices upon the vegetation; improvement of range pastures through reseeding, surface cultivation, and the application of fertilizers; and the growing of cultivated forage crops.

A dryland plant nursery was established in 1929. A dam was constructed just north of the building site for irrigating trees, gardens, and forage crops. Over 4,000 trees supplied by the Forestry Station at Indian Head and a number of fruit bushes and perennial flowers and shrubs from the Morden Experimental Station were set out in the spring of 1929. Sixteen hectares (40 acres) of land were broken, prepared for irrigation, and seeded for hay crops and forage plots. An artesian well was dug and provided water and natural gas for the buildings.

The project to study the behavior of grazing cattle was started in spring 1929 by Mr. Thomson. Thus, Morgan Brock spent the first months of his employment observing the feeding, sleeping, idling, and other activities of cattle from dawn, when cows first began to move, until they were bedded down for the night on two consecutive days twice each month. For equipment, he had a notebook and field glasses.

Ed Tisdale was appointed as a graduate assistant in 1930 and served in that capacity until his transfer to Kamloops, B.C., in 1935.

N. A. (Andy) Skoglund began his duties as graduate assistant in May 1931 and worked on range vegetation and forage crops until September 1944.

A study of carrying capacity involving three intensities of grazing with cattle began in April 1931 and was the first of its kind in Canada. A study of rotational-deferred grazing at various stocking rates was also undertaken.

After 5 years of studies, Mr. Thomson and Dr. Clarke concluded that, no matter which system of grazing was used, from 20 to 25 ha (50 to 60 acres) of range were required to maintain an animal throughout the year. In the reseeding of abandoned lands, they found that crested wheatgrass was the most suitable of all the crops and varieties tested.

The policy on the Range Station was to conduct most of the investigations in cooperation with stockmen. Thus, a great deal of work was carried out with little expenditure. As well as the work at the Range Station, there were cooperative studies on corn growing, at Maple Creek and Vauxhall; reseeding and fertilizing pastures and hay meadows, in the Cypress Hills; reseeding, on forest reserves in western Alberta; fertilizing alfalfa, at Medicine Hat; and feeding cattle on pasture with supplemental grain, at Medicine Hat.

New additions to the staff in 1934 included Harry J. Hargrave and J. A. (Scotty) Campbell.

In 1935, the Animal Husbandry Division undertook an important project to develop a more suitable breed of sheep for the

range areas in Western Canada. A secondary aim was to develop a white-faced breed with good mutton and wool qualities, which could also be crossed with mutton breeds under farm conditions and used for fat lamb production. Foundation stock consisted of 15 purebred Romney-Marsh rams imported from William Riddell, Monmouth, Oregon, and 520 Rambouillet ewes from the range flocks of the Gilchrist Brothers and Green and Company ranches in the district. The project resulted in the registration of the Romnelet breed of sheep in 1961.

Mr. Thomson left for Swift Current in May 1935 to become Superintendent of the Experimental Station there. Harry Hargrave became acting superintendent of the Range Station, and assistant superintendent in 1936; in 1939, he was promoted to the positions of Superintendent of the Manyberries Range Experiment Station and of the grazing substation at Kamloops, B.C. J. Baden Campbell and George D. Chattaway began work in May 1936 as summer-student laborers.

One of the most disastrous droughts on record occurred during the summer of 1936. The drought was a severe test of the Range Station's water development, which consisted of 17 earthen dams and dugouts built of many soil types in various pastures. At no time in the summer or fall was there a shortage of water for livestock; the reservoirs continued to provide a satisfactory supply of water even after many springs and natural water holes had dried up. This work was invaluable to PFRA in planning a water-conservation program for Western Canada.

Mr. H. J. Hargrave, Superintendent of the Manyberries Range Experiment Station, 1935-1947, and Superintendent of the Range Substation at Kamloops, B.C., 1939-1941.

During the summer of 1937, extensive studies began on contour furrowing, dyking, and terracing, and other types of structures for conserving and spreading runoff water to increase and improve growth of native pastures.

The studies of carrying capacity were expanded to include grazing with sheep. The first cycle of grazing by cattle was completed and another cycle started. The results emphasized again that the carrying capacity of the rangeland at the Range Station was about 25 ha (60 acres) a head for cattle on a year-round basis. A carry-over (the ungrazed grass at the end of the grazing season) of about 50% was required to keep the vegetation healthy and productive. The results of the studies on carrying capacity were fundamental in planning larger grazing surveys under PFRA. The pasture survey was one of the activities provided for under the cultural section of PFRA and was conducted on privately owned ranches, community pastures, and special areas throughout the three Prairie Provinces. The surveys included information on the vegetational cover; its botanical composition, density, and nutritive value; the carrying capacity of the areas studied; and the management of the pastures.

In cooperation with the Economics Division of the Dominion Department of Agriculture, the Range Station began a detailed economic survey of the range cattle industry in the fall of 1938. Drought and farm abandonment showed that an economic picture of the cattle industry was necessary before land-use policies could be established for range areas.

The survey covered range areas in Saskatchewan, Alberta, and British Columbia.

A combined office, utility, and bunkhouse building was completed in the fall of 1939. This building provided permanent quarters for employees and accommodation for overnight visitors. It was also useful for Field Day gatherings, meetings, and other community functions.

In 1940, the forage crops report stated: 'Under dryland conditions, crested wheatgrass, Russian wildrye, and a few species of *Agropyron* are the only outstanding species. Several species appear to be drought tolerant, but none equal crested wheatgrass. *Astragalus cicer* and *Medicago falcata* seem to be the leading drought resistant legumes . . . Russian wildrye produced an abundance of leafage but failed to head out . . . It may be possible to stimulate seed production by mowing this grass in the leaf stage.'

Dr. Hobart F. Peters, Superintendent of the Manyberries Range Experiment Station, 1947-1964.

During the next 5 or 6 years, research was reduced because of the war. The collection of data on carrying capacity for cattle was curtailed, but the Romnelet sheep breeding project and the study for wintering calves were continued. The study of carrying capacity for sheep was stopped because of predations by coyotes and lack of help. However, the range survey and the regrassing programs, as well as some forage and range studies, went on.

Fundamental information obtained at the Range Station was used in 1941 to develop an improved rangeland policy for Alberta. The policy, developed by the Short Grass Stock Growers' Association and provincial land administrators, based the rental value of rangeland on its productive capacity. The Range Station carried on range surveys to obtain information on the proper use of ranges administered under the new agreement.

When the war was over, more funds became available to operate the Range Station and more help was acquired. Hobart F. Peters arrived in April 1947 to become Officer-in-Charge upon Harry Hargrave's transfer to Swift Current as head of the Animal Science Section there.

Manyberries Range Experiment Station over the years:
Above
July 1927. Dr. S. E. Clarke and his tent at Federal Ranch southeast of Manyberries—original site of MRES.
Center
1928. Old shacks used as temporary buildings.
Below
1930. Left to right: office, Forage Laboratory, bunkhouse, cookhouse.
Opposite page · Above
1935. Office left, residence right.
Opposite page · Center
1939. Office and utility building completed.
Opposite page · Below
1964. Office and laboratory building.

Plans were made to reestablish some of the experiments and start new ones. R. T. (Bob) Coupland and W. A. (Bill) Hubbard, from the Swift Current Experimental Station, spent the summer of 1947 gathering vegetation data by point sampling in the carrying-capacity fields, the enclosures, and other fields, and also by charting the permanent quadrats in the carrying-capacity fields.

Experiments begun in 1948 included a study of carrying capacity with cattle, a breed comparison of the Corriedale and Romnelet sheep, a cobalt status survey, determination of seasonal yield and nutritive value of crested wheatgrass, and major ecological studies. Introduction nurseries were established on dry land, spring-flooded land, and irrigated land.

An important shift in the research program at the Range Station began in 1949. Because of the scientific interest in crossbreeding, part-Brahman calves obtained from Streeter Brothers of Stavely were placed in a feeding test and carcass study, and compared with Hereford calves. Also included in the study were calves of cattalo, an experimental cross between cattle and the native bison or buffalo. The calves were brought in from Wainwright in November. An expanded program in forage crops and range management was started by Bill Hubbard, assisted by Sylver Smoliak who was appointed as assistant in agronomy in June and agrostologist in 1953.

Plans were made to acquire more grazing land for the cattalo herd and, in 1950, 1555 ha (6 sections) of land were acquired from Bert Foster to increase the holdings to 8815 ha (21,760 acres).

The cattalo herd was transferred from Wainwright to the Range Station, where better facilities and a trained technical staff were available. (The Wainwright Buffalo Park was established in 1908 to accommodate buffalo purchased by the Canadian government in Montana. Most of the buffalo were shipped to Wood Buffalo National Park in the twenties and the remaining animals were destroyed when Wainwright Buffalo Park became a military reserve in 1941. The cattalo experiment, begun many years previously, was accommodated in a corner of the military reserve until 1950.)

The cattalo bulls were moved in June 1950, then sperm counts were made by Hobart Peters and Fred Kristjansson of the Central Experimental Farm, Ottawa. Of 16 bulls tested, 4 showed signs of fertility, 2


1


2

Various animals from the cattalo project at the Manyberries Range Experiment Station, 1960.

1. *Fertile 1/8-bison bull, 5 years old*
2. *Fertile 3/16-bison bull, 2 years old*
3. *Fertile 3/16-bison bull, 3 years old*
4. *Angus × bison hybrid cow, 21 years old*
5. *Fertile 1/8-bison bull, 6 years old*
6. *Hereford × bison hybrid cow, 21 years old*
7. *One-quarter-bison cow, 6 years old*
8. *One-eighth-bison heifer, 18 months old*
9. *One-seventh-bison cow, 3 years old*


3


4


5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would not breed, and the remaining 10 showed no sign of fertility and were shipped for slaughter. In September, two truckloads of hybrids (one-half bison) and five railway stock cars of cattalo cows (one-quarter bison or less) completed the transfer. The 39 hybrids consisting of 10 Hereford × bison, 25 Angus × bison, and 4 Shorthorn × bison ranged in age from 11 to 17 years. The female cattalo comprised 65 cows and 19 heifers. The cattalo were tested to determine whether they could combine the winterhardiness of the bison and the beef-producing ability of domestic cattle. The main problem was male sterility. No fertile first-cross or first-backcross bulls were ever found, but bulls ranging from 75% to 96% domestic were found to have normal fertility. The cattalo did not paw to uncover the grass on snow-covered ranges; however, the hybrids burrowed with their muzzles through deep snow. The cattalo experiment was discontinued in 1964 after it had been shown that progress could be made through selection for fertility and growth rate. Much useful information on crosses between different species came from the project, but the breed did not seem to have characteristics important enough to justify carrying it further.

A crossbreeding experiment with Brahman cattle began in July 1950 in cooperation with Henry and James H. Mitchell of Battle Creek, Sask. They provided a Brahman bull, 13 Shorthorn cows, and 10 Aberdeen Angus cows for the project. The Range Station agreed to provide 12 or more Hereford cows and to keep, feed, and care for all animals involved in the experiment until November 1955. The first Brahman bull, Madera Tippu 2nd, supplied by George G. Ross, Sr. and used in the breeding program during the summer, died on November 19 when the temperature dropped to -24°C (-12°F). His replacement was housed in a closed shed throughout the following winters. Some of the heifer calves from these crosses were retained for a lifetime-productivity study in comparison with the Hereford breed. The crossbreds wintered with the other range cattle and made equal body weight gains. They were active and foraged willingly away from the feed-grounds whenever the Herefords were able to graze. The performance of the Brahman crossbreds exceeded expectations.

An additional 3100 ha (12 sections) of lease-land were acquired in 1951 from Mrs. Mabel Wetherelt of the Onefour district. The land contained some excellent winter range along the Lost River coulee.

The landholdings were increased again in 1952 to accommodate the sheep flock. Another 4400 ha (17 sections) of land were purchased from R. A. Fries and J. H. Stutsman to bring the total area to 16 850 ha (41,600 acres).

Studies on grazing Russian wild ryegrass, crested wheatgrass, and native range were begun in 1954 when 60 ha (150 acres) of prairie were broken. Part of the land was seeded with Russian wild ryegrass and part with crested wheatgrass in the spring of 1955. The areas were cross-fenced and yearling ewes were grazed on the various pastures in April 1957. The study established that Russian wild ryegrass was as productive as crested wheatgrass, but it excelled as fall pasture. The seeded grasses produced about twice as much forage as native range and animals gained about three times as much weight on an equivalent area of land. The seeded pastures were stocked three times as heavily as native range.

A recommendation from Ottawa that animal breeding should have priority over range management research at Manyberries resulted in an active construction program at the Range Station. A Quonset shed for cattle feeding was built in 1957; a garage and shop, duplex residence, and an office-and-laboratory building in 1958; and an assembly hall and another duplex in 1960. Cattle and sheep corrals, cross-fences in breeding pastures, and a number of water developments were also constructed.

The cattle breeding project with purebred Hereford and Angus cows was revised to include two lines of 30 animals of each breed. By 1958, 46 Hereford and 52 Angus cows were acquired for the project. The male calves were fed a performance-testing pelleted ration, but they frequently became bloated because of the high proportion of finely ground alfalfa hay in the pellets. Use of coarser-ground alfalfa and larger pellets almost eliminated the bloat problem.

A range regrassing program, based on the results of the grazing study of cultivated grasses, was set up in 1959. Although it was designed to provide pasture for cattle during the breeding season, the main objective of the regrassing program was to increase productivity of rangeland and to show ranchers and farmers that such a program was feasible. In separate studies, the

grazing capacity of the seeded pastures, the production life of the stand, and methods of management were determined. These results were disseminated to farmers and ranchers through Field Days, field demonstrations and tours, short courses and meetings, and the press. Many of them proceeded to regrass parts of their holdings. Other organizations such as PFRA, Agricultural and Rural Development Administration, provincial departments, grazing reserves, and community pastures began regrassing programs to increase rangeland productivity.

A breed development program in cooperation with Ross Ranches began in 1963. Holstein and Brown Swiss bulls (the same bulls that were used in the breeding of the Hays Converters) were crossed with Hereford range cows in 1963 and 1964. Some Red Angus and Shorthorn cows were introduced into the program. Selection of bulls and heifers for replacement was based on yearling weight. A group of Hereford cows was maintained as a control so that the rates of improvement in the two herds could be compared.

An important change in the role of the Manyberries Experimental Farm occurred in 1964. The professional and technical staff were transferred to the Lethbridge Research Station, although the support staff remained at Manyberries. The livestock phase of the program came under the supervision of S. B. Slen, Animal Science Section, and the forage crops phase under R. W. Peake, Plant Science Section. The Director of the Research Station, Dr. T. H. Anstey, assumed responsibility for administration and direction of the operation. Because of this amalgamation, funds could be used more efficiently and the program of research was diversified. The Manyberries Experimental Farm thus became a Research Substation.

Even the name was changed. The post office address since 1927 had been Manyberries but, in 1965, it was discovered that about $1,200 a year could be saved in postal charges simply by changing the postal address to Onefour. This was possible because, years before, there had been a designated post office at a farm home in Township 1, Range 4. The old post office was moved a few miles north to the Range Station headquarters and the Onefour Range and Livestock Research Substation came into being.

The integration of research and administration with the Lethbridge Research Station on July 13, 1964, marked the end of the Manyberries Range Experiment Station. After 36 years, it left its mark in the range areas of southern Alberta and southwestern Saskatchewan and in the Northern Great Plains of the United States.

Aerial view of the Manyberries Substation in 1963.

Chapter 11. Amalgamation

A general meeting of staffs of the Experimental Farm and Science Service Laboratory, March 13, 1959, at which Dr. T. H. Anstey explained amalgamation of the two institutions.

With the expansion of the Experimental Station in the postwar period and the creation of the Science Service and Livestock Insect laboratories, a major agricultural research establishment came into being at Lethbridge. Although there was complete cooperation among scientists and technicians, each organization was separately administered and there was considerable duplication of services.

In 1951, administration of the Livestock Insect Laboratory was placed under Dr. W. C. Broadfoot, Director of the Science Service Laboratory. This was bitterly resented by R. H. Painter, as the Livestock Insect Laboratory was essentially his creation and he had administered it from the beginning. But the name of the Livestock Insect Laboratory was changed to the Veterinary-Medical Entomology Section of the Science Service Laboratory and Mr. Painter became a liaison officer (livestock insects) for the four western provinces.

The Science Service Laboratory and the Experimental Farm (in 1954, all Experimental Stations were renamed Experimental Farms) continued to be separately administered for several more years. Their research programs went on, however, that of the Experimental Farm at a much faster pace than during the prewar period. The activity reflected a larger staff, more facilities, and greater availability of equipment.

A factor that was to have a great influence on research attitudes and accomplishments was postgraduate study during the decade of the fifties. After the war, veterans were able to take university training under the federal Department of Veterans Affairs (DVA) Re-establishment Credits Program. A few scientists took postgraduate study under the DVA program, and many others took their first degree under it. Shortly after the war, the federal Department of Agriculture instituted a policy whereby professional employees could take postgraduate work and receive half-pay while doing so. The policy was an immediate success, and many men and women took advantage of it to get M.Sc. and Ph.D. degrees. In the immediate postwar period, employees with bachelor degrees outnumbered employees with doctorate degrees, whereas by 1960 the latter far outnumbered the former. The contacts made with other workers, professors, and students, and the informal discussions on methods, techniques, and equipment were as valuable to the research program as were the advanced courses taken for degrees. The intellectual stimulus of people going to and coming from many universities made the decade an exciting one for all employees. All these things had a profound effect on the research by personnel of the Science Service Laboratory and Experimental Farm.

The intellectual stimulus of the fifties was illustrated by the number of publications emanating from the Experimental Farm and Science Service Laboratory. In 1950, about 10 papers were published, whereas in 1960, nearly 70 appeared in print.

Early in the decade, an important research contribution was made by Dr. John T. Slykhuis, a plant pathologist, who discovered the vector (carrier) of the wheat streak mosaic disease. Dr. Slykhuis showed that the virus causing wheat streak mosaic was transmitted by a mite. At the time of writing, it remained the only Canadian discovery of an arthropod vector of a plant virus.

Much research time was devoted to the study of the wheat stem sawfly during the fifties. Dr. C. W. Farstad's enthusiasm had much to do with this as he stimulated other scientists to study the problems. Drs. Ruby I. Larson and M. D. MacDonald studied inheritance of the solid stem character, which made wheat plants resistant to sawfly attack.

Dr. Hugh McKenzie crossed Rescue and Chinook hard red spring wheats and, in 1962, released the variety Cypress. Chinook, released in 1952, was largely the work of Arnold W. Platt and replaced Rescue, the first of the solid-stemmed bread wheats. Drs. A. J. McGinnis and R. Kasting and Mr. L. E. Lopatecki studied nutrition of wheat stem sawfly larvae. Drs. R. W. Salt and N. S. Church assessed cold hardiness and hormone activity in the wheat stem sawfly. Alice M. Wall determined the sex ratio in populations of the sawfly while Margaret R. Mackay

Above
The 50th anniversary celebration, July 25, 1956, which featured the unveiling of a large prairie boulder and attached plaque.
Opposite page
Destruction of the dairy barn by fire, August 10, 1959.

studied the cytology of the insect. Dr. D. W. A. Roberts investigated the physiology of resistance of wheats to the sawfly. And, finally, Drs. Farstad and N. D. Holmes and Mr. L. K. Peterson conducted field studies on the insect, looking particularly at the effects of tillage on populations, the effects of shading on the solidness of wheat stems, the effects of wheat variety on sex ratio in sawflies, parasitism, weather relationships, and the nature of resistance of wheat to the sawfly. At one time, 21 people from Lethbridge and throughout Saskatchewan were working on the wheat stem sawfly.

The Experimental Farm celebrated its Golden Anniversary in 1956. Mr. H. Chester was Superintendent, after a career at Lethbridge as illustration stations supervisor from 1934 to 1945 and head of field husbandry from 1945 to 1953. Special features were run in *The Lethbridge Herald*, and television station CJLH-TV (later CJOC-TV) paid tribute in a special program. Guests on the program were Dr. W. H. Fairfield, Mr. A. E. Palmer, and Mr. H. Chester, the Station's three superintendents. A 5.5-tonne (6-ton) prairie boulder, symbolic of the parent soils of the region, and attached plaque were unveiled in commemoration of the 50th anniversary and in honor of Dr. Fairfield, first Superintendent of the Farm.

An important project of the Forage Crops Section of the Experimental Farm during the period was the development of a bacterial-wilt-resistant alfalfa. The wilt project began with the creation of the Forage Crops Section in 1944 and received further impetus about 1946 when Dr. M. W. Cormack, pathologist at the Plant Pathology Laboratory, Edmonton, and Dr. J. L. Bolton, plant breeder at the Dominion Forage Crops Laboratory, Saskatoon, were named cooperators with R. W. Peake, Lethbridge. The project was later successfully concluded with the release of the bacterial-wilt-resistant variety Beaver in 1961.

Irrigated pasture studies, started on the Experimental Station as early as 1912, also received new impetus during the fifties. Mr. Peake, head of the Forage Crops Section, laid out the original plots that resulted in a recommended pasture mixture containing orchardgrass, creeping red fescue, bromegrass, and white clover. In 1953, scientists D. B. Wilson of the Forage Crops Section and R. D. Clark of the Animal Husbandry Section began replicated experiments on irrigated pastures with sheep as the grazing animal. Later studies were conducted with cattle. The investigators found that irrigated pastures of the region had a high carrying capacity. One hectare could support 4.9 animal units (2.0 animal units per acre) for a 120-day grazing period.

The Cereal Breeding Section was interested in sawfly resistance in the spring wheat breeding program, winterhardiness in the winter wheat breeding program, and high yield in the feed and malting barley breeding programs. The work of W. D. Hay came into its own during the fifties when a troublesome wheat surplus developed from about 1954 to 1960. He had experimented with a variety of crops and was in a position to advise farmers when they tried desperately to find a crop that could be grown and would return immediate revenue.

The horticulture research program during the fifties was divided into four phases. Trials were conducted by Dr. I. L. Nonnecke and W. E. Torfason to find out which varieties were best adapted to the irrigated and dryland areas of the region. Breeding and selection programs were undertaken by Dr. G. A. Kemp to develop varieties that would be suitable for the vegetable-processing industry, with particular emphasis on the tomato. Other experiments were conducted to determine the best cultural practices for growing small fruits and canning crops. And, lastly, research was conducted by G. C. Strachan on the processing and nutritive merits of

varieties found suitable for the region; a Food Processing Laboratory was operated for this purpose.

Much of the research in field husbandry was the same as it had been for many years: rotations, tillage experiments, soil fertility studies on irrigated and dry land, and investigation of plowless tillage and trash cover. Weed research, under J. J. P. Sexsmith, involved studying the effect of herbicides on wild oats growing in canning peas or sugar beets, on mixed annual weeds in canning peas, and on Russian thistle in flax, as well as studies on hoary cress.

There was some building activity during the period. In 1954, the Science Service Laboratory erected a metal barn designed to house 100 cattle and 120 sheep for experimental studies on livestock insects. The north wing of the new barn was built to house environmental control studies, but it was never completed.

In 1955 on the Experimental Farm, a building for cereal breeding work was constructed, something that A. W. Platt had fought for before his resignation in 1951. The old sheep shed, built in 1919-20, had become an eyesore and was demolished in 1957. The Experimental Farm drew up plans for several buildings in 1958 including a new administration building, a field husbandry work building, a calf barn and dairy barn extension, an open-front sheep shed, a tractor storage building, and a climatic laboratory for farm livestock research. Mr. Chester, the Superintendent, had heard rumors of a possible reorganization of the Experimental Farms Service and Science Service and recognized that the building program might be curtailed. And, in fact, none of the buildings were constructed before 1962. The problem of the calf barn and dairy barn extension solved itself in October 1959 when the existing dairy barn caught fire from a malfunctioning bale loader and burned to the ground. The requested building became part of the dairy barn complex when it was rebuilt.

The year 1959 was of great significance in the history of the Experimental Farms Service and Science Service. Dr. C. H. Goulden, Director of Experimental Farms, and Dr. K. W. Neatby, Director of Science Service, undertook to amalgamate the two organizations into one Research Branch.

Rumors of the impending amalgamation were heard as early as May 1958 and were mentioned in a letter that H. Chester, Superintendent of the Lethbridge Experimental Farm, wrote to Ottawa at that time. The rumors became official when a memorandum was sent to directors and superintendents of the two services on September 12, 1958.

Lethbridge was one of six regional centers where an Experimental Farm and a Science Service Laboratory had to be brought under one Director. The plan became effective on April 1, 1959, and Dr. T. H. Anstey was appointed the first Director of the newly created Research Station. Dr. W. C. Broadfoot, Officer-in-Charge of the Science Service Laboratory, and Mr. H. Chester, Superintendent of the Experimental Farm, became associate directors.

Mr. E. A. Olafson, Chief, PFRA Drainage Division, Vauxhall, 1949-1952, 1956-1961.

Dr. Anstey was a native of Victoria, B.C. He joined the army in 1942 and was one of a number of young Canadian lieutenants who volunteered for active duty with the British Army under the Canloan project, a group that suffered very heavy casualties. He joined the Agassiz Experimental Farm in 1945 as a horticulturist and, later, took a Ph.D. in plant genetics. In 1952, he became Superintendent of the Summerland Experimental Station and, at 35, was the second youngest man to hold such a position. Only W. H. Fairfield, who became Superintendent at Lethbridge at age 32, was younger. In 1958, Dr. Anstey was appointed Superintendent of the Kentville Experimental Farm and he moved from there to Lethbridge in 1959.

The Lethbridge Research Station, one gathers, was the cause of some unease in official circles. It was by far the largest of the regional research stations and was made up of two rather diverse groups of scientists. Science Service personnel had embarked on a course of research in depth; Experimental Farm personnel, with some exceptions, conducted research to provide direct answers to practical questions. Science Service personnel, with the exception of crop entomologists, had little to do with the farming public; Experimental Farm personnel had a long tradition of working directly with farmers. And, rumor had it, Science Service personnel were better paid on the average than Experimental Farm personnel. Thus, the new Director had to gain the respect and confidence of a large staff of professional men and women working in many different fields of research. Also, he was judged critically by the region's agricultural producers with their varied interests.

In practice, the process of amalgamation at Lethbridge was accomplished with surprisingly few problems. Dr. Anstey made every effort to keep the staff fully informed and called general meetings to explain decisions and to provide a forum for discussion of difficulties. He was aided greatly by the presence on the Station of C. P. (Cleo) Gubbels, a particularly able administrative officer. Mr. Gubbels restructured the administrative units of the former Experimental Farm and Science Service Laboratory and made them function smoothly as one.

With the reorganization that became effective on April 1, 1959, the Division of Illustration Stations ceased to exist. At Lethbridge, A. Douglas Smith supervised 10 district experiment substations located at Acadia Valley, Bindloss, Claresholm, Craigmyle, Drumheller, Foremost, Lomond, Nobleford, Pincher Creek, and Whitla. The farm of R. H. Babe at Whitla had the distinction of being the oldest Illustration Station in Canada at dissolution. It had been one of the first selected by Dr. J. H. Grisdale and W. H. Fairfield in April 1915 and, when the program was discontinued in 1959, it was still being operated by the son of the original owner.

Part of the process of amalgamation involved moving technical personnel from the Vauxhall Irrigation Research Substation into Lethbridge. The Substation had started in 1953 when the Taber Irrigation Substation closed. W. L. Jacobson was Officer-in-Charge until his retirement on June 20, 1958; Dr. L. E. Lutwick took over as Acting Officer-in-Charge on July 1, 1958. Other scientists were K. K. Krogman, responsible for soil fertility investigations, who had conducted studies at Youngstown, Alta., and Skookumchuck, B.C.; L. G. Sonmore, for soil moisture investigations; and E. H. Hobbs, for irrigation engineering and meteorology. Mr. Krogman was living in Lethbridge and commuting to Vauxhall at the time of amalgamation; the others moved to Lethbridge during the summer and fall of 1959.

After amalgamation, staff of the PFRA Drainage Division, who had shared laboratory facilities at Vauxhall with staff of the Irrigation Substation, became part of the Research Station. The group continued to work at Vauxhall until 1961 because accommodations at Lethbridge were limited.

To sum up, amalgamation in 1959 joined together the Science Service Laboratory, with its sections of Crop Entomology, Chemistry, Veterinary-Medical Entomology, and Plant Pathology; and the Experimental Farm, with its sections of Animal Husbandry, Cereals, Field Husbandry, Forage Crops, and Horticulture, the Grassland Research Substation at Stavely, and the Irrigation Research Substation at Vauxhall. The PFRA Drainage Division, Vauxhall, joined the Research Station in 1961. The Manyberries Experimental Farm did not become part of the Research Station until 1964.

Amalgamation of the Experimental Farm and the Science Service Laboratory was the most significant restructuring of Lethbridge research establishments ever to occur. It set the stage for the mission-oriented, multidisciplinary research programs that followed.

Dr. C. D. Stewart, Chief, PFRA Drainage Division, Vauxhall, 1952-1956.

Chapter 12. The Sixties

The decade of the sixties at the Research Station was a time of consolidation with little expansion. The scientific climate changed. Until the mid-fifties, most people regarded science as an interesting and important phase of human activity but one that did not touch their lives closely. By the sixties, almost everyone recognized that many of the changes, for better or for worse, that had come about in their lives had been initiated by science. People everywhere came to fear the growth of science as the source of new weapons to destroy them, of automation that would leave them unemployed and in poverty, and of a technologically dominated social structure that would leave little room for man's nobler aspirations. At the same time, people hailed science as a benefactor contributing in an important way to better health, to the removal of drudgery, and to many improvements in the quality of life.

At Lethbridge, the changed attitude toward science manifested itself in a freezing of positions, both of scientists and of supporting staff, and a cutback of appropriations. As a result, the Research Station underwent a period of austerity, which was in marked contrast to the optimism and buoyancy of the postwar period.

Dr. H. J. Perkins, biochemist, discussed some of the effects of austerity at the time of his resignation. As was customary, he resigned by means of a letter to the Director. But he sent copies to *Macleans Magazine*, *The Lethbridge Herald*, the Minister of Agriculture, and the local Member of Parliament, Deane R. Gundlock. Officials of the Research Branch took a jaundiced view of Dr. Perkins' action in releasing the letter to the press, but they were mostly sympathetic to his contentions regarding the state of Canadian agricultural research.

Dr. Perkins made several points in his letter. First, he indicated that an alarming and increasing number of Canadian scientists were moving to the United States. Second, the government refused to support its scientists adequately. Third, austerity resulted in the curtailment of travel to scientific meetings and seriously hindered the government scientist in the personal exchange of research ideas with his colleagues. Fourth, petty annoyances existed such as a ruling whereby scientists at Lethbridge had to sign in once a day to prove they were actually at work.

Perkins' letter provoked a reaction from many quarters. Dr. Robert Glen, Assistant Deputy Minister of Agriculture (Research) commented to Dr. S. C. Barry, Deputy Minister of Agriculture, that '. . . [the] letter reveals a state of feeling that is more widespread than we would like to believe. We need to announce an end to further staff deterioration and a progressive policy to match the competition we face.' Dr. J. A. Anderson, Director-General of the Research Branch, sympathized with Dr. Perkins and felt that he should have discussed housing of government scientists who '. . .must be classed as the worst housed scientific staff in Canada.' And Dr. T. H. Anstey was generally in agreement with Perkins' statements.

One of Dr. Anstey's most important contributions came soon after amalgamation. He took the Lethbridge Research Station from dependence on mechanical calculators into the computer age.

In 1960, before he resigned, Dr. Perkins played a part in this advance. He was in touch with a chemist at the Department of National Defence's Suffield Experimental Station at Ralston, Alta., and on one of his visits there he was shown the Stantec Zebra digital computer, then in use at that Station. He conceived the idea that it might be possible for the Research Station to use the Suffield computer for analysis of experimental data. Dr. Perkins returned to Lethbridge and discussed these findings and ideas with Dr. Anstey.

Dr. Anstey visited Suffield and met the Chief Superintendent, A. M. Pennie. Dr. Anstey found that there was considerable free time available on the computer, and Mr. Pennie asked for an example of the type of work that would be required. At the time, Dr. I. L. Nonnecke, head of the Horticulture Section, had data from a series of vegetable uniformity trials that he wanted to have analyzed. Programmers at Suffield spent nearly 2 weeks in transferring the data onto tapes. Then the tapes were run through the computer and, in a few minutes, Dr. Nonnecke had the results. After this demonstration, Dr. Anstey, Dr. S. A. Wells, and Mr. A. L. Lagler went to Suffield and took a course in the use of the Zebra computer. In turn, they taught others how to use the machine.

At Lethbridge, a teletype-keypunch machine was installed in an office in the Biology Building. Mr. Lagler acted as keypunch operator and did whatever typing and editing were necessary in connection with submitted data. He took the completed material to Suffield and ran it on the computer, always after 5:00 p.m. Data were returned to Lethbridge in tape form and were put through the teletype machine so that printouts could be obtained.

The Suffield Experimental Station changed from the Stantec Zebra to an IBM 1130 computer in 1966. The latter used punched cards instead of tape, but a tape-reading facility was available to help in the transition from one computer to the other.

The services of a Univac 1108 computer were rented from a Calgary firm by the Station in 1971. A computer terminal and keypunch machine were set up at Lethbridge on the second floor of the old horse barn, built in 1931 but more recently used as the Forage Crops Laboratory.

In 1960, also, the highway from Lethbridge to Coaldale was widened to four lanes. Station officials discovered that the land required to widen it included plot No. 1 of rotation U, which would be destroyed. This irrigated crop rotation, started by Dr. W. H. Fairfield in 1911, was the oldest such rotation in North America, and useful results were still being obtained from its study. After discussion, it was decided to move the plot.

According to Dr. G. C. Russell, head of the Soil Science Section, '. . . the move upset the physical condition of the soil of the plot but this was not one of the features of the experiment. The chemical aspect was not changed, and that was the important consideration.'

As the Station grew during the late fifties, lack of adequate water pressure in the mains became an increasing problem. There were times when it would have been impossible to fight a fire, for example. Water pressure in taps on the second and third floors of Station buildings was so low that only a trickle could be obtained at times of peak flow. The reason was that the Experimental Farm, Science Service Laboratory, and Provincial Jail shared a 15-cm (6-inch) water line, and its capacity was inadequate. In 1962, a 20-cm (8-inch) water line was put in from city mains to the Lethbridge Research Station and pressures became sufficient for all needs.

Construction during the period included a large addition to the machine shop; a complex containing a dairy barn, a calf-feeding barn, and a laboratory; and a field building for soils studies, all built in 1962. About the same time, the old boardinghouse and foreman's residence were converted to soil salinity and soil science laboratories to accommodate the work formerly done at the Vauxhall Irrigation Research Substation. A cattle-feeding building for use in the Three Walking Sticks crossbreeding project, described further on, was built in 1966-67. Also, an underground irrigation system was installed on plant science plot land north of the railway. All work was done under the watchful eye of E. W. Thurston, maintenance and construction supervisor of the Research Station.

There were nine sections when the Research Station was organized in 1959: Crop Entomology, Veterinary-Medical Entomology, Plant Pathology, Chemistry, Soil Science, Animal Science, Horticulture, Cereals, and Forage Crops. This made for a cumbersome, unresponsive executive committee. The opportunity to correct the situation came about when Dr. I. L. Nonnecke, head of the Horticulture Section, resigned in 1964. The Horticulture, Cereals, and Forage Crops sections were combined into one Plant Science Section under R. W. Peake, with S. R. Pisko as plot foreman. About the same time, the Chemistry Section was abolished and Dr. R. Kasting and technician J. P. Quan were transferred to crop entomology.

About 1965, the Director's workload increased and a secretary was obtained for him. The first person to occupy the position was Jennie M. Svrsek, who was the Director's secretary from 1965 to 1968. She was followed by Lijutje (Leny) Beyer from 1968 to 1970, then by Mrs. Linda A. E. Knelsen.

Other senior stenographic and clerical staff during the period included Yoriko Hiraga, who was head of the steno pool from 1962 to 1963 and who was followed by Mrs. Mary Nowik. Betty E. Nishimura was head of accounting. Catherine M. Webster was office services supervisor, and Jean Ringland was in charge of the central registry, followed by Mrs. Heather A. Doddridge. Outside stenographers included B. Mary Murray in soil science, Mrs. Mary T. Lee in animal science, La Verne H. Hamabata in plant science, and Chyrel A. M. Sedrovic in veterinary-medical entomology.

Coffee Table News, known as CTN, started in January 1966; it was still being circulated in 1976. It was a two-page, mimeographed, weekly newsletter of births, deaths, marriages, transfers, directives of general interest, and jokes of dubious humor. About 200 copies of each issue were printed (in 1976) and there was a mailing list of 72. Copies were left on tables in the various canteens and section coffee-break locations: hence the name.

The Experimental Station's *Semi-Occasional Blatter*, edited by Beth Fairfield during World War II, and the Science Service Laboratory's *SAC* (Social and Athletic Club), edited by Dr. A. M. Harper in the early fifties, were the only comparable publications ever issued by the Station. Both the *Blatter* and *SAC* were several pages in length, the former appearing occasionally, the latter on a monthly basis.

Administrative attention began to be paid to labor relations of supporting staff during the sixties. Before 1950, there were numerous civil servants' organizations throughout the country. The most active was the Amalgamated Civil Servants, of which John Downs was National President for a time. In the mid-fifties, the Amalgamated Civil Servants joined with the Civil Service Association of Ottawa to form the Civil Service Association of Canada (CSAC).

Two major changes occurred in 1966. First, every position description was rewritten and government assumed the responsibility of classifying the positions. Secondly, collective bargaining, including the right to strike, was instituted. All civil servants, except letter carriers and members of the Professional Institute of the Public Service of Canada, united to form the Public Service Alliance of Canada (PSAC).

Each department of government had its union, which was part of PSAC and handled grievances and information at the departmental level. Thus, Research Station support staff belonged to the Agricultural Union of PSAC. Union activity resulted, on March 10, 1975, in picket lines being thrown up at the entrances to the Lethbridge Research Station—for the first time in its history. Picketing lasted only 1 day. Picketers were members of the General Labor and Trades group of PSAC, then in conflict with Treasury Board over wages.

Research began during the sixties on water weeds, which had long been a problem in irrigation reservoirs and systems and in recreational lakes. Four kinds of weeds were of concern: submerged weeds, represented by Richardson's pondweed, Sago pondweed, small-leaved pondweed, green water milfoil, northern water milfoil, and Canada water weed; emergent weeds, represented by cattails and rushes; floating-leaved weeds, represented by the yellow water lily; and free-floating weeds, represented by bladderwort, coontail, and duckweed. In response to a resolution by the Canada Weed Committee that the Research Branch give highest priority to the hiring of an aquatic weed biologist, Dr. J. R. Allan was appointed in 1965.

Results of rangeland studies were based on work done at the Livestock and Range Research Substation (Manyberries), Onefour, Alta., and the Range Research Substation, Stavely, Alta. Results of a cattle-grazing study at Stavely and a sheep-grazing study at Onefour were used to prepare guides to range conditions; Alberta Department of Lands and Forests administrators J. A. Campbell, L. M. Forbes, and R. A. Wroe were involved in the work. Mr. Forbes worked with Messrs. Smoliak and Johnston in surveying and setting aside 16 relict grassland areas (grasslands in a relatively undisturbed state) for study by naturalists, ecologists, and land administrators under the International Biological Programme. Dr. J. F. Dormaar cooperated in studies of soils of grazed fields at both Stavely and Onefour. Results of these studies, and other studies involving the invasion of Fescue Grassland areas by poplar and willow trees, showed that soil profile changes took place in nature much more rapidly than was formerly believed by soil scientists. By the end of the decade, Alberta's range management literature compared favorably with that from any other part of western North America.

Some of the earliest grazing studies with Russian wild ryegrass were conducted at Onefour by Mr. Smoliak. His results showed that Russian wild ryegrass pasture produced from three to six times as much animal gain as adjoining native range and, hence, his data had a great influence on the conversion of rangeland to cultivated hay or pastureland.

The naming of a variety or cultivar was a welcome task to a plant breeder, as it represented the final step in the development program. Considerable thought went into the naming of cultivars developed at Lethbridge. Usually, the plant breeder looked for a word or words that were easy to spell and pronounce, contained one or two syllables, were meaningful, and had no pornographic connotations. Dr. M. R. Hanna was involved in the naming of Trek alfalfa, after the North-West Mounted Police trek west in 1874; Kane alfalfa, after Paul Kane, noted Canadian artist; and Melrose sainfoin, after Melfort, Sask., where Russian sainfoin was first introduced, and rose, the color of the flower. Dr. J. B. Lebeau named Banff Kentucky bluegrass after the Banff Springs Hotel golf course, from which he obtained the original selection. R. W. Peake named Beaver alfalfa after the animal that symbolizes Canada; Chinook orchardgrass, after southern Alberta's famed warm, westerly wind; and Greenleaf pubescent wheatgrass, a descriptive name. Messrs. Smoliak and Johnston named Oxley cicer milkvetch after the Oxley Ranche Ltd., which was located in the Porcupine Hills of southwestern Alberta during the period from 1885 to 1915. Mr. Smoliak named Cabree Russian wild ryegrass, after the French Canadian hunter's name for the prong-horned antelope. Dr. Hugh McKenzie named Chinook spring wheat after the Chinook wind or region, and Cypress spring wheat after the Cypress Hills, which are located in its center of adaptation. In 1976, he received a licence for a spring wheat cultivar he called Chester, after Herbert Chester, third Superintendent of the Lethbridge Experimental Station. Dr. Mark N. Grant was involved in the naming of Winalta winter wheat, which was developed by Dr. J. E. Andrews; the name is a contraction of 'a winter wheat for Alberta'. Dr. Grant also named Sundance winter wheat, from the summer religious festival of the Plains Indians. In 1976, Dr. Grant was ready to release a winter wheat variety, Norstar, so named because its use was expected to extend northward the winter wheat growing region of Western Canada. Dr. S. A. Wells developed and named Galt barley, after the family whose enterprises opened up southern Alberta in 1880 to 1912; Hector barley, after Sir James Hector of the Palliser Expedition; Palliser barley, after Sir John Palliser, leader of the Palliser Expedition of 1857 to 1860; and Fairfield barley, after Dr. W. H. Fairfield.

The horticulturists sometimes selected longer names. For example, Dr. I. L. Nonnecke developed a number of chrysanthemum cultivars and used a mixture of Indian and historical names: Aceena, Ahnasti, Akimina, Colonel Macleod, Colonel Mewburn, Dr. Fairfield, Enee, Father Lacombe, Jerry Potts, Kainai, Kishinena, Kokanee, Kootenai, Mayor Magrath, Metis, Moeis, Nootka, Peigan, Sarcee, and Waterton. Apple varieties were named Dr. Bill after Dr. W. H. Fairfield, and Leth after Lethbridge. Dr. W. E. Torfason named a potato cultivar Chinook, after the wind. Dr. G. A. Kemp used a series of descriptive names: Early Lethbridge, Earlinorth, and Earlicrop tomatoes, and Earligold muskmelon. Also, he named a bean cultivar Limelight, the name being a more acceptable version of 'Lima-like' because the seed resembled a lima bean in size and shape. A later cultivar was named Green Limelight since the seeds were green.

In animal science, an all-concentrate cattle diet was examined by researcher Dr. R. Hironaka in the early sixties, but only in 1969 did the feeding of an all-concentrate diet become successful. The feeding of crossbred steers to examine the growth rate and feed efficiency of different crosses had begun in the mid-sixties. However, the program met a problem when budget restrictions forced removal of the 15% ground hay that was being incorporated into the feed pellets. The all-concentrate diet was the answer. This led to work by Drs. Hironaka and K.-J. Cheng on feedlot bloat, which was almost eliminated when they avoided using feed of a fine particle size. The problem of starting cattle on a high-energy diet was largely eliminated by use of a starter ration developed at the Lethbridge Research Station by Dr. Hironaka. The ration was adopted by the industry, and most feed mills had it available as one of their standard stock items. The technique of harvesting forage and feeding it in drylots was examined in the sixties, also. Although some feedlots adopted the practice for a short period, it was abandoned because of the abundance and low cost of grains as well as the amount of labor required to feed fresh forage in drylots. Alternative feeding programs were developed when it was shown that cattle could make compensatory gains after their feed had been restricted for part of the feeding period. These programs were designed to maximize returns, based on the feed and time required and the different prices received for the different grades of beef carcasses produced. Use of the computer to project the most profitable program and least-cost diets was under way at the end of the decade.

It was during the sixties that Dr. R. W. Salt achieved world recognition for his work on cold hardiness in insects. His discovery that certain insects evidently produced enough glycerol to act as an 'antifreeze' captured popular and scientific interest. His other investigations led into the nature and cause of freezing and earned him invitations to contribute to various international symposia and books. He was invited to lecture at various locations, the most notable being Cambridge, U.K., and Michigan State University, U.S.A.

Various factors combined to shape crop entomology research during the sixties. Studies of pesticide residues in crops and soil were begun by W. A. Charnetski and D. L. Struble. New or modified controls for 33 species of insects or their relatives were developed for use in crops. Research covering life histories, behavior, and economic population thresholds was completed for some species and begun for others; the purpose was to improve controls and to determine their economics and the necessity for them. A permanent sawfly nursery was started on land owned by the Animal Diseases Research Institute (Western) so that a sawfly population could be maintained for use in studies of the insect and for testing lines of wheat for sawfly resistance. To meet the need for uniform recommendations on crop pest control and to provide more liaison among prairie stations and other agencies, Dr. N. D. Holmes formed the Western Committee on Crop Pesticides. The committee flourished and soon included representatives from British Columbia as well as the Prairie Provinces. In 1976, a similar committee on crop diseases was founded, largely through the efforts of Drs. T. G. Atkinson and F. R. Harper.

Dr. Gordon A. Hobbs and his co-workers attempted for a decade to protect populations of native leafcutter bees in their nesting sites and to encourage them to pollinate alfalfa fields for seed production. Their lack of success made them realize that they had to domesticate a bee species in order to manipulate its population. This they set out to do when they imported *Megachile pacifica*, a leafcutter bee that was gregarious and would live in man-made dwellings. By 1964, the group had done the experiments that allowed them to provide the necessary protection against weather and insect pests. Thus, they achieved one of their objectives, the domestication of a leafcutter bee for the pollination of alfalfa.

In 1968, Dr. Hobbs won the Merit Award of the Public Service of Canada for his work.

In 1969, Dr. Anstey was transferred to Ottawa and became Assistant Director-General (Western) of the Research Branch. At Lethbridge, he accomplished a smooth, trouble-free transition at the time of amalgamation, a task that was not nearly as easy as he made it appear. And he brought the western research stations, and especially the Lethbridge Research Station, into the computer age.

Dr. J. E. Andrews returned to Lethbridge as Director in 1969. He was a native of Selkirk, Man., and had served with the Royal Canadian Air Force from 1942 to 1945. His research career began at the Winnipeg Research Station in 1949, and he was transferred to the Lethbridge Experimental Station in 1951 as a cerealist, remaining there until 1959. His major research contributions at Lethbridge were the development of Winalta, a widely grown winter wheat, and the development of laboratory techniques for assessing hardiness in winter wheat. From 1959 to 1965, Dr. Andrews was Director of the Research Station at Brandon, and from 1965 to 1969, he was Director of the Station at Swift Current.

The Swift Current Station had completed a major building program in 1965 and, at Lethbridge, Dr. Andrews found himself in the midst of an even larger one. At various times, he discussed the need for modern research facilities with the publisher of *The Lethbridge Herald*, the Mayor, officials of Treasury Board, local Members of Parliament, and the federal Minister of Agriculture. These men all recognized the need for modern facilities to carry out appropriate agricultural research. There is no question but that their support helped to obtain a new office-laboratory complex for the Lethbridge Research Station.

The need for such an office-laboratory complex had been apparent for many years. In December 1965, Dr. Anstey discussed the prospects for a new building for the Research Station and concluded that it could not be expected for several years. But, by November 1966, Dr. R. A. Ludwig, Acting Director of Administration for the Research Branch at Ottawa, visited the Station and discussed the preparations that had to be made for the proposed new building. By February 1968, town planners of the Oldman River Regional Planning Commission had been brought into the picture and had clarified municipal requirements. In August 1968, Underwood McLellan & Associates Ltd., Calgary, were appointed planning consultants for the new building and the federal Department of Public Works delegated R. E. Mayne to work with them. Also, R. W. Peake was appointed Station liaison representative in the planning program. By May 1969, serious thought was being given to a suitable site; Mr. Peake favored a location off No. 3 highway, just west of the old dryland orchard. Instructions were received from Ottawa that a location at the University of Lethbridge was not even to be considered. Eventually, a site just west of the existing building area was selected. A preliminary planning report was completed in June and was considered by the Executive Committee. After years of rumors and false starts, it looked as if a new building was finally to be constructed.

Participants in an unofficial sod-turning ceremony, October 16, 1974. From left to right: S. B. Arnason, Dr. J. E. Andrews, L. C. McLaughlin, and E. W. Thurston.

As current agricultural problems of the region were solved, investigators moved on to new problems. Each solution raised new questions, which tended to be more difficult than the old. Frequently, their solution required more intensive specialization, more teamwork, and more sophisticated equipment. And this, in turn, meant that more coordination of research and a bigger administrative superstructure were needed to serve the scientists and, indirectly, agriculture.

In 1968, Dr. B. B. Migicovsky, Director-General, committed the Research Branch to a planned program with stated goals and objectives. Commonly used in business administration, this was 'management by objectives'. The process is one where the superior and subordinate managers of an organization jointly identify its common goals, define each individual's main areas of responsibility in terms of the results expected, and use those measures as guides for operating a unit and assessing the contribution of each of its members. Lethbridge was selected as one of several Stations where the program was to go into effect and was the first to implement it fully.

An annual critical review was held in the fall to look at program results and projected plans. 'Program review' was an integral part of management by objectives. Its purpose was to measure results against goals in order to improve performance. Each project report was considered and progress toward a particular goal was discussed. There followed a critical appraisal of the program report, which was prepared beforehand by a program leader, its revision, and, finally, its acceptance. Future plans were discussed and justification was demanded for requests for additional staff, equipment, or funds. If accepted, these plans were incorporated into the program report and became an official recommendation of the Lethbridge Research Station.

A Research Branch goal under management by objectives was 'To improve physical facilities by implementing a continuously updated construction program to provide, by 1975, suitable

laboratory and related research facilities at all establishments'.

This goal struck a responsive chord at Lethbridge because, for 20 years, scientists there had worked in modest laboratories, often widely separated from each other. There had been rumors of a new main building, notably in the late fifties, but these had come to naught. But, by 1970, a new office-laboratory complex gave every indication of becoming a reality.

In January 1971, word was received from Ottawa that the new laboratory for Lethbridge was assigned highest priority in the Department of Agriculture's construction estimates for 1971-72. Immediately, Station staff were asked to list their requirements and to be prepared to document their needs by sections.

In August 1971, Dr. J. E. Andrews, Director, wrote letters to C. J. McAndrews, Director, Extension and Colleges Division, and J. G. Calpas, Regional Director, Extension Division, Alberta Agriculture, to determine their interest in having Alberta extension staff move into offices in the new building. They acknowledged his letters but replied that they could not make a commitment at that time. Negotiations continued and, eventually, an agreement was reached with the department to construct a provincial wing to house extension and other staff. Its cost was estimated at $2.0 million, bringing the total cost of the new office-laboratory complex to about $10.0 million.

By February 1974, the estimated cost of the new office-laboratory complex had increased by about $2.0 million. With previous increases, this brought the cost to about $14.5 million, requiring further Treasury Board approval. The additional money was requested and approved in March.

On April 11, 1974, Western Industrial Contractors Limited, the contractor for the sewage and water facilities, started work on the Station. E. W. Thurston and Mr. L. C. McLaughlin were named by the Station to provide liaison with the contractors and the supervisory engineering firm. Mr. McLaughlin had been recruited from the Swift Current Research Station where he had gained much experience in working with contractors.

Tenders for the main building finally were called on July 26 and were reviewed on July 29-30. Three tenders were received, from Poole Construction Limited, Foundation Company of Canada Limited, and Cana Construction Company Limited. The successful bidder was Poole Construction with a tender of $22,197,173. This was a shock to all officials, who had hoped for a tender of about $14.7 million but thought it might be as high as $17.0 million. There was some delay while Ottawa officials considered the Poole Construction tender and made arrangements for the additional funds. By September, details had been ironed out and, on October 3, 1974, Poole Construction started to deliver concrete forms to the site. On October 16, Mr. McLaughlin organized an unofficial sod-turning ceremony involving Dr. Andrews, Mr. Thurston, S. B. Arnason, and himself. Dr. Andrews ran an earthmover and stripped the first sod from the building site.

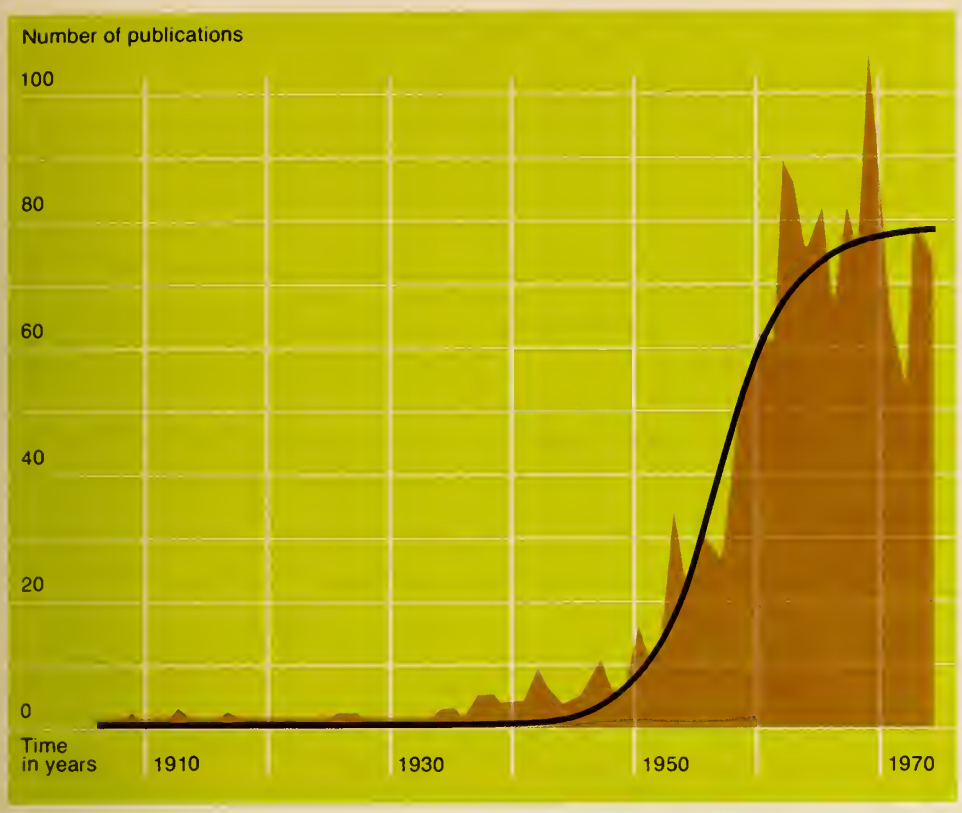
In the seventies, an important part of the Lethbridge Research Station's work was participation in the All-India Coordinated Research Project for Dryland Agriculture. Scientists who were involved in the project from Lethbridge included Dr. Andrews, the Canadian Director; Dr. W. L. Pelton, formerly with the Swift Current Research Station and first Canadian Joint Coordinator of the India project; D. T. Anderson, agricultural engineer; and Dr. S. Freyman, plant physiologist. In February 1976, Agriculture Minister Eugene Whelan presented to Dr. Andrews the Public Service Merit Award for '. . . exceptional and distinguished service in relation to the Dryland Project in India'.

The broader scope of Station activities in the seventies was indicated by its committees, on one or another of which nearly every scientist served. The most important was the Executive Committee, which ran the Research Station. In the mid-seventies, it was made up of Dr. Andrews, Director; Dr. Pelton, assistant director; Mr. Arnason, administrative officer; and section heads Drs. D. B. Wilson for plant science, E. E. Swierstra for animal science, N. D. Holmes for crop entomology, W. O. Haufe for veterinary-medical entomology, D. C. MacKay for soil science, and J. B. Lebeau for plant pathology. Other committees were the canteen committee; chemical committee; committee to produce *Coffee Table News*; controlled temperature room committee; field plot committee; fire control committee; greenhouse and growth chamber committee, renamed in 1975 the phytotron committee; land use committee; library committee; manure committee, an ad hoc committee to advise on the storage, use, and disposal of animal wastes; pasture committee; radioisotope committee; remote sensing committee; safety committee; seminar committee; silage committee; slide library committee; social committee; statistics committee; toxic chemicals committee; and Whoop-up Compound committee, a committee to set up an annual outdoor display at the Lethbridge Exhibition. The Executive Committee once considered setting up a committee to study the need for additional committees! In the mid-seventies, many of the committees spent much time planning the move to new quarters.

P. H. Walker, Station editor, retired in 1972 and was succeeded by G. C. R. Croome, a professional forester from Fredericton, N.B. The Lethbridge Station was the only Station or Institute in the Research Branch with a full-time editor. The first Station editor was Dr. W. C. Broadfoot, who assumed the responsibility as one of his duties after amalgamation in 1959. When Dr. Broadfoot contemplated retirement in 1963, Mr. Walker, a member of the Soil Science and Field Husbandry sections since 1933, became Station editor.

The number of research papers written by the staff of the various institutions that made up the Lethbridge Research Station conformed to a typical growth curve. There was a period of slow, initial growth, which lasted from 1906 to about 1946; a period of rapid growth, with the fastest rate in the middle years, which lasted from about 1946 to 1960; then a period of fluctuation, which lasted from 1969 to 1976, when an average of 80 papers a year were published. The long period of slow growth in the early years occurred mainly because Ottawa officials in both the Experimental Farms Service and the Science Service actively discouraged scientific writing. Most papers were written during the winter months and were submitted to the Station editor in March and April. The fewest papers were submitted in August and September. Of the papers, roughly two-thirds were published in Canadian journals and one-third in American ones.

Other support services included the information officer, P. E. Blakeley; the biometrician, G. C. Kozub; and the librarians, headed by J. P. Miska.



Actual and calculated curves to show the number of publications issued by the various institutions that made up the Lethbridge Research Station, 1906-1974.

Although bilingualism became official government policy in the sixties, the only person on the Station to make a conscientious effort to learn French was Dr. Ruby I. Larson. She took 6-week courses at the University of Montreal in 1969 and 1971 as well as various courses in French literature at the University of Lethbridge. Dr. J. F. Dormaar spent 1970 at the Centre de Pédologie biologique, Centre national de la Recherche scientifique, Nancy, France, on a postdoctorate fellowship and greatly improved his French there. In 1975, about 26 scientists expressed interest in learning French. Instructors were provided and courses were established so that participants could attain whatever level of proficiency they desired.

Efforts to add economists to the staff of the Research Station began in 1967 when V. J. Miles was seconded to Lethbridge from the Economics Branch. He soon resigned to accept a foreign assignment and was replaced by B. H. Sonntag. Mr. Sonntag left almost immediately to obtain his Ph.D. degree. In 1970, he returned to set up the Economics Section, which, in 1976, was staffed by Dr. Sonntag and three economists.

Severe drought and soil drifting were thought to be characteristic of the thirties. But soil drifting occurred in the late forties and early fifties and drought as severe as that of the thirties occurred again in the early sixties and early seventies. Because of the development of herbicides that were useful for weed control on summerfallow and in seedbed preparation, minimum and zero tillage techniques were studied by D. T. Anderson of the Soil Science Section. The idea was that elimination of most, or all, tillage operations would increase the amount of residue on the surface and never expose bare soil to wind erosion. The zero tillage or minimum tillage techniques had tremendous potential for saving energy, which was of great concern in the seventies. Included in the study were evaluations of erosion control, moisture conservation, weed control, and various combinations of mechanical and chemical tillage. Chemical and physical changes in the soil as a result of minimum or zero tillage were studied also. Zero tillage (chemical fallow) gave better moisture conservation than mechanically prepared fallow and increased yields of wheat crops over the following 5 years. However, in most years, one tillage operation improved yields further, presumably because it prevented the slight depression in nitrate-nitrogen levels that occurred with chemical fallow only.

Problems of salinity (alkali) and drainage troubled researchers during the seventies—

Artist's conception of the new office-laboratory complex at Lethbridge.

problems that began when the first sod was broken and the first water was turned into the canals. Before 1940, salinity was only a minor problem throughout the region but, by 1975, an estimated 101 250 ha (250,000 acres) of dry land and 40 500 ha (100,000 acres) of irrigated land had become salinized. Observations of aerial photographs indicated that the area affected was increasing at an accelerated rate. Management techniques were developed to alleviate the problem.

Projects involving the crossbreeding of beef cattle were an important part of Animal Science studies in the seventies and earlier. In 1965, a cooperative research project was set up between rancher Bryce C. Stringam and the Lethbridge Research Station. Drs. S. B. Slen and H. F. Peters planned the project and Mr. Stringam provided the land and cattle at his Three Walking Sticks Ranch, north of Duchess.

The program was discontinued in 1969 and canceled after the last calves were fed out in 1970. There were a number of problems, the most important one being that Mr. Stringam lost money and felt that he was subsidizing a costly research project.

Still another project, on foreign breed evaluation, was started in 1968 to evaluate the reproductive performance of hybrid heifers produced by mating Charolais, Limousin, and Simmental bulls to Angus, Hereford, and Shorthorn cows. The project continued through successive generations of hybrids.

Studies on urinary calculi in range cattle began at Lethbridge under Dr. Frank Whiting in 1949 and were expanded after a severe outbreak of the condition in the fall of 1953. The calculi were shown to be composed of amorphous silica and minor amounts of oxalate, carbonate, and organic matter. L. M. Bezeau found that range grasses had a high silica content, which increased as the grasses matured. Dr. C. B. (Peter) Bailey studied the metabolism of plant silica consumed by cattle. He found that the output of urine in cattle fed on range grasses was low and the concentration of silicic acid in the urine was high. In such urine, silicic acid molecules joined together in increasing numbers until they formed aggregates and came out of solution. These aggregates formed the substance of the calculi. In 1975, Dr. Bailey suggested a solution: range calves should be given a supplement containing large amounts of salt, which would increase their water intake and urine flow and reduce the concentration of silicic acid in the urine.

Winterhardiness was of constant concern to researchers because crops of the region had to be grown in spite of long, cold winters and spring and fall frosts. During the seventies, a number of scientists worked on cold hardiness. These included Drs. D. W. A. Roberts, M. D. MacDonald, J. B. Lebeau, M. R. Hanna, E. J. Hawn, M. N. Grant, and S. Freyman, and Messrs. U. J. Pittman and S. Smoliak.

The Plant Pathology Section was concerned with diseases of cereal crops, forage crops, and specialty crops. In cereals, common root rot was a disease of major economic importance. An obvious method of control was to develop varieties resistant to the disease, but progress was slow. In work unrelated to root rot resistance, Drs. Ruby I. Larson and M. D. MacDonald produced monosomics and other aneuploids in solid-stemmed wheat

varieties, and whole-chromosome substitution lines between them and hollow-stemmed varieties. Dr. M. N. Grant suggested that such monosomic and nullisomic lines could be used to study inheritance of root rot resistance. Dr. T. G. Atkinson developed better tests for determining plant reactions to root rot in the growth chamber or greenhouse. Working with Dr. Hugh McKenzie, Dr. Atkinson found that the reaction to root rot was not associated with the characteristic of stem solidness, which largely governs sawfly resistance. Drs. Larson and Atkinson studied substitution lines involving crosses between solid-stemmed, root-rot-susceptible wheat varieties, and hollow-stemmed, root-rot-resistant wheat varieties. They found that chromosome 5B contained the main genes governing root rot reaction. Their conclusion was that there should be no difficulty in incorporating root rot resistance in sawfly-resistant wheats. Chester wheat, produced in 1975, was sawfly resistant and had better resistance to root rot.

A cooperative project on black flies, involving federal and provincial scientists, was conducted during the early seventies. The black fly, which develops in mountain-fed rivers, was only a nuisance to humans but was sometimes fatal to livestock. Animals introduced into the black fly area were particularly susceptible as it took time to develop a tolerance for the fly. K. R. Depner began studies on the biology of the fly, and Dr. M. A. Khan attempted to control the insect by chemical means as it attacked the cattle. Mr. Depner and Dr. W. A. Charnetski, with associates from the provincial departments of Agriculture and Environment, the Fish and Game Branch, and the Alberta Research Council, undertook studies on chemical control of the insect in the river. J. A. Shemanchuk studied population dynamics of the pest and tagged black flies with a fluorescent dye to establish their range of activity.

The study of sex attractants in insects was an important part of crop entomology research in the seventies. In 1958, C. E. Lilly, assisted by technician W. L. Pelham, started laboratory and field studies on insect sex attractants. Working with click beetles, the adult of the wireworm, sex pheromones were discovered in extracts of virgin females from five species, representing three genera. Detailed laboratory investigations on the response of adult males of the sugarbeet wireworm to the female sex pheromone were carried out and, in cooperation with Dr. Martin Jacobson, a chemist from the United States Department of Agriculture, the pheromone was isolated and identified as valeric acid.

After 1970, the attractant studies were expanded into an extensive program embracing pheromones and attractants of moths. Dr. D. L. Struble, an organic chemist, joined the program to handle the analytical aspects of the research, and to participate in laboratory and field bioassays in cooperation with scientists Dr. G. E. Swailes, L. A. Jacobson, and Mr. Lilly. Dr. Struble identified and synthesized the chemicals involved. Field testing of about 80 synthetic chemicals provided good leads to synthetic attractants for about 15 major species of moths; about 40 other species were attracted to some degree. Sex pheromones were discovered in females or synthetic attractants determined for males of several common species: the redbacked cutworm, clover cutworm, bertha armyworm, beet webworm, and forest tent caterpillar. Trapping methods were developed for the clover cutworm and the beet webworm.

In the mid-seventies, attention began to be focused on remote sensing, the term used to describe airborne and satellite imagery. Aerial cameras and films were improved and various scanning devices were in use in orbiting earth satellites. Dr. T. G. Atkinson used remote sensing data to determine the area of winter wheat crops; Dr. T. G. Sommerfeldt was involved with remote sensing in relation to salinity studies; and Mr. U. J. Pittman in relation to the growth and area of spring wheat crops.

Throughout its history, the Station has been fairly free from scandal, but has not escaped it entirely. There were rumored improprieties involving equipment and facilities in the period before World War II, mysterious happenings in the early fifties about which I have been unable to obtain details, an inquiry into feed supplies in the late sixties, and occasional sexual peccadilloes that usually (but not always) resulted in the female partner being disciplined. Cars and trucks have been involved in accidents at least since the thirties, when Dr. Fairfield had a bee fly in through a wide-open side-vent window and sting him on the back. In the ensuing confusion, his car hit the ditch and turned over. There has never been a fatal accident involving Station staff on duty, a remarkable record because the Station owned 75 vehicles and personnel drove about 804 500 km (500,000 miles) in 1976. A speed limit of 88 km/h, or 55 miles per hour, imposed on federal government vehicles in May 1975 helped to perpetuate the record. With a staff of 300, there were usually a few alcoholics to cause administrative headaches, but the condition was looked upon as a disease and treated accordingly.

The unsung heroes of the Lethbridge Research Station have been the stenographers, accountants, librarians, casual and temporary employees—supporting staff, generally—without whom the Station could not function. In 1976, there were about 230 of them, and there was an annual turnover of about 10%. As a result, it is impossible to name or describe the work of more than a few. They were the ones who maintained the grounds, looked after the cattle, ran the tractors, typed the manuscripts, and performed the physical work of the Station. Their duties were sometimes arduous, often tedious, but always important.

The Lethbridge Research Station of 1976 bore little resemblance to the Dominion Experimental Station of 1906. In 1906, the staff consisted of W. H. Fairfield, Superintendent, and half a dozen employees. In 1976, the staff comprised Dr. J. E. Andrews, Director, and about 300 professional and supporting employees. The aim of the Station, to serve agriculture, had not changed. And Dr. J. H. Grisdale's comment, that 'Our work falls naturally into two great divisions: first, the accumulation of data by careful experiments; and, second, the making of our results known', was as applicable in 1976 as it was in 1915.

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Alex Johnston