#### THE SWIFT CURRENT RESEARCH STATION







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#### THE SWIFT CURRENT RESEARCH STATION J.B. Campbell



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#### FOREWORD



In 1920, The Saskatchewan Legislature appointed a royal commission to inquire into the conditions of the farming industry in the western and southwestern parts of the province. One of the recommendations of the commission was that agricultural experimentation be done in the southwestern part of the province, so that farmers could obtain "a complete and thorough knowledge of crops, soils and farming methods—to make their farming productive, profitable and permanent." In the summer of 1920, the federal government obtained land near Swift Current to establish an experimental farm.

The prime purpose of this undertaking was to assist drought-plagued farmers in the Palliser Triangle. Now, after 50 years, scientists have developed crop varieties adapted to the environment, introduced and designed machinery to reduce farming costs, and devised and proved cultural practices that conserve soil moisture and control the devastation of wind and water erosion. This research has helped to move the economy of southwestern Saskatchewan from near extinction to ever-increasing levels of wealth. The basic concepts and principles developed to manage rangelands, to farm fallow, and to grow cereals and forage crops under semiaridity are used throughout the world to ease social desperation, and to improve and stabilize farming.

Much of the research recounted in the following pages is the work of scientists at the Research Station at Swift Current. But great help has been received from experimental work at other centers of the Research Branch of the Canada Department of Agriculture. Many of the local scientists have worked closely with their confreres across Canada. If by chance, the contributions of the collaborators are not mentioned in the manuscript, it is my pleasure to here acknowledge their contributions. After all, good research requires the co-ordination of many disciplines and the testing and implementation of many ideas in many environments. During his 32 years at the Swift Current Research Station, J. Baden Campbell became an international authority on pasture management and production. Before his retirement in February 1970, he agreed to record the accomplishments of this station during its first 50 years, to discuss the need for the research undertaken, and to show the benefits that this research has given the agricultural community. He has done much more. He has told of the people who guided, conducted, and supported this work. Even more important, he has recorded the philosophies of those who, during the formative years of this station, molded the experimental program to the firm and lasting concept of service to agriculture.

A. A. Guitard Director Research Station Swift Current, Sask.



A HISTORY OF AN INDUSTRY SHOULD TELL ITS ACCOMPLISHMENTS, THE ECONOMIC AND SOCIAL STRESSES THAT HAVE INFLUENCED ITS PHILOS-OPHY, AND THE IDEAS OF ITS ADVENTUROUS PEOPLE. THE 50-YEAR HISTORY OF THE SWIFT CURRENT RESEARCH STATION, THOUGH NECESSARILY DIFFE-RENT, IS IN MANY WAYS SIMILAR TO THE STORY OF OTHER SUCCESSFUL VENTURES. ITS ACCOMPLISHMENTS IN AGRICULTURAL RESEARCH HAVE HAD AN IMPACT ON FARMING PRACTICES THROUGHOUT WESTERN CANADA AND ALL OVER THE WORLD. THE STATION HAS HAD MANY PEOPLE WHO HAVE HAD VENTURESOME VISIONS.

A SUCCESSFUL BUSINESS DEPENDS ON ITS POSSESSION OF A LINE-LEADER. THE SWIFT CURRENT RESEARCH STATION HAS BEEN GUIDED BY THE NEED FOR STABILIZATION OF FARMING THROUGHOUT THE PALLISER TRIAN-GLE. A LINE-LEADER MAY EASILY BE FORGOTTEN BY THOSE WHO CONCEIVE AND USE IT. IT MUST BE IMPROVED THROUGH RESEARCH TO MEET THE DEMANDS OF A CHALLENGING MARKET. IT MUST BE REALISTIC OR IT WILL GO TO THE JUNK PILE. BUT ITS BASIC PRINCIPLES MUST NEVER BE OVER-LOOKED AND, IN OUR CASE, THEY ARE THE PRINCIPLES CONCERNED WITH MOISTURE CONSERVATION, SOIL EROSION CONTROL, PLANT IMPROVEMENT, AND GRAZING CAPACITY STANDARDS.

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#### THE PRESETTLEMENT ERA

Where to start. What to record. How to report. Undoubtedly the early social and economic problems in the Triangle influenced the history of the Swift Current Research Station. These problems are associated with the Station's growth because they played a part in determining the Station's research objectives and programs. Reports indicated the adverse nature of the environment, and they forecast some of the difficulties that would befall agriculture after settlement upset the balance of nature in Palliser's Triangle.

The Governor and Company of Adventurers of England Trading into Hudson's Bay had a considerable impact on the presettlement culture of the grassland region. As the fur trading business moved from York Factory and Montreal into Rupert's Land, some Indian tribes migrated westward and eventually into the Prairie (7). In part, this movement was caused by pressures of settlement in eastern North America. With the migration, a new Indian culture developed. It was based on the horse, the dog, and the buffalo. These three resources provided transportation, food, clothing, shelter, and motifs for artistic expression.

Though the Hudson's Bay Company was not interested in agriculture anywhere or at any time in its expansion, it was vitally concerned with the Prairie as a source of food. The buffalo not only supported the new Indian culture; it also provided the Hudson's Bay Company employees with pemmican, jerky, and fresh meat. The Prairie was the food basket of the Hudson's Bay Company 100 years ago; today it is one of the food baskets of the world.

The Hudson's Bay Company was opposed to any settlement that might disrupt the fur trade, and the Company knew that agriculture would certainly do so. In 1857 the Rt. Hon. Edward Ellice, a governor of the Company, was asked what agricultural potential was present in the grassland zone. He replied, ''None, in the lifetime of the youngest man now alive.'' Sir George Simpson, also a governor of the Company, had similar convictions when he said: ''I do not think that any part of the Hudson Bay territories is well adapted for settlement; the crops are very uncertain.'' These statements were presented to a committee of the British House of Commons, when it was considering the renewal of the Hudson's Bay Company charter. Thus, the desire to perpetuate a lucrative

business and a primitive culture forestalled settlement in Rupert's Land (1).

And the Hudson's Bay Company had support! The John Palliser Expedition of 1857 to 1860 reported to the Royal Geographical Society and the Colonial Office in London<sup>+</sup> that sustained agriculture would be a precarious industry in the grassland region of Rupert's Land. Palliser did state in his report that a "Fertile Belt" extended northwest from east of Fort Garry to beyond Fort Edmonton, and from there southward along the foothills of the Rocky Mountains. The "Fertile Belt" concept encouraged settlement within that comparatively narrow strip, but discouraged interest in the agricultural potential of the grassland region it surrounded. Palliser did little exploration within the grassland region that he called the "Triangle," and unfortunately he made his trips during drought years and in seasons that are normally dry. Also, a great extent of his travel was through areas of poor soil, much of which has never been cultivated, or, if cultivated, was abandoned soon after settlement. It is unfortunate also that Eugene Bourgeau, the botanist with Palliser's expedition, was a taxonomist and not an ecologist, and that his field work had been in the Alps Mountains in Switzerland instead of in a grassland region. The lack of surface fuel and water, and the incidence of soil erosion after the passage of large buffalo herds and prairie fires undoubtedly influenced Palliser's belief that agriculture would be a precarious industry in much of the Triangle (6).

Henry Youle Hind, Professor of Chemistry and Geology at Trinity College, Toronto, was commissioned in 1858 by the governments of Upper and Lower Canada to undertake surveys west of the Red River in Assiniboia and Saskatchewan. He was more concerned with transport than he was with resources, but he did consider agricultural possibilities. He reported that an 85-foot dam on the South Saskatchewan River near Elbow would divert water into the Qu'Appelle and Assiniboine rivers and establish 'splendid and probably uninterrupted navigation, for steamers of large size, for a distance exceeding six hundred miles (2).'' Hind's water transportation system was never realized, but Gardiner Dam was built. That story has been documented by the Hon. George Spence in *Survival of a Vision* (13). In general, Hind agreed with Palliser's observations about agricultural possibilities. In his journal he stated: "A proper appreciation and use of facts will convince the most sanguine that the larger portion of this area is, in its present state, unfit for permanent habitation of man, on account of climate, soil, and a lack of fuel (2)."

In 1871, Sir John A. Macdonald appointed Sir Sandford Fleming to the position of Chief Engineer for the Canadian Pacific Railway. When Fleming decided to check the proposed route for the railroad, he recruited John Macoun, Professor of Botany at Albert College, Belleville, Ontario, as the botanist for his party. Macoun made several trips across Canada and differed from Palliser and Hind about the agricultural potential of the Triangle. In 1877, he estimated that there was about 80 million acres of arable land with fertile soil and over 100 million acres of natural pasture land in Manitoba, the Northwest Territories, and British Columbia (4). Macoun's estimate of arable land is close to the present acreage under cultivation, but his estimate of rangeland was excessive.

Two important comments on Macoun's observations are necessary. First, a variable annual precipitation in the late 1850s made Palliser and Hind question the agricultural potential of the Triangle, whereas, at the time of his surveys, Macoun beleived that about 35 million acres within the Triangle had desirable agricultural characters. However, it must be realized that four of Macoun's six trips across Western Canada took place in years of average or above-average precipitation (4). Second, Macoun's report influenced the government's decision to locate the main line of the Canadian Pacific Railway through the Triangle rather than to run it farther north through Palliser's Fertile Belt.

Confederation was achieved in 1867. The administration of the Northwest Territories was transferred from the Hudson's Bay Company to Great Britain in 1868, and to Canada in 1869. The federal Department of Agriculture was established with Confederation. The Prime Minister appointed Senator Jean Charles Chapeau as the first Minister of the Department; Dr. J. C. Taché was appointed the first Deputy Minister.

After Confederation, numerous surveys and studies were conducted throughout the Prairie. The provisions of fuel and water for permanent rural settlement and urban development were of immediate concern. The fuel problem was solved quickly when unlimited supplies of coal were uncovered in many districts. Water for rural and urban need was obtained by drilling wells to subterranean sources. A survey to demarcate the legal boundaries of land was started. Before 1890, surveys got under way in the southern Rocky Mountains and the adjacent plains. The purpose was to exploit the water and land resources for irrigated agriculture.

## 2

#### THE EXPERIMENTAL FARMS SERVICE

The federal Experimental Farms Service was established in 1886. In 1884, a Select Committee of the House of Commons was appointed to consider the agricultural problems of Canada. That committee recommended establishing an Experimental Farm, and Professor William Saunders was commissioned to study and report on an experimental program for agriculture. His report was tabled in April 1886. In June of the same year a bill entitled "An Act Respecting Experimental Farm Stations" was presented to parliament by Sir John Carling, and given royal assent. William Saunders was appointed Director of Experimental Farms Service, a position he held for 25 years. His first responsibilities were to locate, establish, and direct five Experimental Farms, one at Ottawa to serve Ontario and Quebec, one at Nappan for the Atlantic Provinces, one at Brandon for Palliser's Fertile Belt, one at Indian Head for the Triangle, and one at Agassiz for British Columbia. The history of agricultural research in Canada has been documented in Fifty Years of Progress on Dominion Experimental Farms, 1886 to 1936 (1) and Canada Agriculture: The First Hundred Years (2). However, a few additional considerations are worthy of repetition, and two letters are of interest.

New experimental stations were established in all provinces as the need arose. The Lethbridge Station was started in 1906, and the one at Lacombe in 1907. One at Rosthern had its inception in 1909, and at Scott in 1911. Though these stations were at the periphery of the Triangle, much of the research done at those points influenced agricultural practices in the dry central area. The peripheral station findings, which helped to ameliorate the cost-price squeeze that has plagued Prairie farmers since settlement, related to cultural, harvesting, and threshing machinery; the use of Hannchen, Trebi and OAC21 barleys; Banner and Victory oats; Mindum durum, and Red Fife and Marquis bread wheats; grass–alfalfa mixtures, and summerfallow and other cultural practices.

But all was not well within the Triangle. Damage caused by wind erosion increased through most of the years from 1910 to 1920. Some of the recommended cultural practices to control local and widespread erosion actually augmented its devastation. When, in 1915, it rained every

day from June 1 to July 15 wheat yields were as high as 50 bushels per acre. But the next five years were disastrous. Rust and early frosts badly reduced the 1916 crops and the governments had to supply cereal and vegetable seed for the 1917 plantings in many districts. Drought continued from 1917 through 1920, and conditions were as severe as they had been in the mid-1930s. Wind erosion was rampant and widespread; farms were abandoned; cattle and horses were often hungry; taxes were unpaid; swarms of migratory grasshoppers sometimes obscured the sun and ate the poor crops, even the paint off farm homes; and federal, provincial, and municipal governments were concerned with agricultural relief despite \$2.00 plus for a bushel of wheat. From 1917 through 1920 both seasonal and total precipitation was about three inches less than average. Only in Palliser's Fertile Belt and in a few fortunate districts within the Triangle was production sustained during those years.

In part, the agricultural difficulties in the Triangle from 1916 through 1920 were related to government policy. Before the First World War, most farms had cattle, hogs, poultry, and gardens. But flour was needed for Canada and her allies during the war, and farmers throughout Western Canada were encouraged to grow wheat. To do so, farmers neglected good cultural practices. Many farmers disposed of their cattle and bought more horses, which provided additional power. High prices for wheat and wartime farming demands were not conducive to agricultural practices that conserved soil moisture and controlled wind devastation, or to the maintenance of a high standard of living throughout the Triangle.

It is very difficult to pinpoint a determinant of crop failure and wind erosion. Undoubtedly, the environment itself was a major cause. Aridity, the erosion that followed cover disturbances, and the desiccating influence of wind and heat and frost certainly contributed to the disaster. The erosive potential of the soil was increased by settlers who introduced and used unrealistic cultural methods, by speculators who came for the fast buck and then abandoned their land to wind, weeds, and insects, by settlement on land with poor quality soil, by the limitations of horse power and machinery, and by the lack of experimental and extension services. The results were soil deterioration and social and economic stress for the farmers, the business communities, and the municipal governments. By 1920 wind erosion was widespread, and farms on sandy and shallow soils were being abandoned. In fact, considerable farm abandonment occurred on the heavy clay soil of the Regina Plains, though the land was selling for \$80 to \$125 an acre. However, there were districts that were unaffected by these conditions. The lands farmed by the Mennonite people, who had emigrated from Russia to Western Canada about 1895, were comparatively productive even in the most difficult years (3).

### ESTABLISHING AN EXPERIMENTAL STATION IN THE DRY ZONE

On May 28, 1910, and on March 25, 1911, the Hon. W. R. Motherwell, Minister of Agriculture for Saskatchewan, wrote to the Hon. Sydney A. Fisher, his federal counterpart, stressing the need for an experimental station in the Dry Zone of southwestern Saskatchewan. Mr. Motherwell recommended that the station be established at Swift Current (Saskatchewan Archives Board). In 1921, Mr. Motherwell was appointed Minister of Agriculture for Canada and, except for a few months in 1926, he held that position until 1930. The young station at Swift Current benefited from Mr. Motherwell's knowledge of farming in a dry environment and his interest in the welfare of the agricultural community throughout Western Canada.

The following editorial appeared in the Saskatchewan Farmer, Vol. 10, April 1920. It was titled: Another Government Experimental Farm Wanted.

For several years farmers in the southwestern part of the Province of Saskatchewan that is in what is called the dry district, have been clamoring for an Experimental Farm

Professor Bracken has records that show that in the northeastern part of the province, where the rainfall is abundant, the average period between the late spring frosts and the first fall frosts was 73 days and in the southwestern part of the province 133 days. Surely there is an opportunity to experiment with different crops where the district is frost free for 133 days, as compared with the Experimental Farms now located in the Province at Indian Head, Rosthern and Scott.

More than a score of enquiries have been made to the Editor of the Saskatchewan Farmer about cultivation of the land and what crops to grow, what trees to plant, would corn be a success. etc., etc. Only an Experimental Farm could give reliable information about such subjects from practical experience. We can only suggest and advise This whole district has only been settled by farmers within the last few years. They have been following the methods practised by farmers in Manitoba or in the eastern parts of the province of Saskatchewan They have been too busy to do experimenting for themselves. They are now seeking Government assistance to pull them through after two or three crop failures. The Directors of any Agricultural Society in the district can give valuable information regarding the list of experiments that would be most valuable to farmers at the present time. We hope that the Dominion Minister of Agriculture may take action this year, and thereby encourage the farmers, who, though struggling against adverse

conditions, are still confident that their soil is good and that with improved methods of cultivation and proper selection of crops to be grown, success will attend their efforts

In the same article, the editor reported as follows:

At the meeting of delegates from Agricultural Societies in Saskatoon in January last, a resolution was unanimously passed asking the Dominion Government to establish an Experimental Farm in the southwestern part of the province. Any location on the Shaunavon Branch of the C.P.R., or in the Swift Current district, where farmers have suffered the past two years on account of drought and hot winds, would be satisfactory.

An item appeared in the Official Report of the Debates of the House of Commons of the Dominion of Canada, Volume 145, page 4560, 1920, under the heading: To Provide for the Establishment of an Experimental Station at Swift Current, Sask., \$15,000.

There was considerable debate on this item. No real objection was raised, but Mr. Sutherland, Member of Parliament from Ontario, strongly objected to the preference shown the Province of Quebec regarding the establishment of experimental stations and substations. But a few statements from the debate are worth remembering. They were introduced at the beginning of the debate and are as follows:

Mr. Sutherland: '1 would like some explanation with regard to this item.'

Mr. Tolmie - (The Honorable Simon Fraser Tolmie, Minister of Agriculture): "I may say there is a large territory in the neighborhood of Swift Current where farming has been carried on under semiarid conditions. This runs for a number of miles, east and west of Swift Current, down to the boundary line."

Mr. Lemieux: "To the American desert?"

Mr. Tolmie: ''It is on the Canadian side, and it is most important that we establish an experimental station at that point so as to assist the farmers, and to fully inform them as to the best methods of farming under the conditions prevailing in that particular district.''

Mr. Lemieux: ''Is not that territory known as the prolongation of the American desert?''

Mr. Tolmie: "Yes."

In 1920, the administration of crown lands was vested in the Dominion Lands Branch, Department of the Interior. One duty of the Branch concerned the sale or exchange of school lands. An Order-in-Council, P.C. No. 1970, dated August 21, 1920, provided that Section 29, Township 15, Range 13, W3M 'be relinquished from the School Lands Endowment Fund for transfer to the Department of Agriculture for the purpose of establishing an Experimental Farm thereon.' A section of land elsewhere in the province was to be named to compensate (Saskatchewan Archives Board). There were enough delays to prevent the Department of the Interior from advising the Department of Agriculture about the transfer until some six weeks after Parliament had approved the exchange.

Consequently, the interests and urgent requests of the people, which were expressed through their elected representatives and the agricultural press, caused the Parliament of Canada and its Department of Agriculture to extend the Experimental Farms Service to southwestern Saskatchewan. The June 15, 1920, edition of the Swift Current Sun reported that J. H. Grisdale, Deputy Minister, Department of Agriculture approved the choice of Section 29, Township 15, Range 13, W3M as the site for the new establishment and gave the reasons for his selection: its soil pattern included sand, silt, and clay; the location was adjacent to the city of Swift Current, which could supply amenities; the main line of the C.P.R. was close by, and it would facilitate transportation.

Through its illustration stations, the Department of Agriculture had been providing information to farmers in southwestern Saskatchewan since 1915. These stations were situated at Herbert, Maple Creek, Pambrun, Prelate, Shaunavon, Tugaske, Zealandia, and Assiniboia by 1920; those at Avonlea, Chaplin, Fox Valley, Parkbeg, and Piapot, and many in southeastern Alberta were added before 1930. Edward C. (Ed) Sackville was the Saskatchewan supervisor. He worked from Saskatoon until 1921, when he was transferred to the Swift Current Experimental Station. For several years Mr. Sackville was in charge of all illustration stations in Saskatchewan, and he made regular visits to communities as distant as Yorkton and Estevan. Some of the better stories of what traveling was like 40 to 50 years ago are those of Ed Sackville's trips. One of his best yarns tells of the time he completed a 600-mile jaunt and, as he stopped in front of his home on the station, a front wheel dropped off his car.

The illustration stations had a useful function. For example, they compared the costs of producing grain in wheat-fallow, wheat-wheat-fallow, wheat-wheat-corn, or sunflowers, clovers, or other annuals or bienniels in two-, three-, five-, and seven-year rotations. They also indicated the variability of seasonal production and differences in the productivity of the environment between the districts where they were established. Unfortunately, the size of the portion used on each farm was only about 40 acres.

It is inconceivable to me that the five-year records of the illustration stations were not consulted when the decision was made to establish the Swift Current Experimental Station. Dr. E. S. Archibald, the Director of the Experimental Farms Service at that time, seldom approved a project or a program without obtaining considerable background information, but he supported strongly those programs that were logical, needed, and well-documented. I am sure that letters and discussions about agricultural experimentation passed between Dr. Hedley Auld and Mr. J. H. Grisdale, deputy ministers of agriculture for Saskatchewan and Canada, respectively. Nor can I forego the thought that Mr. J. E. Argue, Member of Parliament, Swift Current, probably consultedand harassed-the Hon. Simon Fraser Tolmie about the need for an experimental station in his constituency. Likewise, Mr. D. Sykes, M.L.A., Swift Current, must have discussed this matter with the Hon. C. M. Hamilton, Saskatchewan Minister of Agriculture at that time. The Swift Current Sun reported the interests of the local Board of Trade and the Swift Current Agricultural Society.

The Better Farming Conference was held in Swift Current on July 6, 7, and 8, 1920. This meeting was organized by the Saskatchewan Department of Agriculture to consider farming problems in the Dry Zone. People who attended were addressed by well-known agriculturists from North and South Dakota, Montana, and Minnesota, by government officers from Ottawa and Regina, and by prominent farmers from Alberta and Saskatchewan. Over 800 farmers attended the conference. It was held in Citizens Rink because no other building in Swift Current was large enough to accommodate the crowd. While Sir Frederic Stupart, Director of the Meteorological Service for Canada, was addressing the conference on the dry nature of the climate, it started to rain; and it continued so heavily and for so long, that Sir Frederic's address was drowned by the noise and forgotten by the thirsty farmers who rushed out to see the phenomenon. George Spence describes the event in his book Survival of a Vision. At the conference, Mr. J. H. Grisdale, the federal Deputy Minister of Agriculture, announced parliament's decision to establish the Swift Current Experimental Station. The conference passed two important resolutions: one to express appreciation to the federal government for undertaking agricultural research in the Dry Zone, and the other to ask the Saskatchewan government to appoint a commission to follow up the work of the conference.

Within a few days, the Better Farming Commission was appointed. The Commission was directed to enquire into agriculture in southwestern Saskatchewan, and to recommend the action necessary to stabilize soil and to prevent the disintegration of social services and society within the affected area. Twelve hearings were held in communities between Mortlach and Robsart. As a result, the Commission received briefs from individuals and local agricultural societies. In its January 1921 report, the Commission recommended that the Government of Saskatchewan enact legislation to: increase its Extension Service personnel, establish more experimental substations, institute soil surveys, and undertake a community pasture program.

Also included in the report was a list of 27 questions that farmers asked the Commission, questions that could not be answered with assurance at that time. Though presented in the interrogative, these questions were actually recommendations presented to formulate, in part, the program for research at the newly established Swift Current Experimental Station.

## THE SWIFT CURRENT EXPERIMENTAL STATION

For administration purposes during 1920 and most of 1921, the Swift Current Station was directed by Mr. N.D. McKenzie, Superintendent, Experimental Farm, Indian Head, Sask. In an article in the Swift Current **Sun** of March 15, 1921, McKenzie said that plowing and cultivating the virgin land on Section 29 would be completed by July 4, and that work would be contracted. Actually, this work was done with a tractor and equipment that were bought locally. It is known that Harold J. (Shorty) Kemp, who was hired as a student laborer, drove the tractor that pulled the plow and other equipment over some 460 acres. Shorty also had to keep the plowshares sharp, and he would ride to and from Swift Current on his bicycle to exchange the dull shares for sharp ones.

There was a lot of correspondence between Dr. Archibald and Mr. McKenzie about the new Station. The letters, preserved in the files at the Indian Head Experimental Farm, were made available to me by Mr. R. Foster, its present Superintendent. Within a few weeks after parliament had allocated the \$15,000 for the Swift Current Station, McKenzie had purchased lumber, cement, and hardware, and had accepted tenders to build a house, a barn, and a shop, and to erect fences. Because of the delay in completing the land exchange, the tenders had to be cancelled and the material that had been purchased was stored for spring delivery. But work went ahead rapidly in 1921.

Mr. J. G. Taggart was appointed to the position of Superintendent in September 1921. The appointment is recorded in the 1921 report of Dr. Archibald to the Minister of Agriculture. Some details of Taggart's background are reported in the October 1921 issue of the **Saskatchewan Farmer** under a headline that reads J. G. Taggart Appointed Superintendent, Swift Current Experimental Station.

J G Taggart, BSA, has recently been appointed Super-intendent of the Dominion Experimental Station at Swift Current Mr Taggart has had extensive experience in Western Canada and comes well fitted for this position

Mr Taggart was born on a farm near Truro. Nova Scotia He is a graduate of the Provincial Agricultural College at Truro and of the Ontario Agricultural College at Guelph. For two years he was district representative of the Ontario Agricultural College at Guelph

The first building at the Swift Current Research Station, erected in 1921, served as administrative and staff headquarters

For two years he was district representative of the Ontario Department of Agriculture for Frontenac County For five years he was instructor in the Provincial Schools of Agriculture at Vermilion and Olds, Alberta, and for two years was Principal of the School of Agriculture at Vermilion For the last year he has been in charge of the Power Farming Branch of the Ford Motor Company for the Province of Saskatchewan

The Swift Current Experimental Station was established in the late fall of 1920. The prime function of this farm is to discover suitable cultural methods and cropping systems for the dry areas of Southern Saskatchewan and Alberta. During this summer about 475 acres of raw land was broken on this farm and definite experimental work will be commenced next year. It is fortunate that a man of Mr. Taggart's education and experience has been secured for this competent work.

After he left Swift Current, in 1934, Mr. Taggart became Minister of Agriculture for the Province of Saskatchewan, and from 1949 to 1959 was Deputy Minister in the federal Department of Agriculture. He served also as Chairman of the Wartime Meat Board, Chairman of the Agricultural Prices Support Board, Food Administrator of the Wartime Prices and Food Board, and Director General, Special Products Board. Now retired, he lives in Ottawa.

Mr. Taggart's first report to the Minister of Agriculture, the Hon. William Richard Motherwell, is quoted:

Preliminary steps toward establishing an Experimental Station for Southwestern Saskatchewan were taken in 1920 Some fencing was done in the autumn of that year

In April 1921, Mr T Chalmers was appointed temporary supervisor under the direction of the superintendent of the Indian Head Experimental Farm Mr Chalmers did a large amount of preparatory work, putting the Station in shape to begin experimental work in the spring of 1922

During the season, 460 acres were broken, 300 acres of which was broken shallow and backset. The balance was broken in one operation to a depth of about six inches. The entire area was disced into reasonably good condition for seeding.

Twenty-five acres of the early breaking was seeded to oats for feed. Another forty acres was seeded to two varieties of fall rye. In the coming season the remainder of the broken land will be laid down to various rotations and other experimental work.

The breaking, backsetting and discing were done with a Case 15-27 tractor at an average cost of \$8.75 an acre



In 1921. Shorty Kemp plowed by tractor the 460 acres that were made ready for crops



The Swift Current Station developed rapidly after 1921 The upper panorama was taken in 1924. In the lower picture, taken in 1936, shelterbelts of many species of trees almost hide the building site. A house and barn were erected on the farm, a well was sunk, which provides a good supply of water, and all outside fencing was completed

At present the stock consists of ten work horses, two colts, one cow and one calf Six of the horses were purchased locally; the other four and the two colts were obtained from the Indian Head Farm.

Two complementary philosophies gave impetus to the work directed by Mr. Taggart. Mr. Taggart believed that the experimental program should provide information that would raise the standard of living in both rural and urban environments throughout Palliser's Triangle, and that the program at the Experimental Station had to show how farmers in the Triangle could cultivate 40 acres as cheaply as 10 acres in Palliser's Fertile Belt. These two philosophies were the foundations for the objectives and the projects of the experimental program at this research station; both are as valid today as they were 50 years ago.

J. K. McKenzie and Shorty Kemp joined Taggart to form the experimental team. Mr. McKenzie had been a student of Mr. Taggart at the Olds and Vermilion schools of agriculture and had graduated from the University of Saskatchewan in 1918. He is remembered as an outstanding raconteur, a public speaker, and a prolific writer for farm papers. His responsibilities comprised the cultural, machinery, and livestock programs. He brought the first test combine to Western Canada, and his reports on its effectiveness were responsible for its widespread use by 1928. Mr. McKenzie resigned from the Station in 1929 to join the Caterpillar Company, and he is now living at Priddis, Alberta. In 1969 he was made an Honorary Member of the Canadian Society of Agricultural Engineering.

Shorty Kemp worked as a student in 1921 and 1922 and as a graduate assistant in 1923. He was classified as a laborer until his permanent appointment in 1928. His responsibilities included the cereal, forage, and horticultural testing programs and Station beautification. He was Acting Superintendent between the time that Mr. Taggart resigned and before L. B. Thomson's appointment in July 1935. In 1946 he transferred to the Experimental Station at Saanichton, British Columbia. He was keenly interested in plot machine design, and he became recognized as a world authority on that subject. His plot seeders and threshers are probably his best-known contributions. He also selected Prospect barley, which was a natural cross between Black Barbless and Albert. Prospect was known as Sans Barb Early in thé testing program of the 1920s. He was awarded a Fellowship in the Agricultural Institute of Canada in 1956 and, more recently, was elected an Honorary Member of the Canadian Society of Agricultural Engineering. He died at his home in Sydney, British Columbia, in 1969.



The first field day, in August 1921, was organized by the Swift Current Board of Trade

### EXPERIMENTS IN THE 1920'S

All of the early Station reports were very impersonal, even more so than they are today. The numbers of horses, cattle, sheep, pigs, and chickens were always reported, even the numbers of eggs that the chickens laid. But the people who did the work and the many interesting events were ignored. Nowhere in the reports does it say that M. C. (Corny) Smith came in 1926 to drive a six-horse team and was appointed foreman in 1929, or that the elevator-cereal building burned in September 1931 during a thunderstorm, or that the machinist and the carpenter had a grudge fight nearly every Monday morning. Not a word is told about the Station picnics (field days), the first of which was held August 1921 under the sponsorship of the Swift Current Board of Trade. As a matter of fact, this event perturbed Dr. Archibald because he had not been informed about the picnic before it was held. The community dances in the loft of the horse barn are not reported, and not even a note tells of how the last dance was interrupted while the sides of the barn were strengthened with telephone poles to prevent collapse of the building.

Much experimental work was started in 1922. The agronomy plots comprised about 40 acres adjacent to and including the present building area. Shorty Kemp started experiments to select suitable varieties of cereal, forage, and horticultural crops. Field husbandry studies were conducted on the land across the C.P.R. tracks and on the slope to the east. The first of two combines in Western Canada was obtained from Massey-Harris that year, and the limitations and advantages of the No. 5 Reaper-Harvester were studied. Other work was concerned with crop rotations.

Soil investigations were started. Plot and tank studies were located in the area of the Soils Building. This work was directed by the late Sidney Barnes, whose headquarters was at Ottawa. Mr. Barnes spent only summers at the Station until 1929, when he was seconded to a local position and there stayed until his death in 1935. A great deal of the soils work being done today was started by Mr. Barnes. Archie Budd joined Mr. Barnes as a technician in 1926.

Some of the early experiments seem odd in view of our present knowledge. One of great interest in the early 1920s was the design and operation of stubble burners.

Though stubble burning is frowned on today, there were logical reasons for the practice five decades ago. The land was virgin and wealthy, the vegetative growth was heavy, and machinery and power to cultivate heavy trash were limited. The need was realistic at that time, and it was found that a harrow, pulling burning trash, was as effective as expensive implements in removing the excess stubble. G. N. (Grant) Denike joined the staff as a student in the summer of 1926. He worked here again in 1927, and was appointed Assitant Superintendent in 1929.

Before J. K. McKenzie left, he had proved the worth of the combine, and farmers were buying these machines. Though few may have realized it, many of the first combines were powered by horses, either all of them in front or part of the team pulling and part pushing. Before 1928, Mr. McKenzie introduced and recommended the swather and the barge.

L. B. Thomson and Dr. S. E. Clarke were appointed to the staff in 1926. But they were not part of the Station. Their responsibilities were with rangelands and their summer work was at the Experiment Substation, Manyberries, to where they were transferred permanently in 1929. The 1926 report states also that chickens were under test and that Herb Tatton was transferred from Indian Head as Poultryman.

The building program was well under way by 1926. Four houses, the large horse and cattle barn, upright and trench silos, several granaries, and an elevator with a cereal building attached, straw sheds to house steers, a small shop, and several chicken runs were completed. The building area was landscaped, other plantations were set out along the roads, and the planting of shelterbelts to enclose the garden and orchard was begun.

The soil of Section 29. Township 16. Range 13. W3M proved not to be representative of the area. In 1924, the east half of the South Farm was rented for field husbandry and machinery tests and became Station property in 1965: the west half of 16 and the southwest quarter of 21 were purchased in 1937. Where the east-west road divides the two quarters of the W 1/2 of 16, wind erosion and deposition had built a ridge of silt about ten feet high that had buried two fence lines, the second of which had been built on top of the first. The Campbell farm on the S 1/2 of Section 32 was

purchased in 1928.

There is a natural break in the history of this research station somewhere between 1930 and 1935, 1930 being probably the more logical date. Not only did the stock market crash of the previous year bring devastating effects, but farmers were in much the same position they are in today; they had large supplies of wheat that they refused to sell at fire-sale prices, and few countries wanted to buy the wheat at any price. The yearly reports of the Station ended in 1930, and afterwards only five-year reports were published. J. G. Taggart and G. N. (Grant) Denike have pointed out that the first period in the history of this station ended about 1933 or 1934, because the economic conditions by that time necessitated a reassessment of the experimental program and the Station's responsibilities.

After E. W. Stapleford retired as principal of Regina College in the early 1930s, he became concerned about social conditions throughout Saskatchewan. He was commissioned by the Rt. Hon. J. G. Gardiner, Minister of Agriculture for Canada, to investigate drought stresses on the Prairies. His 1938 report, "Rural Relief in the Prairie Provinces," indicates that the period from 1922 through 1929 was one of relative prosperity in all Saskatchewan: The average selling price of wheat was 98 cents a bushel; the average yield was 18 bushels an acre; the average annual wheat sales amounted to over 200 million dollars. Because precipitation was above average, it favored production and careless cultural practices. This prosperity created an optimistic economic climate, and little preparation was made for the eight-year economic and production drought that followed. The favorable climate that existed between 1922 and 1929 undoubtedly influenced the experimental program at this station.

To bring an account of this period to a close, I wish to summarize the results attained at the Swift Current Experimental Station in the agronomic, livestock, cultural, horticultural, machinery testing, soil, and illustration station programs.

Exotic species, varieties, and strains of annuals and perennials were tested for their adaptability to the environment. Marquis was the standard spring wheat, and it made up 90 percent of the bread wheat grown in the Northern Great



This model of a V-belt rod-row seeder was the first of several implements that Shorty Kemp designed

Plains. The recommended oat varieties were Banner and Victory; those of barley were Trebi and Hannchen. It is interesting to note that in 1927 Dakold fall rye was the popular variety and it yielded 59 bushels per acre on the plots. No flax variety outyielded Common. Mindum and Kubanka durums were tested, but the 1930 report states that "there seems no reason whatever for any farmer in South-west Saskatchewan to consider growing durums in place of common wheat." The only cereal improvement program was with the natural cross known as Sans Barb Early, which was licensed as Prospect in 1940.

Forage crop studies were concerned with corn, sunflowers, and oats for silage. Grasses for hay to develop horsepower were recommended, and grass-legume mixtures and cereal hays were suggested as feed for dairy cattle. The highest yielding hay mixture was spring rye, Banner oats, and barley grown on summerfallow. Crested wheatgrass, brome, and western rye (slender wheatgrass) were the most productive perennial grasses; Grimm and Ladak alfalfas were the highest yielding legumes. It should be mentioned, however, that perennial grasses and legumes sown with a nurse crop (wheat, oats, or barley) seldom established satisfactory stands. Much interest was displayed in hay for horses, and strain testing of western rye was the only plant improvement study with perennials until the 1930s. Fruits, vegetables, and ornamentals were studied, and recommended varieties were reported in news media and bulletins. The species under test 40 years ago are the same as those under test today, but the varieties are different.

Replicated tests were reported in 1924, usually on 1/50th-acre plots in triplicate. Reports give no evidence that yield or growth data were analyzed statistically; comparative yields were based on the mean of the three replicates. The rod-row method of comparing varieties was introduced in 1928.

The livestock comprised Clydesdale horses, Shorthorn and Holstein cattle, Yorkshire pigs, and a laying flock of about 300 Barred Rocks. However, because of lack of pasture the Holsteins were sold in 1930 and the Shorthorns a few years later. The horses were pensioned as tractors replaced them. But little experimental work was done with Shorty Kemp's portable plot thresher was contrived for use in threshing small plots of elite and registered cereals A sophisticated portable plot thresher was designed at the Swift Current Research Station



The Massey-Harris No 5 Reaper-Thresher bought in 1922, was the first working combine in Western Canada The one in this picture pulls a wagon that catches the grain, but a later machine had an added hopper

livestock and none was completed, except with chickens.

Cultural studies showed the advantages of the wheat-fallow rotation for dry years, though the wheatwheat-fallow rotation was more productive when precipitation was above average for three or more successive years. Longer rotations that included cereals, grasses, and row or root crops were unsatisfactory. All cultural practices were cost accounted. The cost of cereal production on fallow, including costs for labor, machinery, and land was about \$8 per acre. The wheat-fallow rotation from 1922 to 1929 netted \$3.05 per acre, but the wheat-wheat-fallow rotation provided a net income of \$4.72 per acre. The advantage of the three-year rotation was obvious, not only because the annual precipitation was well above average in the 1920s but because the soil was new and fertile.

Tests with commercial fertilizers, started in 1926, were conducted on the Station and on selected farms in the district. Triple superphosphate, ammonium phosphate, and ammonium sulfate were the only fertilizers available. On heavy clay soil, where there was an adequate moisture reserve, the application of 60 or 120 pounds of triple super-phosphate increased yields by eight bushels an acre. But these rates of application gave no response on stubble in a wheat-wheat-fallow rotation or on sandy loam soils in a wheat-fallow rotation. Fertilizer applications advanced maturity, improved stands in fields affected with wireworms, and helped to control weeds; but they did not affect the milling quality of the grain.

Though studies on fallow substitutes were important, results were disappointing even under the most favorable climatic conditions. Corn, sunflowers, peas, potatoes, and millets were grown as fallow substitutes, but wheat yields were low in the next crop year. Also, cereals were grown in two- or three-adjacent six-inch rows with a six- to eightfoot fallow strip between. Weeds increased no matter which substitute was tried, and on occasions they grew so prolifically that fallow substitutes were total failures. Alternatively, a failure of the fallow substitute often resulted in a high yield of the succeeding wheat crop, sometimes as high as that after fallow. The results were so confusing that the logical recommendation was to not attempt fallow substitutes. From 1923

through 1930 no fallow-substitute wheat-rotation had yields equal to the 15 bushels per acre produced on the three-year wheat-wheat-fallow rotations or the 12.5 bushels per acre on the two-year wheat-fallow rotation, and seldom equaled the yield of ten bushels per acre of continuous wheat.

The work that Sidney Barnes directed had to do with moisture conservation and weed control. Mr. Barnes' reports showed that about 30 percent of the total precipitation was stored in the soil during the 20-month fallow period in the wheat-fallow rotation, but that less than half of this would have been stored if weeds had not been controlled. The ratio of transpired water per pound of wheat grain harvested was 1348 pounds in the wheat-fallow rotation, but over 2000 pounds when the rotation was wheat-wheat-fallow. His results showed that it was weed control, and not the drymulch practice, that conserved moisture. Reports of illustration stations emphasized that early-season fallow was needed and that surface cultivation with the wheatland plow (oneway disc) controlled weed growth and conserved moisture on most soil types. Careful cultivation reduced the cost of summerfallow to about 80 percent of the cost by traditional farming methods. Throughout the area, the cost of growing wheat was \$12 to \$25 an acre. The higher cost was incurred when wheat yielded 40 to 50 bushels an acre, because harvesting and threshing were costly operations.

But it was the machinery testing program that held farmer interest during the first 10 or 12 years of this station's history. So many new power, cultural, and harvesting machines were introduced, tested, and recommended for use that those years might be called the golden age of machinery development. With few exceptions, all the agricultural machines in use today were introduced and accepted by farmers during those years. Since then, agricultural engineers and machine companies have directed their research to improving design and to meeting the needs of different crops and soils.

The first patent for a combine was granted in 1828 by the United States Patent Office. M. E. (Murray) Dodds reported in the Family Herald and Weekly Star, November 6, 1952 that the first combine was brought to Saskatchewan in 1910. But by 1922, the only combine operating in Western Canada was at the Swift Current Experimental Station. It was



a Massey-Harris No. 5 lent by the company for testings. Nearly 10,000 combines were operating in Western Canada by 1932, and as more and more of them came into use, binders and threshing machines grew high on the junk pile of obsolete farm equipment (5). All research on the oil-pull tractors, and the inefficient eight- to twelve-horse teams.

Cultivation machines had their heyday during the decade that began in 1920. Machine innovations kept suppliers happy as they sold them to the farmers, who were fairly wealthy. The duck-foot cultivator, the rod



The practice of burning stubble to prepare a seedbed for the following year was common till the late 1920s, when tractor power became available

combine was reported in a Station bulletin, published in 1928, in an article titled "Seven Years Experience with the Combined Reaper-Harvester, 1922 to 1928, on the Dominion Experimental Farm, Swift Current." In the 1930 Station report, the Reaper-Harvester is called the combine, the name given to the machine by the local farmers.

The combine was versatile. It could thresh standing, windrowed, or barged crops, as well as those cut with a binder. Consequently, it was often used to thresh cereals harvested with headers, swathers, and barges. All these machinery additions lowered harvesting costs, and helped to reduce not only grain losses but the length of time between seeding and threshing.

The gasoline-powered farm tractor was introduced and accepted by farmers during the same period. It had drawbar power equivalent to that of a six- or an eight-horse team. It was reliable and fairly trouble-free. This general-purpose machine ended the era of the giant steamers, the clumsy Rumley, Ranson, and other

weeder, the one-way (with and without seeding attachments), the stubble burner, the power take-off, rubber tires for tractors, and blades were tested to find out their usefulness to conserve moisture, kill weeds, and control soil drifting. Tests with crawler-drive and wheel-drive tractors found out their slippage under different loads and different soil conditions. Grant Denike introduced pneumatic rubber tires for tractors in 1933. Their use saved fuel, reduced repair costs, and eased the tempers of the operators, especially after weights were added to the wheels to prevent bounce. These many advances are reported in the 1931-1936 Report of this station.

Publications were classified as bulletins, pamphlets, and seasonable hints. There was little difference between the bulletins and pamphlets, but seasonable hints, published two to four times a year from 1915 to 1933, covered many subjects in short articles. Experimental Farm Service officers published in many farm papers. Two important bulletins were released from this station, one by J. G. Taggart and J. K. McKenzie on the reaper-thresher, and one by S. Barnes and E. S. Hopkins on the eight-year tank experiments. An exceptionally interesting press article appeared in the March 15, 1927 issue of the **Grain Grower's Guide**. It was titled "Progress and the Junk Pile," and was written by J. K. McKenzie. A copy is in the Station library (Scrap Book No. 1, page 104).

The period ended. It will be recalled that the Station was founded because of drought and wind erosion throughout Palliser's Triangle. Until 1930, the Station had had a break from the stress of wind and drought. Experimental work progressed and good relations with farmers and ranchers were established. But the period ended on a difficult note. The return of drought brought questions. They could only be answered by a revised research program.



Still on display are the first pair of tractor tires in Western Canada They testify to 3000 hours of work

# THE EARLY PERA YEARS

Several additions to the staff took place during the last few years of J. G. Taggart's superintendency. Jack Waddell came in 1927 as a laborer, and later as the elevator operator. Peter Janzen joined the staff in 1930 as a student laborer, and as a graduate laborer in 1933. Taffy Morgan arrived in July 1930. Dave Morgan was hired in April 1931 as a teamster to work with Mr. Kemp in cereals. His important contribution during his first year of employment was to turn in the alarm for the fire that destroyed the cereal-elevator building. Grant Denike often quipped that it was a good thing Dave didn't report the fire a half-hour sooner, because then it might have been possible to save the monstrosity. R. M. (Bob) Blakely joined the Station in 1932 as a horticulturist and. later, he was responsible for the poultry work. In 1934, H. A. (Herb) Purdy and W. M. (Bill) Harding were appointed assistants to work with Mr. Kemp in plant improvement projects. Helen Mitchell succeeded Mr. Mack as a secretary-accountant. Jessie Bain went to greener fields in Alberta. Many changes and additions in staff caused the activities of the Station to expand beyond the policy outlined in a letter from Dr. Archibald to N. D. McKenzie in November 1920: "It is not my intention to make Swift Current a large Experimental Farm dealing with all phases of our work, but rather to make it a Farm having to do very largely with field husbandry problems." Dr. Archibald chose the wrong superintendents to administer his limited policy.

And more leaders were needed. At many levels questions were being asked about farming. Answers had to be given. Farmers asked how to stop soil drifting, and what crops to grow on their eroded land when the rains came. Municipal officers asked why taxes and seed loans were unpaid, and why farmers pulled the lien papers off their empty granaries. Business asked why legislation was not passed to help the job of servicing drought-stricken communities. Provincial legislatures asked why the federal treasury did not come to their aid.

The legislatures of the provinces of Alberta and Saskatchewan were in a difficult position at that time. Until 1932, the natural resources of both provinces were administered by the federal government and the revenues from those resources were retained. In 1932 it seemed that the time had arrived to transfer the resources from Canada to Alberta and Saskatchewan. A decade of relative prosperity had passed, and most provincial and municipal coffers had satisfactory reserves, although they were not enough to meet the effects of drought and the economic distress that lasted until 1938. The average price of wheat from 1930 to 1937 was 60 cents a bushel, the average wheat yield for Saskatchewan was nine bushels an acre, and Saskatchewan wheat that was sold amounted to less than 100 million bushels a year. In 1932, the price of wheat in commercial trading was the lowest in over 300 years. It was 34 cents a bushel. Such a small figure meant that farm income was less than 30 percent of the amount it had been from 1922 to 1929, and most of this was earned in Palliser's Fertile Belt. The Triangle bore the brunt of the disaster.

The following story related by Grant Denike illustrates one problem that faced experimental agriculture. A farm a few miles south of Swift Current, on which the dry mulch fallow method was practiced, was selected as an example of what could be achieved by good farming methods. The farm operator was awarded a Better Farming Certificate by a local service club. There were no weeds, no stones, no trash, and no cultivator furrows anywhere on his half section. Its surface was as smooth as a billiard table. But the day after the farm was so singularly honored, the west wind started to blow. It blew for three days, at a velocity as high as 35 miles an hour. When the wind abated, the soil had been swept away to the depth of cultivation. It might have eroded further, but the hidden stones in the near surface settled out to form a protective layer. The same discouraging story could be told about many farms in the Triangle.

The Government of Canada recognized its responsibilities in the recent transfer of the natural resources to the provinces of Alberta and Saskatchewan. The Hon. Walter Weir, Minister of Agriculture in the government of the Rt. Hon, R. B. Bennett, introduced legislation to ease agricultural distress in the Triangle. The act was called ''Prairie Farm Rehabilitation Administration'' (PFRA). But before it was put into effect, Mr. Bennett's Conservative government was defeated, and the program had to await implementation by the succeeding Liberal government of the Rt. Hon. William Lyon McKenzie King. Fortunately for Canada, the Triangle, and the farmers, Mr. King chose the Rt. Hon. J. G. Gardiner as Minister of Agriculture. Mr. Gardiner had experienced the disasters of drought on his farm near Melville, Saskatchewan, and when he was Premier of Saskatchewan he became well acquainted with problems of the farmers and the agricultural industry.

PFRA was not just a dream of politicians. It was based on three sound and practical objectives: water conservation, community pasture development, and a soil erosion control (cultural program). Each of these objectives had a background of knowledge, of acceptance by farmers, and of local success.

After the First World War, the Department of the Interior continued its program of measuring water resources. Sites were selected for dams, irrigable areas were mapped, and farmers were helped to develop small water-use projects. Among the projects that were studied were the water resources in the Cypress Hills, and the drainage from those hills into the irrigable lands along the Frenchman River, and the Maple, Gap, Swift Current, Battle, Sage, and other creeks. The reports of this work were available to PFRA when they were needed.

A provincial community pasture program had been operative in Saskatchewan since the Better Farming Commission had recommended it as government policy in 1921. The management and administrative experience in the 1920s. at the Matador, in the Great Sand Hills, and in southwestern Saskatchewan forecast the success of the PFRA pasture program. But the idea of the federal government enlarged the principles underlying the provincial legislation. Under PFRA, farm families were moved from distressed land and were assisted financially to establish themselves on irrigated farms in Alberta or on divland farms in more agriculturally stable areas in Saskatchewan. The properties that were released, together with other Crown holdings, were organized in community pastures by the Saskatchewan Land Use Board. Fences, water supplies, corrals, and buildings were erected by PFRA as the federal contribution.

The Dominion experimental farms and stations had important responsibilities in both the water conservation and

A single-share walking plow was powered as often by oxen as by horses



The header barge was popular for harvesting short crops Many models were designed by farmers to meet individual needs This Shorty Kemp model was exhibited at the World Grain Show at Regina. Saskatchewan. in 1933 This Swift Current forage plot harvester No 2 gives evidence of the change from hand labor to nearly complete mechanization

community pasture programs. However, the work was not experimental; it embodied the practical application of sure knowledge that was known by the mid-thirties. Actually, a great deal of knowledge was gained from this work, and it helped to re-evaluate the experimental program under way at this station after 1945.

The cultural program was not included in the PFRA act of 1935; it was added in the spring of 1937, when Mr. Gardiner piloted it through Parliament. Five men have been credited with formulating this program: E. S. Archibald, Director, Experimental Farms Service; L. E. Kirk, Dominion Agrostologist; L. B. Thomson, Superintendent, Experimental Station, Swift Current; J. G. Taggart, Minister of Agriculture, Government of Saskatchewan; and A. C. (Ace) Palmer, Research Station, Lethbridge. The terms of the original act (1935) provided for the construction of major works: large and small dams, dugouts, and fencing of community pastures. But the development of the land to use the stored water as well as the regrassing of eroded land in community pastures and rehabilitation areas were to be responsibilities of the provinces. The provinces, however, had neither staff, money, or knowledge to undertake this work. When the PFRA cultural program was added to the act, provisions for completing the job of rehabilitation were available. The cultural provisions of the act were administered by the Experimental Farms Service; the work of rehabilitation and development was directed by staff members from experimental farms at Brandon and Indian Head, and the stations at Swift Current, Scott, and Lethbridge.

L. B. Thomson was appointed superintendent of the Swift Current Experimental Station in July 1936. For a short time he was superintendent of both the Swift Current Experimental Station and the Range Experiment Station at Manyberries; he was also Chairman of the PFRA Action Committee. He relinquished his extra duties when Harry Hargrave became Superintendent at Manyberries, and John Vallance was appointed Superintendent of Water Development for PFRA.

To those of us who worked with him, Leonard Baden Thomson was a great man. As long as we were working, or apparently working, L. B. didn't bother us. But, if by chance, it appeared that our job of the moment was not pressing, he would hit on a new idea for a job that we would have to undertake and finish. If a good job was done on a current project, L. B. added larger responsibilities immediately. He believed the staff at this station was the best in the world, and he supported all of us to the ultimate. On occasions he supported us beyond his authority, because I heard him say more than once, "You do the job; I'll find the money." His administration was an enigma to many officials in our headquarters in Ottawa, but not to three men; the Rt. Hon. James Garfield Gardiner, Minister of Agriculture; Dr. H. Barton, Deputy Minister of that Department; and Dr. E. S. Archibald, Director of the Experimental Farms Service. We know he created headaches for those three men as well as for others, but we also know that we received our pay cheques on time, and that the accounts we authorized were always paid.

L. B. was not an empire builder, but he knew that lots of people were needed to make the PFRA cultural program a success. Cliff Shirriff, A. W. (Arn) Platt, and J. A. (Al) Murray joined the staff in 1936. Dr. S. E. Clarke came from Manyberries to head the forage crop work, and he was joined by Dr. J. L. (Lin) Bolton and J. A. (Scotty) Campbell, Murray Dodds, John Parker, Stu Forsaith, Jim Beamish, Jack Thompson, Glenn Downing, Don Horne, Stewart Shields, and others with engineering training were recruited to develop irrigation projects. Miss M. B. (Barb) Morice became head of a secretarial staff. Mrs. Sidney Barnes was appointed librarian before the end of the 1930s. D. H. Heinrichs, D. S. McBean, Pat Metheral, Walter Burns, Roy McKenzie, and I were put on the PFRA cultural program in 1938 and 1939. Joe Dickie, Harry Smith, Don Baillie, Joe Buist, Bill Maley, George Torrans, Bob Grinder, Ray Honey, and many others were hired as teamsters, truck drivers, or equipment operators to work on the Station or on one of the several developing PFRA projects. Homer Sinclair was in charge of records till he enlisted in the Canadian Army. He was succeeded by John White.

The Soil Research Laboratory, established in 1936, continued the intensive studies in moisture conservation, soil fertility, and wind erosion control started by Sidney Barnes in

1922. Dr. J. L. Doughty was appointed officer in charge; his staff comprised Dr. W. S. (Bill) Chepil, J. J. (Joe) Lehane, R. A. (Reg) Milne, Dr. W. J. (Bill) Staple, F. G. (Frank) Warder, A. (Al) Stalwick, F. (Fred) Bisal, and supporting technicians. This unit remained as a separate entity under the PFRA cultural program until 1957, when it became a section of this station. Its first important report was printed in July 1943, but 20 research papers were published in scientific journals before this date. This laboratory provided answers to questions about dryland agriculture that have had world-wide acclaim.

One of the most far-reaching developments in the late 1930s was the Agricultural Improvement Association (AIA) program. This movement arose from the co-operative action of farmers, usually within a municipality, to adopt the strip-farming practice that had proved successful to the control of wind erosion near Monarch, Alberta. Associations had been formed at Shaunavon, Aneroid, Gull Lake, and Limerick before 1935, and all had been assisted by the Swift Current Experimental Station. When PFRA support was available, the AIA program in southwestern Saskatchewan expanded rapidly under the direction of Cliff Shirriff, Peter Janzen, and Al Murray. Until 1939, the organizations were given cash grants to cover costs of administration and grass and legume seed. Trees were free to AIA members. When necessary, this station lent equipment for emergency control of soil drifting. It was through the AIAs that the strip and trash-cover methods of farming were introduced throughout most of southwestern Saskatchewan. These techniques controlled wind erosion and conserved moisture, but as we will see, they introduced new problems. Herb Purdy seeded roadside ditches and burrow pits to control weeds.

Our Assembly Hall was the center for the collection, packaging, and distribution of crested wheatgrass seed to AIAs and their members. Over a quarter-million pounds of grass and legume seed were given out in 5-, 10-, 75-, and 100-pound packages. One of the unforeseen advantages of this program was the knowledge acquired by many farmers of how and when to sow grass. An estimated 50,000 acres in 5- to 50-acre plots were established on farms throughout the area under this scheme.

Cumbersome steam and oil-pull tractors were used in plowing millions of acres of prairie sod before 1930 This picture was taken at Val Marie about 1937, when the flats along the Frenchman River were being developed for irrigation



Blades to break sod and to cultivate stubble fields became common during the 1940s Simple models were used until about 1920

The one-way reduced costs of production and it was the cultivating machine most generally used in the late 1940s This particular one is smaller than the models used on many farms in Western Canada during the 1960s

Four-wheel-drive tractors developing 100 or more drawbar horsepower are not uncommon. They pull equipment to cultivate or seed 75-foot swaths



Regrassing 300.000 acres of abandoned farmland in PFRA community pastures with crested wheatgrass during the late 1930s was done by local farmers under the direction of the Experimental Farms in Saskatchewan To beat grasshoppers, poisoned bait, shoveled from a wagon box, was spread by a fan under a barrel



Fields eroded by wind on abandoned farmland in the mid-1930s were leveled, ridged, and sown to rye to obtain a stubble protection before they were seeded to crested wheatgrass and alfalfa. Four conservation projects were managed by the Swift Current Research Station.

There were a few areas where farm abandonment was complete and where erosion was causing distress to neighboring farms and nearby villages. Four of the worst in southwestern Saskatchewan were at Mortlach, Meyronne, Vanguard, and Cadillac. These lands were rife with conditions of almost desert intensity. Their reclamation was assigned to the Swift Current Station, and after three summers of work all areas were completely stabilized. Transformation was slow and often discouraging, particularly when two months' work could be lost by a one-day windstorm. The usual procedure was to corrugate the land by listing in such a way that clods were brought to the surface. The area was then sown to fall or spring rye by broadcast method. After a stubble was obtained, the land was sown to grass-legume mixtures. Many of the listing machines used were standard-manufactured equipment, but variations were also contrived by farm and village shops. Several experiments in tree planting were undertaken by the Indian Head Forest Nursery Station; one of these plantations is a few rods south of the Trans-Canada Highway at Mortlach.

The illustration stations were replaced by district experiment substations. Only a few acres of the farms where illustration stations had been established were cropped according to directions from the Experimental Farms Service. But on the experiment substations the entire farm was the basic unit. With the exception of the substation at Valiean, all were at least one section in size. All were privately owned. but the general management, cropping practices, and livestock projects were operated under a co-operative agreement between the farmer and the Experimental Farms Service. Each farm operator received a small annual payment for his co-operation and for the work of keeping a complete set of records. Ten new substations were started in southwestern Saskatchewan. Four of the original illustration stations were revitalized and added to the new program. The great advantage of this plan was the opportunity to test crops and cultural practices on a field scale that had proved successful on experimental plots. Of equal importance, each substation became a center from which good farming practices radiated to adjacent farms. Peter Janzen and N. A. (Norm) Korven directed this program in southwestern Saskatchewan.
It has been said that research at the Swift Current Station was discontinued during the years from 1935 to 1940. This is partly true, but it is misleading because of its generality. Actually, there was a strong research program during those years. But for those employed under the PFRA, and on the cultural program particularly, and if research is interpreted as an organized industry based on formal project outlines and step-by-step answers to questions, the remark is correct. For most of us, there wasn't time to have project outlines approved. The work demanded giant strides after equally long hops from day to day. Though the work may not have been authorized as projects, the Parliament of Canada had authorized jobs to revive the agricultural economy in the Triangle. That was all the authorization necessary. It was a most exciting period. Though there were few formal experimental projects, the PFRA cultural program provided factual data that were interpreted in terms of research.

The range studies introduced the ecotone concept of the vegetation-climate relationship within the Triangle. The natural cover was a mixture of plant invaders from northern and southern environments. The Triangle was an area of convergence, where none of the dominant plant species were really at home and where weeds grew better than grasses. The vegetation responded quickly to the stresses of drought, to above-average summer rainfall or temperature, and to overgrazing. The need for exotic grasses and legumes to revegetate the eroded land was supported by this observation.

When agricultural engineers on the irrigation projects at Val Marie and Eastend learned that the recommended standards for canals, head ditches, drainage facilities, heads of water, and length of flow could not possibly apply to the heavy clay soil where the slope was often no more than one foot per mile, they had to make drastic changes. Water had to be moved across fields quickly. This meant that head ditches had to be twice as large as those that normally were satisfactory. With near-level land, the water flowed slowly and only for short distances. It was necessary, then, to develop a complicated drainage system to prevent ponding. Eventually field ditches were replaced by border dykes.

The winter of 1937-38 was disastrous for the ranchers who were trying to maintain their breeding herds. Insufficient forage was probably the main distress, but there were others. Excess selenium in the winter feed harvested around the Great Sand Hills and eastward as far as Mortlach became a new problem to be solved. Lin Bolton and Al Stalwick realized that a high selenium content in the soil was associated with the surface density of two legumes, narrowleaved milk-vetch and two-grooved milk vetch. In 1938, the range survey located ranches where cattle losses had been heavy the previous winter and symptoms indicated selenium poisoning. Cows that lived were barren, and they lost their hooves, tails, and hair. With the help of Dr. W. D. Davidson, Dominion Veterinary Service, cows were slaughtered and postmortems were conducted, after ranchers gave their permission. The postmortems supported the external evidence that selenium was the causal factor.

Cattle losses did not end when the drought broke. With the return of average rainfall, larkspur and arrow-grass grew profusely and cattle died when they grazed these plants. The nitrate in oat hay processed for winter feed often wiped out small herds in one night. A few years later, cattle deaths were traced to the high nitrate content of water in wells. The work of several officers at this station provided the reasons for the livestock losses.

The agricultural engineering division was concerned with the use of water to increase pasture growth. Grant Denike and his associates built dykes, contour furrows, and dams at this station and at the Manyberries Range Experiment Station from 1935 to 1937. These structures spread spring runoff over the native and cultivated grassland. Though the acreage where water was spread or impounded was often small, the increased yield was often as much as 15 times the amount produced before development. The increase was due largely to an increase of the heavier-yielding species in the plant association.

Two PFRA community pasture projects were a grass survey and regrassing. The grass survey measured the cover on each section within a pasture and the acreage that needed to be regrassed. Also, it devised the point-quadrat-yield method to estimate the grazing capacity of grasslands. Reseeding the abandoned cultivated land followed. But probably the most important result of these projects was the assessment of the regrassing work and of grazing capacities under careful management.

These programs, and others, provided material for many varied publications. Departmental bulletins, scientific papers, articles for the agricultural press, reports for national and provincial committee meetings, theses, and weekly letters published carefully recorded data from pasture surveys and irrigation programs.

When "Seasonal Hints" was discontinued in 1932, programmed communication between the Experimental Farms Service and the farmers through the medium of the agricultural press practically ceased. To compensate for this lack, weekly letters were started and they have continued ever since. A copy of each of the 1800 weekly letters is in our library. Present distribution numbers about 160 copies to news media and to companies and services concerned with agriculture. L. B. Thomson wrote the first weekly letter. Peter Janzen and Joe Ficht have been editors over the years.

The first scientific paper from this station was published in the January 1932 issue of **Scientific Agriculture**. Sydney Barnes was the author of the article entitled ''Economic aspects of drought resistance.'' The second paper, written by Shorty Kemp, was published in the same journal in September 1934. Its title was 'Studies of solid stem wheat varieties in relation to wheat stem sawfly control.'

Though the Station's job was agriculture, staff members had many diversions. Dave Morgan tells about a Station soccer team that played in a city league during the 1930s. It was made up of Station employees and officers from the Entomological Service who were investigating wireworm, cutworm, sawfly, and grasshopper control on wheat fields in southwestern Saskatchewan. Grant Denike coached the Indian hockey team for a short time, and L. B. Thomson was the team president in the early 1940s. Taffy Morgan was the Indians' number-one fan. Our Station's bonspiels, corn feeds, picnics, and dances were welcome events. There was also a 16-voice male chorus, directed by Walter Burden, but it must be admitted that its quality was less than its volume. Taffy Morgan started our annual children's Christmas party in 1933. Ed Tanguay was the first Santa Claus and, by hapless chance, he and his pack stuck in the chimney after the long and eventful trip from the North Pole. While Taffy was directing the children in "Jingle Bells," Ed joined the chorus with "La Marseillaise," in a clear Parisian tenor. No one wants to admit that he was the entrepreneur of the first pre-Christmas shop party, nor can the year of this party's inception be remembered with assurance.

#### THE SECOND WORLD WAR AND THE SWIFT CURRENT RESEARCH STATION

Research was often overshadowed by the magic of PFRA during the late 1930s. But research progressed. All of the important studies were intensified as needs became evident and as trained people became available.

Problems other than those of soil drifting and social stress became evident. Actually, the research to control soil erosion was well advanced; research concerned with social stress will never end. Invasions and the rapid spreading of exotic and indigenous weeds caused loss of the moisture that was needed for grain and forage. Plant diseases took their toll. The exaction was sometimes the entire crop. Grasshoppers, wireworms, cutworms, and sawflies were the most destructive of the insect predators. One or another of the experimental farms or stations was working on an answer to the questions asked by the farmers about those weeds, those diseases, and those insects. The Swift Current Station had action programs made up of many interests.

Shorty Kemp had foreseen the need for a wheat more adapted to the environment than the varieties then being grown. His work with plot machinery in the 1930s, and more recently, have overshadowed his contributions to plant improvement. He introduced numerous strains and varieties of cereal and oil crops, yellow sweet clover, Ladak alfalfa, crested wheatgrass, and many other annual and perennial crops that were tested at this station.

But Kemp's most valuable introductions were strains of wheat that showed promise of combating the wheat-stem sawfly. Kemp saw that, though some cultivation practices reduced sawfly damage, the strip and trash cover farming methods that controlled wind erosion actually helped to increase sawfly populations and depredations. As strip farming became common, so did many miles of the wheat-field borders that sawflies loved. Further, the trash cover on adjacent strips provided ideal breeding conditions for the pest.

Before 1929, Kemp observed that the solid-stem Golden Ball durum was less seriously damaged by sawflies than Marquis, Reward, and other bread wheats. In 1930, he planted seed from two heads of wheat with semisolid stems that he obtained from the United States Department of Agriculture. This strain, C. I. 7265-12, was of Egyptian origin. But the strain must have had a variable genotype, because only a few offspring had solid or even semisolid stems. Solidstemmed plants were undamaged, but the hollow-stemmed plants of C. I. 7265-12 were infested and their stems were cut off by the sawflies.

During the winter of 1931-32 Kemp obtained 38 varieties or strains of wheat with solid stems from Dr. O. Frankel, Lincoln College, Christchurch, New Zealand. Most of them had been collected in Spain, Portugal and Morocco, but two were Dr. Frankel's selections. Two of the Portugal strains, S-615 and S-633, seemed to have desirable qualities, and they were grown in nurseries until 1937 to increase the stability of their solid-stem character. During the winter of 1937-38, Arn Platt made crosses of Apex and S-615 and Thatcher and S-615-11 at the Central Experimental Farm, Ottawa. After many experiments and many disappointing results, and with the co-operation of many agencies, the sawfly-resistant Rescue (Apex S-615) and Chinook (Thatcher S-615-11) were licensed as varieties in 1946 and 1952, respectively. The variety Cypress, which was licensed in 1962, was a Rescue and Chinook cross made at the Swift Current Station in 1947.

Mr. Kemp remained interested in this project, and because of his foresight, the germ plasm for sawfly resistance was available when the intensive cross-breeding and selection programs were started in 1937. For the work, Arn Platt headed a strong team made up of Stu McBean, Charley Jenkins, Stew Wells, George Darrock, Ruby Larson, and Alice Wall; and John Dore, Steve Buzinski, Fran Powell, and other people of the field and laboratory staffs. Though the three varieties were released after Platt and many of his associates had been transferred to the Lethbridge Experimental Farm to form the Prairie Region Project Group, the Handbook of Canadian Varieties, published through the courtesy of the Searle Grain Company, credits the basic work for sawfly resistance to the Swift Current Station.

Though sawfly breeding held the spotlight of interest, the Cereal Division worked with oats, barley, flax, and fall rye to improve drought, insect and disease resistance, and ability to compete with weeds. After Dr. S. E. Clarke was transferred from Manyberries to this station in 1935, he traveled throughout the Triangle to encourage farmers and ranchers to grow crested wheatgrass and Ladak alfalfa. But he realized that Ladak did not have the persistence necessary for a dryland alfalfa, either when grown by itself or in grass-alfalfa mixtures, and he considered a breeding project to be necessary for developing a better variety.

Fortunately, the germ plasm was available for an alfalfa improvement project. Shorty Kemp, who had introduced many varieties and strains, had selected individual plants that were tolerant to cold and drought, that had some resistance to disease, and also gave good yields. From Kemp's material, Clarke and Bolton chose Ladak, Rhizoma, and Siberian (Medicago falcata) plants, from which they made many crosses. From these crosses, the creeping-rooted varieties Rambler and Roamer arose. The project sounds simple when only its start and its end are reported, but in the scientific aspect it was the intermediate steps that were the most important and certainly the most frustrating. The problem of maintaining a creeping-rooted character, satisfactory seed and forage yields, and drought- and cold-tolerance all in one plant, was solved by Dave Heinrichs, Marie Van Haerlem, and Beatrice Murray in the 1950s and 1960s.

I recall an incident in May 1938. It happened when we were sowing plots in the introduction nursery. Lin Bolton had decided that the new members of the Forage Crops Division needed some training in plot seeding and plot organization. These new members were Dave Heinrichs, Pat Metheral, Walter Burns, and myself. Dave and Pat were in one team, and Walter and I, who made up the other team, were operating Planet Jr. drills to sow Lin's plots. I have forgotten what Walter and I were discussing at that particular time, but it must have held our complete attention. We kept adding seed of different grasses and legumes until the seeder box overflowed. Very quick investigation showed the reason. We found that the shoe of the seeder had plugged and none of the last six plots had been sown! Lin Bolton and Dr. Clarke laughed at our embarrassment, but L. B. Thomson said, "Seed those plots again, and after six o'clock tonight." If this

story did not happen to be true, it might be termed a parable. Anyway, it shows how earnestly the Division concerned itself with the testing of exotic and native grasses and legumes.

During the 1940s, Peter Janzen observed that the depth of moisture in the soil at planting was related to the yield of wheat. Sidney Barnes had pointed out that summer-fallow conserved more moisture when weeds were controlled. Cultivation to prevent weed growth but to keep trash on the surface was then, and still is, the best cultural practice. Peter Janzen talked to individual farmers, and boards of trade and, at substation field days, he told the new story of *good* farming in the Triangle. But farmers were reluctant to accept the new methods. They thought the practice *looked* like poor farming, and that neighbors would criticize their seemingly sloppy fallow when they met in the local pool hall or restaurant.

An Agricultural Engineering Division was formed with Grant Denike at its head. The funds from the PFRA cultural program were used to buy crawler and wheeled tractors, scrapers and ditchers, combines, mowers, and seeding and cultural machines for testing and Station use. Before the Noble and Victory blades appeared on the market this station had become sure of their true value for the Triangle and it had helped to correct some of their weaknesses. With a wealth of equipment available, the Agricultural Engineering and Field Husbandry divisions were better able to provide farmers with more information about the control of soil drifting, about moisture conservation practices, and about suitable equipment for large and small farms on different soil types.

By the mid-1930s, the tractor had pretty well replaced the horse. Though farmers were in the midst of drought and economic stress, tractors were selling well and they were being bought with cash. It must be remembered that the reserves accumulated in the 1920s were not completely gone, and that there were small districts where heavy rains came at the *right time* to produce good crops. After Grant Denike had proved the value of rubber tires on tractors, in 1933 and 1934, farmers demanded that machinery companies provide such an accessory. As a sales gimmick, all rubber-mounted tractors were painted bright colors, and the same colors distinguish the different makes to this day.

In 1938 this station farmed the partly developed irrigation flats at Val Marie. Most of the work was contracted, . but much of the equipment bought under the PFRA cultural program was used to level land and improve the water distribution system. Only oats were grown that year, and a tremendous crop was harvested from about 2000 acres. The big job ahead, assigned to Roy McKenzie, was how to establish stands of perennial crops. Roy worked out a technique of using oats as a companion crop, and broadcasting the grasses and legumes when the oats were a few inches above ground. Alex Johnston was stationed at Eastend, where he established and maintained annual and perennial crop nurseries. The Introduction Nursery at Maple Creek was directed from this station by Lin Bolton.

Dr. Clarke was enthusiastic about corn as a crop for the Triangle because of his success with fodder corn at the Manyberries Range Station. He started his corn testing at the Swift Current Station in 1935, but he soon found out that the fodder corns rarely outyielded oats or a good grass-alfalfa sward. Interest in fodder corn was revived now and then after Dr. Clarke's early work, particularly when plant breeders released new varieties and strains. Unfortunately none have been competitive.

No one is sure when irrigation was started on the Station, but Corny Smith, Grant Denike, and John Parker believe it was in 1936, when a small area near the shop was irrigated by water stored in the coulee on the Alexander farm. In 1937, a small acreage in the northwest corner of the Campbell Farm was leveled and ditched, and a pump was installed to lift water from the Swift Current Creek. That year, plots of cereal, oil, and forage crops were laid out, and the testing of varieties and strains of the environmentally adapted crops began. In the early 1940s, Duncairn Dam and the canal joining the city reservoir to Highfield were completed. From the canal, water flowed through A lateral to the 200 acres to be irrigated on the S 1/2 of Sec. 29, Township 15, Range 13, W3M. The assured supply of water made it possible to study irrigation practices in relation to duty of water, cultural

The Val Marie irrigation project included construction of a main canal



A head ditch resulted from the Maple Creek irrigation project

practices, and machinery. Roy McKenzie moved from Val Marie to do irrigation research with forage crops. His work with spring ponding was a unique and useful contribution. Oral Colquhoun was appointed irrigator.

The Range Experiment Substation at Kamloops was closed in 1941 and the staff and equipment were moved to Swift Current. E. W. (Ed) Tisdale, who had been Officer-incharge at Kamloops, used the time of his temporary employment to summarize and report several years of field data. The herbarium from Kamloops was added to the one that Lin Bolton had started, and the inclusion of the British Columbia plants made our herbarium one of the largest and most comprehensive in Western Canada.

Helen Mitchell left in early 1941, and her position was filled by Bernice Downing. Bernice had many interests other than those of keeping the books and distributing monthly pay cheques. She and I wrote the first constitution and by-laws for the staff organization known today as the Research Station Employees Association (RSEA). We did so because new people who replaced the many members of the staff who joined the Canadian Armed Forces needed to be encouraged in their new employment. The first edition of the Rambler, the RSEA monthly bulletin, was distributed in July 1946. There were other girls in the accounting and stenographic office. Marge Coombes, Lou Wetheralt, Mary Ellen Hayes, Elinor Elliott, Joan Sentence, and Janie Kennedy are those I remember because they were the girls I tried to date. But I must admit that I didn't have much success, because all were popular and competition was terrific-and effective.

The winter program included seminars, similar to those held todal. Every officer presented a paper that was related to his work, though some contributions were fairly short. Several employees had joined the Armed Forces. Frank Reynolds was the first to enlist. Many of the agricultural engineers had enlisted or had been called up to serve in the R.C.E., and others had joined the Army or Navy or Air Force. At a seminar in the spring of 1940, L. B. Thomson outlined the following program of the Swift Current Experimental Station, to run for the duration of the war: • The range survey, community pasture regrassing, and engineering and cultural studies to be curtailed,

• Plant Breeding programs to be continued and possibly to be increased,

• All activities of the PFRA cultural program to cease if the officer in charge of the program enlisted in the Armed Forces,

• Research relating to special conditions at the Val Marie, Eastend, and Maple Creek irrigation projects to be continued.

• Staff members rejected for active service to be moved from nonessential to essential jobs,

• The theme for many seminars for the duration to be the rehabilitation of agriculture and related industries after the end of the war.

Though the war outlook was gloomy at that time, there was no doubt in our minds of eventual victory. Dr. Thomson mentioned that the war might last from three to five years, but no one believed him.

Essential jobs were soon allotted to those still on staff. The Government of Canada established policy; the Agricultural Production Service directed policies related to farming; the Station implemented some of the policies that concerned agriculture in southwestern Saskatchewan.

Undoubtedly many farmers remembered the two to three dollars they received for a bushel of wheat during the First World War, and they planned to gear their production to the same objective. But wheat was not of prime importance during the Second World War; meat, milk, butter, hides, and wool were. Farmers had to realign their thinking. The previous sentences do not infer that wheat was unwanted; it was, and in large amounts. But the Allied Forces and the people of Western Europe looked to North America for animal products that were normally supplied by New Zealand, Australia, and South America. This need became acute after the Japanese air force bombed Pearl Harbor on December 7, 1941, and air and undersea warfare disrupted merchant shipping in the Indian and Pacific oceans. Convoys of troops and food and war supplies were guarded by British, Canadian, and United States navies on the North Atlantic; other seaways were largely unguarded and they provided easy hunting by the U-boats and surface raiders of the German and Japanese navies. Wheat and meat from the Palliser Triangle were part of many convoys.

The agricultural policies for Canada were directed to extension and research services and made known to farmers through the Wartime Production Series, published by the Agricultural Supply Board. Eighty-two pamphlets were prepared and distributed between 1940 and 1945; all are now in our library. The first sentence or the title was usually indicative: "Canada needs oil," "More pork is required," "Canada urgently needs more wool," "The life and efficiency of machinery depends largely on its care," "Wheat is a good livestock feed," "Pasture improvement for cheaper production," and "Irrigation increases yield." Six of these leaflets were of direct concern to this station, and several were written by Station officers.

One of the important tasks was to ensure a supply of machinery to grow grain. This was the function of the Western Agricultural Engineering Committee, L. B. Thomson was Chairman; Grant Denike and Jack Thompson were two of its four members. Though all agricultural machinery companies were manufacturing war equipment, such as tanks, Bren gun carriers, jeeps, mortars, and field guns, they still made a small number of tractors, combines, and cultural machinery for sale to farmers. If a farmer could prove to the satisfaction of the Committee that his tractor or combine or cultivator could not be repaired or that the cost of its repair would be prohibitive, and if he had cash or credit to pay for the machine, the Committee would approve the application and the farmer could go shopping. Sometimes the Committee refused the request, because repairs were usually available from most retail dealers. H. H. Bloom, President of Massey Harris, was seconded as a dollar-a-year man to the job of Agricultural Machinery Administrator.

Grant Denike and Jack Thompson also had the responsibility of writing for the Wartime Production Series about the maintenance and operation of the farm machinery that was slowly wearing out. The following titles are those of articles that Denike or Thompson wrote or authorized: "Seeding machinery maintenance," "Engine lubrication," "Combine-Harvester maintenance and operation," "Portable grain loaders for farm use," "One-way disc operation and maintenance," "Field cultivator operation and maintenance."

"Engine Lubrication," was particularly important to farmers because lubricating oil was in short supply. Corny Smith, who wrote this article, pointed out that lubricating oil did not wear out—it just became dirty with use and disappeared when engines were not working properly. Ways to clean oil and service motors were given in the pamphlet. The entire series is impressive because it gave practical advice on adapting farm resources to the solution of special problems.

Many of the Wartime Production Series pamphlets were about livestock production. As a result of the call for more wool and mutton, a flock of Rambouillet sheep was established at this station in 1941. J. A. (Jim) Bennett was in charge until he joined Utah State College in 1946; Peder Myhr continued the study until the flock was dispersed in 1965; George Stirbu was brought from Manyberries as herdsman. During the 25 years that the flock was here, body conformation was improved greatly, neck folds were removed, and wool-free faces were attained. At the time of its dispersal, the flock of Rambouillets was recognized as one of the best in North America.

Comparisons between Rambouillet, Romeldale, and Romnelet, and breed crosses for carcass quality, conformation, and meat yield were tried. This work was an interest of Harry Hargrave during the few years he was here as head of the Animal Husbandry Division. He concerned himself also with the distribution of quality rams to ranches and farms throughout the Triangle.

Sheep co-operatives were established at Val Marie, Eastend, and Maple Creek. Local farmers and businessmen subscribed money to provide operating funds, and investment capital was borrowed under Section 88 of the Bank Act. Jim Bennett mouthed 10,000 sheep to select healthy and young breeding flocks; L. B. Thomson arranged finances; Grant Denike sent Roy Harden, Foy Johnson, and Jack Kemp with earth-moving equipment to build stock-watering dams on the summer and winter pastures I selected. The Land Use Board and the Department of Cooperation, both of the Government of Saskatchewan, arranged land transfers and other organizational matters. Feed for wintering the ewes and finishing the lambs was bought from farmers on the irrigation projects. Bob Baird came from Brooks to tend camp at Val Marie; Mel Beacom had the same job at Eastend; Stew Shields kept his eye on the smaller flock at Maple Creek. George Newton was elected president of the Val Marie cooperative. Ed Wright held the same position at Eastend and bought out the organization in the late 1940s. Peder Myhr joined the shearing crew at Val Marie. It was his first job as an employee of this station. Terry Oatway and I built sheds and corrals at Val Marie, but L. B. Thomson was not satisfied with our work and he sent Jack Sharp and his father to strengthen the structures we built.

L. B. Thomson was the driving force behind these co-operatives, not only because of the policies of the Agricultural Supplies Board and his interest in sheep, but also because he related all of this work to research. I held the dubious and unofficial title of experimental observer, which meant that I was supposed to do any job necessary at the moment, including herding, lambing, buying feed, watching the grass supply, and writing reports.

A wealth of research information was gleaned from this project. Probably the most important was the observed difference between retail, wholesale, or manufacturing cooperatives and the other organizations concerned with agricultural production. Legislation for co-operative enterprises in Saskatchewan was not designed for organizations that had only one or two sales of produce per year. A larger percentage of total capital for operation was needed by retail or wholesale businesses. The problem was recognized in the postwar period, when co-operative farms were started at several points in Saskatchewan.

There was a demand for horse meat in Western Europe, and the Prairie Provinces had 1.5 million surplus horses eating the grass that was needed for the rapidly increasing cattle population. The association that started the sheep co-operatives and the experience these people obtained were put to work in this new venture. Cliff Shirriff was



Successful livestock enterprises demanded sufficient winter feed, and hay was the crop most readily handled by farm equipment

named president after George Newton resigned because of ill health; Stew Shields and Dave Harding left the Station for positions of secretary and accountant, respectively. Reg Milne became the organization's chemist after he was demobilized., Others of our employees joined the new group as engineers and butchers.

Actually the Horse Co-op had its start at Val Marie. One afternoon in October 1944, George Newton and I drove southeast of the village to inspect an eight-section block of native grass that had been protected during the summer for winter use of the flock of the Val Marie Sheep Co-op. We estimated that over 1000 horses were eating the grass needed for the sheep. As we sat in the car, George decided that it was necessary to rid the prairie of unwanted horses, especially as a market was available for horse meat. Within a fortnight, meetings had been held at centers throughout southwestern Saskatchewan; within a month the Horse Cooperative became a business. The discarded power plant building in Swift Current near the stockyards was rebuilt as a processing plant by the early summer of 1945. By this time horse meat was being sold on the local market as well as to oversea buyers. Undoubtedly the most important contribution to the economy of Palliser's Triangle by the Horse Co-op was the great reduction of overgrazing on the native grass pastures after the horses were removed.

The Station was concerned with other livestock enterprises. Steers were grown out and finished on irrigated pastures that were supplemented with cereal grain. In 1941 Jim Bennett began studies in maintenance and finishing of Yorkshire pigs. The herd was dispersed to local farmers in 1946. Turkeys were added to the poultry flock and the research with chickens ended. Bob Blakely and Howard MacGregor worked out starter, growing, and finishing diets for turkeys. All these short-term projects were the response of this station to the directives of the Agricultural Supplies Board.

The years of the Second World War were among the most productive in terms of research reporting. There was time to summarize data and to write reports, bulletins, and scientific papers. Not only was information from PFRA cultural programs available, but also plot results relating to



adapted crops and cultural practices. There was time, too, to test field observations in plot and greenhouse experiments, and to confirm or establish basic principles of land use and crop production. L. B. Thomson was seconded to work on Victory Loan drives, and for his contribution he was awarded the O.B.E. My main work, range research, was changed to a two-year assignment managing the PFRA irrigation projects at Swift Current, Rush Lake, and Maple Creek, and building dams near Cadillac.

Cultural studies were providing guidelines to farmers throughout the Triangle. Definite relations were observed between depth of soil moisture at seeding time and yields of grain on both fallow and stubble. Peter Janzen found that if two feet of moisture was in the soil at date of sowing, farmers could expect a paying crop; success with less moisture was not promising. Summerfallowing early in May left a tilth that assured more moisture in the soil the following spring, and consequently a better chance for a paying crop. However, tests showed that oats and barley sown early in May produced the highest yields. When wheat was sown as late as mid-May, or even a week later, there was no significant difference in the harvest yield. On a pound-for-pound basis, the yield of barley was greater than either oats or wheat on the Station plots and on the fields of most of the substations. Flax proved to be a poor competitor with weeds, and its sparse stubble did not protect the soil from wind erosion during the summerfallow year. On many types of soil fall rye was a good alternative for wheat. Under certain conditions cover crops were recommended for preventing wind erosion. When they were sown in late July or early August, they had little influence on the wheat yield the following year. Commercial fertilizers and barnvard manure seldom increased the wheat yield on well-prepared fallow.

Dr. E. S. Archibald was the director of the Experimental Farms Service during those years. He spent almost as much time at the farms



Trench silos were used by progressive farmers, as early as 1910, but they did not become popular until the 1960s Cereals, sunflowers, corn, forages, and weeds have been used to make good winter roughage

and stations as he did in his office at Ottawa, and this dedication encouraged us to produce more for Canada's war effort. On one of his visits to Swift Current, he spoke to a combined meeting of the Rotary and Kiwanis clubs, and during his address he recommended apple juice as a mixer for alcoholic beverages. The sale of apples was a wartime casualty and farmers in the Annapolis and Okanagon valleys were hard pressed. But chemists of the Canada Department of Agriculture had developed a way to extract and preserve the juice; and apple juice came on the market about 1940. Many of this station's employees believed Dr. Archibald when he said, "Apple juice is an excellent mixer," and after the meeting we hurried to purchase supplies to prove the worth of the speaker's recommendation.

But, alas, this is what we found out: apple juice was indeed a good breakfast drink, but, as a mixer, it spoiled rye, scotch, rum, gin, and vodka.

## POSTWAR INTERESTS

Within weeks of the end of the Second World War, former employees returned from the services to begin new research projects or to revitalize those that held their attention six years before. Their experiences and observations in Western Europe were invaluable. Their ideas were fresh, sound, and optimistic, and opportunities to put them to use were provided by the support of L. B. Thomson and other members of the staff.

Many veterans wanted more formal education, either by studying for technician certificates or science degrees, or by taking postgraduate training. From 1946 to 1956, two to four staff members were on educational leave each year.

A second development was the renewed interest of the farmers. Many visitors to the Station asked questions, and many others wrote letters to ask about farm practices. As a result, new experiments were undertaken with the aim of finding answers to questions, as well as adding to what we had learned about dryland and irrigation farming practices.

A third consideration was the difference between prewar and postwar research. There seemed to be more time to conduct research after 1945 than there had been before 1940. The crash programs to control wind erosion, to speed land leveling and water distribution systems on the irrigation projects at Val Marie, Eastend, Maple Creek, and Rush Lake, and to undertake regrassing programs on PFRA community pastures were matters of earlier years. There was, or appeared to be, time to reorganize the research program, and time to consider how the observations of progressive farmers. might be combined with the results of 25 years of experimentation to become a dramatic action program related to the agricultural problems of the Triangle. There were questions that had to be answered, not just jobs to supervise. Of course, research objectives had been reviewed regularly during the first 25 years of the Station's growth and changed whenever it was considered necessary. But the greatest review and realignment came just after the Second World War. Changing and expanding world markets demanded new production technologies. If the Triangle was to keep itself productive, established farming techniques had to be questioned and expanding objectives had to be incorporated. Grant Denike recently said that 'all we did was to take the ideas of

progressive farmers, define and refine them, and pass them to the other 50,000 or so farmers in the Triangle."

A fourth development concerned the depth of research needed to answer questions on farming. Too often the prewar work had provided an answer or a partial answer to a problem without a statement on the reasons for its success. Alternatively, sometimes an unsatisfactory final result, or the failure of a project, was due to an insufficient understanding of the environment. Too often the final result was the immediate goal rather than the development of new, less expensive, and more accurate techniques. The redefinition of the research objectives in the mid-1940s recognized the need for depth of study to assure complete answers for farming prosperity in the Triangle.

Recurring drought still presented the big problem facing the farming community. From 1945 to 1970 there were three periods when precipitation was less than average for two or more successive years. The first was from 1947 through 1949, when annual precipitation was about three inches less than average, and all of the difference occurred during the growing season from May to September. A second dry period, which ended its three years' duration in 1960, was general throughout the Triangle. The third occurred in the late 1960s. The Station had pioneered cultural practices, had introduced or developed crops, and had devised machinery that lowered cost of production, and through this work it had lessened the magnitude of problems associated with drought. Farmers generally had machinery and they knew how to use these machines to apply the results of the Station's research to offset the limitations of an adverse climate. Though there was some wind erosion, it was neither widespread nor severe; though grain yields were reduced by drought, there were no crop failures; though there were some economic and social stresses that adversely affected the rural culture, none were as severe as the droughts before 1940.

The Station's staff increased rapidly in the late 1940s, but many newcomers left almost as soon as they arrived. The large turnover was caused by retirements, by advancement within the Department of Agriculture, by the establishment or reopening of other research centers, and by the loss of trained people to business and university posts. Dr. S. E. Clarke retired; G. B. (Grev) Harrison moved to the Olds school of agriculture; Scotty Campbell went to the Alberta Department of Lands and Forests as a range specialist; L. B. Thomson moved to Regina as Director of PFRA; Bill Harding joined the Calgary Exhibition staff, and Pat Metheral the Saskatchewan Government service; Ed Tisdale went to a position in range management at State College, Moscow, Idaho. Herb Purdy became the secretary of the Saskatchewan Chamber of Commerce. Wally Hanson joined the Eastern Rockies Forest Conservation Board as a range specialist after he had left the Station to accept a teaching position in Alberta.

Many former members returned to the Station from overseas, but left within a few years. John Parker moved to Nova Scotia to direct the marshland reclamation program; Don Horne joined the research department of the Cockshutt Plow Company; Stu Forsaith went back to the family ranch south of Tompkins; after Hugh Ayers completed his postgraduate studies he settled at the Ontario Agricultural College. Tom Willis and Al McLean moved to Kamloops to reopen the Range Station at that location; Bill Hubbard was transferred to Manyberries with Tom Peters; Bob Coupland accepted a position at the University of Saskatchewan; Wally Pigden moved to the Central Experimental Farm, Ottawa, and a few years later Jack Kemp joined him. Arn Platt and most of his associates in the cereal improvement program were transferred to the Research Station at Lethbridge; George Darroch went to Hawaii. It seemed that as soon as we became acquainted or reacquainted with many staff members, they were moved to positions at far away places within the Department or they went to better jobs over the whole world.

Grant Denike succeeded L. B. Thomson as Superintendent in 1948, and held that position until 1965 when he was transferred to Ottawa. Both of the previous superintendents had contributed to the Station's development. Mr. Taggart had built up an excellent association with farmers throughout the district. L. B. Thomson had utilized the resources of PFRA to increase both staff and breadth of research well beyond the commitment that Dr. Archibald made to Mr. McKenzie in 1920. Dr J G Taggart was Superintendent of the Experimental Farm from 1921 to 1934 Dr L B Thomson, OBE, was Superintendent of the Research Station, 1935 to 1948







G N Denike, Superintendent, Research Station, 1948 to 1965

Actually the research policy changed very little when Grant Denike accepted the position of Superintendent. Grant had been senior assistant for many years, and he had also served as Acting Superintendent when L. B. Thomson worked on PFRA operations, when he was seconded to Victory Loan work during the war years, and when he was traveling abroad. Both Grant and L. B. had worked closely for over ten years to develop policies and set up research programs that would benefit agriculture throughout Palliser's Triangle.

Denike had many ideas, but three were of great importance to the growth of the Swift Current Research Station. First, he was determined to attract well-trained research officers who would be supported with equally welltrained technicians. Second, he insisted that research should be in depth as well as in breadth, because he realized that the step-to-step solution to a problem resulted in valuable knowledge that was not obtained in a crash program. Third, Grant was convinced that good accommodation and the best possible equipment were necessary if the training and knowledge of the staff were to be used effectively and if the staff members were to be retained on jobs for which they were trained. Though all his contributions were valuable to agriculture in the Triangle and to this station, the construction of a plant for careful research was the most important.

Thomson Hall was moved from the Swift Current airport before L. B. Thomson left to join PFRA. Grant Denike and Grev Harrison superintended its rebuilding and finishing. For an increasing field and shop personnel it provided dining facilities and rooms, conveniences that were necessary immediately after the Second World War but which outlived their usefulness within a few years. Later the building became a very useful center for research in cereal, forage, livestock, and pasture utilization.

But the shop was Grant's greatest interest during the 1950s. It was here that the field and technician staffs gathered in the morning before they moved to their plots or work benches. It was in the shop that machinery was overhauled and repaired, and there equipment was built to our specifications. It was the place where new ideas for experimental equipment, born in the drafting laboratory, became finished To Grant Denike's great satisfaction, he was on hand to see the breaking of the ground for the new Research Building Here, Grant is standing beside the scraper and John Heinrichs is at the controls

products, where they were tested and, in many cases, redesigned and rebuilt. All supplies arrived at the shop, and from there they were distributed to the area of need. But probably most important, the shop was where Grant could usually be found whenever he was away from his office. The present building was completed in 1957.

The turkey nutrition studies soon outgrew the available facilities. Bob Blakely outlined the requirements as he saw them, and then Grant increased Bob's basic specifications by 50 percent. A feed storage and mixing plant was erected first, then a combined work area, hatchery, egg storage, poult rearing, and laying unit. Air temperature and humidity, air flow, and light intensities are controlled throughout the building. But after R. E. (Ray) Salmon and K. E. (Ken) Dunkelgod joined the staff, two of the livestock sheds had to be converted to house the expanding flock needed for the increasing research.

The pasture work also received Grant's strong support. Fields of one to eight acres were sown to a variety of perennial and annual crops. Fences were built and a stockwatering system was installed. Good winter feeding sheds were erected to house experimental cattle and sheep and to store forages used in feeding tests. The piggery was converted to a nutrition laboratory, where fistulated sheep were housed and where feeding trials could be conducted.

Improved facilities for storing sheaves and threshing grain were built on the South Farm. This made it possible for the Field Husbandry and Soils sections to concentrate their field studies at one location.

Grant Denike also hoped to have a research service center for machinery storage, where crops could be threshed and seed processed, where field technicians would have a headquarters, and where many ideas relating to experimentation could be implemented. However, his transfer to Ottawa prevented the fulfillment of that plan and this part of the program has yet to be realized.

But Grant did see the completion of the Research Building. He believed that if all the research officers were in one building, there would be better communication between disciplines and, consequently, more effective experimentation.



Dr J E Andrews, Director, Research Station, 1965 to 1969 Dr A A Guitard, Director, Research Station, who came in 1969







H J (Shorty) Kemp, one of the first research officers at the Experimental Farm, achieved fame for his work with cereal, forage, and horticultural crops, and his designs of plot equipment The Research Building is certainly a landmark to Grant Denike's engineering knowledge, his research philosophy, and his perseverance, which some call stubbornness. He introduced features in design and facilities that have proved to be superior to those in other research buildings constructed about the same time, even though many of his ideas were not supported by other staff members during the ten years of planning that preceded the final approval of the blueprints.

It would be hard to give an account of all the design features of the Research Building. Probably the most vital ones were the provisions for convenient work flows and interoffice communications. Of equal interest was the separation of the office and laboratory wings, which were connected by administrative and service facilities. This feature was criticized by many staff members during the planning years, but now it is recognized as an excellent layout by some of the officers who objected to its revolutionary concept. The plan provided each research scientist with an office separated from, but close to, the laboratory and the technicians he directed.

Dr. J. E. (Ed) Andrews succeeded Grant Denike as Director in midsummer 1965. While working at the Lethbridge Research Station, Ed had led a plant breeding team that worked on improving the quality and hardiness of winter wheat. Later, he became Director of the Brandon Station, where he supervised projects in plant improvement, the breeding and physiology of cattle, pigs, and poultry, and in the development and management of pastures. His formal training and experience in research and administration were invaluable to the further development of the work at the Swift Current Research Station.

But Ed's stay at Swift Current ended in 1969, when he returned to the Lethbridge Station as its director. In turn, he was succeeded by Dr. A. A. (Art) Guitard, who came from the Research Station at Beaverlodge. Art continues in the traditions of his predecessors, and this station continues to benefit from his experience and leadership. Though he came from a vastly different environment, his interests in research between west-central Alberta and the Palliser Triangle have The Research Building was completed in 1965 The office wing is at the far right, the laboratory and service areas are in the center and at the left



much in common. Cereal and forage improvement studies are shared by both centers, and increased yields, improved quality, and resistance to environmental stresses are common objectives. Control of soil erosion and soil salinity are important at both places. Good public relations and extension services are vital to the agricultural community if it is to benefit from research endeavors. Art's broad experience and research leadership have provided new ideas for the betterment of agriculture within the Triangle.

### AGRICULTURAL ENGINEERING

After G. N. Denike was appointed Superintendent, Jack Thompson became Head of the Agricultural Engineering Section and held that position until the research staff was reorganized in 1970.

Before 1935, this section's prime objective was the introduction and testing of seeding, cultural, and harvesting equipment. But as the staff grew, engineering became concerned with farm buildings, rural electrification, seed cleaning, water erosion, canal lining, land leveling, grain drying, evaporation suppressors for dams and dugouts, rental charges for farm machines, windrowing to complement combining, designing and building of plot machinery, and a host of other projects. Some of the chief studies are reviewed briefly.

Windrowing or swathing was studied by Murray Dodds. The objectives of this harvesting practice were to lengthen the harvest period and so reduce the number of expensive combines, and, by shortening the period when the crop was standing, to reduce the threat of loss by insects, hail, rain, snow, or other adversities. Many farmers hesitated to swath their crops because they feared that the practice would reduce the grade and the bushel weight, that the stubble would not support swaths, that shattering would be excessive, and that the swaths would be more susceptible to bird and rodent damage than the standing crop would be.

Dodds showed that neither grade nor bushel weight of wheat and barley was reduced if windrowing began when the grain contained about 35 percent moisture. He also demonstrated that the shape and density of a swath assisted pickup. He proved that grain losses by shattering were often less than when the crop was straight combined. Windrowing advanced harvest dates of wheat and barley by a week to ten days.

Farm buildings were being erected without any guides on construction. At this time new houses, machinery sheds, granaries, piggeries, and other buildings were replacing those erected when the land was settled. Grev Harrison was a member of a Saskatchewan committee to plan farm structures suitable to the environment. Before he left, he had tested paints, plywoods, masonry, and building plans, and had suggested alternative guidelines for farm buildings.



Two important agricultural practices are illustrated in the background beyond the Research Station grounds The alternate strips of fallow and crop ensure soil stabilization and lessen the effects of wind erosion This crop has been swathed or windrowed, a practice that lengthens the harvest season and reduces the expense that harvesting equipment would incur A great interest was developing in rural electrification and its influence on the new building program. Bruce Martin and Bill Maley went to the Olds district in central Alberta, where rural electrification was underway, to gather information on the interest of farm families in labor-saving equipment, costs of installation, and other pertinent matters. These data were available to the Farm Building Committee before rural electrification expanded rapidly in Saskatchewan.

Water erosion was increasing. Sheet erosion was noticeable even on moderate slopes where the land was cultivated for annual crop production. The layer of stones increased each year, rills were numerous, and fans of silt and sand occurred where the runoff was slowed or halted. Sheet erosion was evident even in the driest part of the Triangle. Gully erosion was developing in drainage channels, where annual crop stubble was the only protection afforded the soil. This type of erosion was more evident in central than in southwestern Saskatchewan, but it occurred everywhere.

John Parker selected an area in east-central Saskatchewan for the gully erosion control studies. On the farms where he worked, two to six gullies on each quarter section were deep enough to prevent their being crossed by farm machinery. Control runoff dykes were constructed so that they forced the flow into a single channel in each quarter- or half-section. The channels were sloped to a 5:1-grade and each was then grassed down. By reducing the number of small irregular fields, erosion was stopped and farming costs were lowered. Further, farm equipment could easily cross all the channels. Parker did this work with the machinery used on most farms, though he had to use a grader to build the dykes.

The site for seepage and drainage studies was below the main canal, where it crossed the Station and also along *A* lateral. Stu Forsaith continued the work he started in the 1930s, and after he left, the work was carried on by Peter Boving, Kaljo Pohjakas, and others. Surface linings of shotcrete, cement, oils, asphalt, and compacted clay greatly reduced seepage, but most effective was a subsurface lining of polyethylene. Seepage has been stopped, and much of the salinized land has been made productive by drainage, which lowered the salt-laden water table. Drainage efficiency, with When particles of soil are saltated during a windstorm, they hit the ground and bounce into the wind stream



When a raindrop splashes on bare ground, soil particles spray into the airstream, at first starting sheet erosion and eventually gully erosion (Photo by Naval Research Laboratory)

both open and tile drains, was studied. Perforated plastic pipes were used to investigate the movement of water at subirrigated locations and the resulting problems of water use and drainage.

Irrigation studies were related to evapotranspiration and methods of water application. Hans Korven reported that 20 to 25 inches of water was needed from May through August to assure high yields of cereal, oil, and forage crops. In drought years, irrigation might supply over 80 percent of the required water, but less than 50 percent when precipitation was average or above-average. The factors that determined the choice of spring-flood, border-dyke, or borderditch systems of applying water were studied in relation to soil type, crop yields, slope of the land, and drainage effectiveness.

Watershed hydrology is being studied on a 300-acre watershed at the Station and on a 3000-acre watershed near Davin, Saskatchewan. Ralph Melvin compiled data from both locations for nearly 20 years before he joined the Saskatchewan Research Council in 1962, Walter Nicholaichuk contributed information until he left for postgraduate training in 1967, and Jack Thompson and Hans Korven provided further facts after that year. The sites represent two soil types, a Wood Mountain loam at Swift Current, and a Regina heavy clay at Davin. Runoff varies greatly from year to year, depending on the amount of winter snowfall and the intensity and duration of summer rainstorms. At Davin, the yearly runoff has ranged from 0.14 to 3.41 inches per acre; at Swift Current the range has been from 0.6 to 1.40 inches per acre. The work study has already shown that the average annual runoff is about 25 percent of the total precipitation, and that about 60 percent of the moisture stored in summerfallow is conserved before the stubble is disturbed by cultivation to destroy weeds.

Suppressors to reduce evaporation from dams and dugouts form a fairly new study. Because summer evaporation is two to four times the annual precipitation throughout the Triangle, saving water from evaporation in stock-watering dams and dugouts is a sensible idea. Kaljo Pohjakas has undertaken this work, which he combines with his studies on drainage and salinity. Rental charges for farm machinery were first reported by Art Wenhardt and Jack Thompson several years ago. This study still goes on. A report, revised regularly, relates rentals to machine design and efficiency and to changes in retail prices. It covers the range of farm machinery, and also some earth-moving equipment that might be used on farms for land leveling, dam or dugout construction, drainage, or water erosion control. The reports of this endeavor have been related to other studies of tractor performance, self-propelled and pull-type swathers and combines, tillage and haying equipment, handling of materials, and power flows.

Laboratory and plot-machine design interested Shorty Kemp from the 1920s till he moved to Saanichton in 1944. Jack Thompson continued the work. More recently F. B. (Ben) Dyck has been concerned with this phase of investigation, particularly the addition of electronic features. Researchers who need the machines outline the broad specifications. Kemp, Thompson, and Dyck incorporate engineering principles. After the drafting laboratory has prepared detailed plans, the equipment is built in the shop. This service is national, even international, in scope.

Seminars in the late 1940s considered agrobusiness within the Triangle. As a result of studies, it was concluded that grain-cleaning, grain-drying, and grain-moving machinery could be built in small local plants. The manufacture of blade machines was well established in Alberta. This product was sufficiently capitalized and advertised to control the blade market, but business had shown little interest in manufacturing machinery to clean, dry, or move grain. Station officers designed models for potential local agrobusiness.

Shorty Kemp designed and built the first powered grain loader in the early 1930s; his successors in machine design have added to his accomplishment.

### ANIMAL AND PASTURE SCIENCE

The Section that studies animals and pastures has investigated matters that are of direct concern to farmers and ranchers in the Triangle. Research in range ecology, pasture management, forage evaluation, sheep improvement, and turkey nutrition has been conducted.

Archie Budd, Bob Lodge, Jan Looman, and Keith Best have made up the research staff for range and pasture ecology. Ebbe Troelsen joined the Section to continue and expand the forage evaluation program started by Wally Pigden. Peder Myhr was added when the sheep work became a Section responsibility, and remained till he was appointed Information Officer after the sheep flock was dispersed. In the early 1960s, the turkey nutrition work became part of the Section's responsibility. This change simplified administration and brought the livestock interests into closer association. Don Baillie was appointed field foreman, and Herb Tatton, John Wohlgemuth, and Jack Taylor, each in turn, became a head poultryman. Yves Rouvreau, who was appointed shepherd after George Stirbu retired, remained until he was transferred to the Normandin Experimental Station. Sven Christensen and Malcolm Gillies were assistant herdsmen. The Section was lucky to have Mrs. Bill Hanel as laboratory technician till she left for another full-time job to raise a family of three boys on the Hanel ranch near Lac Pelletier. Marge Hooey and Donna Wallner did lab work before Mrs. Hanel arrived. After Jim Jowsey left for a teaching career, and Bob Blakely and Howard MacGregor retired, their positions were filled by Ray Salmon and Ken Dunkelgod.

The dominant grasses in the Triangle are invaders from warmer or colder environments. Characters of the three grassland associations within the Triangle, and the methods devised and used to measure their productivity and grazing capacity have been described in Publications 762, 1133, and 1425 of the Canada Department of Agriculture (5, 3, 7). The three grassland associations have been given the popular names of short-grass, mixed, and fescue prairies. The grazing capacities of the mixed and fescue prairies are about two and three times as large as the production of short-grass prairie.

There is a popular belief that rotated pastures have higher grazing capacities than pastures that are grazed con-

tinuously throughout the year. But grazing trials with cattle and sheep on native grasslands and cultivated dryland pastures sown to environmentally adapted grasses and legumes have not justified such an opinion. However, the complementary use of cultivated and native grass pastures and the inclusion of Rambler or Roamer alfalfa in swards can increase grazing capacity. Through complementary management it is possible to begin grazing earlier in the spring, to retain a fairly high nutritive value in the herbage till late in the fall, and to increase summer production. On irrigated pastures, some form of rotation is necessary.

Our land-clearing and regrassing work in the bush areas of Saskatchewan and Manitoba began in response to the demand for more pasture when the number of cattle increased to a new high in the early 1940s. Work in the PFRA community pastures of Beaver Hills and Lakeview demonstrated the value of cultivated grass pastures to complement the bush range. These studies were the basis for later bush pasture development by PFRA and the governments of the three Prairie Provinces during the last two decades.

Our concept of forage quality has changed greatly during the last 20 or 30 years. Laboratory analyses for proximate principles and other chemical entities have been used extensively to measure quality for many decades. All analyses provided estimates of the nutritional value of a feed. Studies at this station have also added to our own and world knowledge about measuring forage quality. The morphological studies of Wally Pigden answered the question of why some grasses cured on the stem retained a high nutritive rating after growth ceased, and why the nutrients in other grasses were not digested readily by ruminants. Ebbe Troelsen's more recent work with the in vitro procedure to determine available nutrients in forage, complements the work of scientists, in Britain and elsewhere, who found that the method was an accurate, fairly simple, and quick way to evaluate forage quality. Troelsen's in vitro technique has been adopted by the Feed Testing Laboratories of the provinces of Alberta and Saskatchewan. The sensory rating system, developed by Troelsen and his associates, to estimate forage quality has been proved in feeding tests with sheep. But, in his more recent work, Troelsen relates intake to quality, and states that the greater the intake the better the feed.

A further objective of the Rambouillet breeding program was to breed out the tight fleece and to select for wool with a longer and lighter shrinking staple. Peder Myhr removed animals with undesirable traits, and then achieved the desirable characters by selective breeding and inbreeding. Performance testing of ram lambs showed that the greatest gains were made on the lowest feed intake per pound of liveweight gain. Diethylstilbestrol implants had no influence on the growth of lambs when they were fed at low nutritional levels. Implants increased liveweight gain per pound of feed, but depressed market grade when a high nutritive diet was fed. Ewes fed only alfalfa hay produced healthier and stronger lambs than ewes fed grass hay supplemented with grain or protein.

Because the work with turkeys covered such a wide range of interest, the flock was greatly increased in 1947. Two breeding flocks were maintained for several years to supply poults for experiments. More recently, the policy has been to buy eggs or poults and from these to select toms and hens for the following year's breeders. This procedure was introduced to reduce the high labor and feed costs in maintaining separate breeding flocks. Up to 8000 poults are hatched each year, and most are used in the experimental program. The range of studies has included the sources and levels of protein and energy in starter, growing, and finishing diets, the effect of granular feed on growth and nutrition, the vitamin needs for birds of all ages, the management and diets for the early finishing of market birds, and the value of antibiotics in diets. Of late, the research has been concerned with protein-energy balance and the need for specific amino acids and fatty acids in starter and growing diets. It has been proved that diet bulk is an important consideration. One of the most complete studies has been with rapeseed meal when it is used as a protein supplement. Other tests have demonstrated a close association between diets and depot fatty acids. Artificial insemination has been practiced when natural matings proved unsatisfactory. A technique was devised for collecting clean feces when the digestible energy in diets had to be measured.

## PLANT SCIENCE

The first work with cereals, forages, and horticultural plants was directed by Shorty Kemp. About 1935, his responsibilities were transferred to three other officers: Dr. S. E. Clarke, who came from the Range Station, Manyberries, to direct the forage crop program; Arn Platt, who arrived from Edmonton to expand the studies with cereals; and Bob Blakely, who combined the horticultural work with his poultry interests.

Dr. S. E. Clarke headed the forage crop work until he retired in 1944. He was succeeded by E. W. (Ed) Tisdale. After Ed left to join the staff of the State College, Moscow, Idaho, in 1947, I was promoted to head the Pasture and Forage Crop Section. I held that position until 1952 when forage studies were separated from pasture work. In that year Dr. D. H. (Dave) Heinrichs headed forage crop research. Roy McKenzie joined the Saskatchewan Department of Agriculture as Head of the Plant Industry Branch.

There have, of course, been many changes in the personnel of the Plant Science Section. Lawrence Anderson went to the Lacombe Experimental Station to help with the Substation program in central Alberta. Beatrice Murray was transferred to the Central Experimental Farm, Ottawa, to work on the cytology of creeping-rooted alfalfas. Mark Kilcher and Tom Lawrence joined the staff as research officers after they finished their university work, and recently Jim McElgunn joined them in the same capacity. K. W. (Ken) Clark, who came from New Zealand in 1950, completed his postgraduate training while working in the Section. After obtaining his Ph.D., he worked with the Commonwealth Scientific and Industrial Research Organization in Australia for three years before joining the staff of the University of Manitoba. Ross Ashford arrived from British Columbia in 1962 and left in 1966 to lecture at the University of Saskatchewan. R. A. (Bob) Thaine, a native of New Zealand, worked with forages, but after a few years he left for postgraduate studies. He is now at the Grassland Research Station, Hurley, England. In the mid-1960s the Forage and Cereal sections were combined to form the Plant Science Section. Dave Heinrichs was appointed Head, and Stu McBean became the only officer working with cereals. Lately, Fred Townley-Smith and E. A. (Ted) Hurd have joined McBean to form a cereal im-

In the early 1930s steers were wintered on roughage from the thistle-straw hay

provement team. Bill Hanel has long been the field foreman for forage studies. Cornie Froese, Maurice Lyne, and John P. Penner have worked with Bill since the early fifties. Steve Buzinski, Jack Sharp, and Jim Hodgson have worked equally long on the cereal program.

All studies in the forage and cereal programs are directed to securing high-yielding crops adapted to the environment of the Palliser Triangle. Drought tolerance, insect and disease resistance, and quality are the prime objectives of annual crop research. The same objectives apply to research with biennials and perennials, but persistence and winterhardiness are qualities of equal concern.

The alfalfa varieties Roamer and Rambler continue to be the most suitable for our dry environment. This is true for these varieties grown on both dry and irrigated land and grown alone or in mixtures with grasses. But, as with all crops, the search for better germ plasm continues. One of Dave Heinrichs' recent studies has been with the alfalfa varieties in his nursery. He has obtained strains with a crude protein varying from 15 to 35 percent, and he is now making selections to obtain varieties with low, intermediate, and high crude protein contents.

During the last two decades, grass improvement projects have continued. Tom Lawrence's research in grass breeding and selection has produced two licensed varieties: Sawki Russian wild rye in 1963, and Orbit tall wheatgrass in 1966. Tom's work with intermediate wheatgrass has progressed to such a degree that a licensed variety should be available soon. Of the new grasses he is studying, Altai wild rye will probably add a new dimension to pasture and hay supplies for farm and ranch use, and aid in the rehabilitation of eroded lands. As well as including the broad objectives in forage research, Tom has incorporated selection techniques to speed emergence, to increase seed size and yield, and to improve forage quality.

Mark Kilcher had made a frank confession. He studied agriculture and then accepted a job at this station so that he wouldn't have to clear bush and pick roots on the family farm in east-central Saskatchewan. Of course, his first job just had to be clearing a poplar-willow area in the PFRA community pasture of Beaver Hills. Afterward, he sowed the





Dave Heinrichs points out the creeping roots that are a character of Rambler alfalfa. a variety he developed



cleared area to grasses and legumes. At the same time, he directed Jack Kemp in different methods of preparing seedbeds for perennials at 20 sites that were cultivated by six different methods and sown to seven different grasses and legumes. Results of this project showed definitely proved, that it was not possible to investigate bloat because of the nature of the local environment. Today, many more farmers graze ruminants on alfalfa than they did twenty years ago, because we found that grass-alfalfa pastures yield at least 50 percent



Breeding and selection of alfalfa resulted in better winter roughage for the increasing cattle herds *Left to right in the foreground*, this picture shows the effect of winter injury of Ladak, the best available variety for many years, Francks Langmeiler, a European variety 70 percent of which winter-killed; and SCMA 601, the strain from which Rambler was selected *At the extreme right* is a plant that was not winter-injured

that the better the seedbed preparation, the better the resulting stand. After the staff reorganization in 1952, Mark began to investigate cultural problems of forage crops. Depth of seeding, row-spacing and cross-seeding, alternate rows of grasses and alfalfa, fertilization, comparative yields of annuals and perennials, and simulated grazing methods were among the many studies he completed or ones he is continuing.

For centuries, bloat has been a bugbear to stockmen throughout the world, wherever ruminants have grazed legumes. Its potential as a killer has stopped many farmers and ranchers from sowing alfalfa in pastures. We began pasture study to investigate some of the basic causes of bloat. And we found that bloat seldom occurred when ruminants grazed the alfalfa varieties recommended for the Triangle. Our cattle and sheep grazed alfalfa and grass-alfalfa mixture on either dry or irrigated land with safety. It was believed, even though it was not

more liveweight gain per acre than grasses alone.

The acceptance and popularity of Russian wild rye by farmers and ranchers can be credited to the advice given by Bob Thaine. He had seen a few stands of this grass near his home in New Zealand and he was impressed with its possibilities. His observations agree with mine, when I saw plots of the grass growing on the eroded slopes of the Hokanul Hills near Blenheim, New Zealand, and when I worked at the Manyberries Range Station in 1937. Bob showed that Russian wild rye had a high pasture yield but a low hay yield. His estimation of its pasture qualities were confirmed by grazing tests with sheep, because Russian wild rye produced 50 percent more liveweight gain per acre than either intermediate wheatgrass or crested wheatgrass.

By 1947, about 3000 varieties of cereal and oil crops had been imported and tested, but few had qualities needed for the rigorous environment of the Triangle. About

this time, all officers were looking for readily identifiable growth patterns and morphological characters that gave evidence of such traits as drought tolerance and other adverse influences. None were found. It was hoped that drought-tolerant and drought-susceptible wheat varieties would use different amounts of soil moisture, but this was not found to be so. The selection program could be based only on the field response of the different varieties when they were grown under the same conditions and measured by yield of grain, strength of straw, weight per measured bushel, protein content, and other standard criteria. Tests to determine these qualities led to recommending for Palliser's Triangle varieties of bread and durum wheats, oats, barley, flax, and spring and winter rye. Nearly as many other varieties and strains of cereal and oil crops have been tested since 1947 as were tried before that date. A few replaced previously recommended varieties, but most were discarded.

Winter rye is an important crop on light loam soils in the Triangle. Results from testing programs in the thirties and forties showed that only Dakold 23 and Antelope had sufficient winterhardiness and drought-tolerance. Unfortunately, Dakold 23 had many disappointing characters, including seeds that were small, wrinkled, and greenish. Antelope was less winter-hardy, and was more suitable for central than southwestern Saskatchewan.

McBean released the variety Frontier after about 12 years of investigation. It was the first winter rye to originate in Canada from hybridization and was licensed in July 1964. Frontier was selected from a cross between Dakold 23 and Petkus (C.D. 5793), a German variety. Frontier is as hardy as Dakold 23 and much more vigorous than Antelope. It has adequate strawstrength, height, and maturity, which characters are all needed for windrowing and combining. Its kernels are uniform in size and color, and its yield is greater than Dakold 23. The continuing selection program is aimed at obtaining a variety even superior to Frontier.

# FIELD HUSBANDRY

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From 1921 to 1958, the Field Husbandry Section was directed in turn by J. K. McKenzie, Grant Denike, Peter Janzen, Joe Ficht, and Art Wenhardt. In 1959 an administrative reorganization of the Station caused the Field Husbandry Section to disappear as an individual unit. The change was justified at that time, because it provided better research coordination of work and personnel. The reorganization followed the retirement of Dr. J. L. Doughty in 1957 and the exchange of Bill Staple, who went to the Central Experimental Farm, Ottawa, and K. F. (Ken) Nielsen, who came to us from that establishment. For many years, Dave Morgan was the field foreman on irrigated land on the Campbell Farm, and on the dryland studies on the South Farm.

The Field Husbandry Section kept meteorological records. During the 33 years of recording, the average annual precipitation was 13.9 inches, the average May-June-July rainfall was 6.4 inches, and the average evaporation from a free-water surface from May through September was 28.6 inches. But averages do not reveal precipitation patterns, because during 15 of the 33 years the total and seasonal precipitation was less than average; only during eight years was it above average, and half of those years were in the 1920s. If average and normal conditions may be considered synonyms, then in only 10 of the 33 years did we experience normal precipitation. During the same period the number of days without killing frost were as few as 101 (1930), as many as 160 (1941), and they averaged 129 days. But in six of the 33 years, the length of the frost-free period was insufficient to mature crops that require 110 days of growth to ripen their seed.

According to the observations of Peter Janzen and Norm Korven, wheat yields were affected by the amount of soil moisture conserved in fallow. When the depth of soil moisture was 27 inches or less, and the May-through-July rainfall was five inches or less, the average yield of wheat was less than six bushels an acre. But when soil moisture penetrated to 40 or more inches, and even when less than five inches fell in the growing period, the average yield of wheat was 15 bushels per acre. These wheat yields are averages, but the figures are close to those that can be expected on carefully fallowed loam soils. When soil moisture was at least 40 inches deep, yields of wheat grown on stubble were nearly equal.

With the advent of ammonium fertilizers, 11-48-0, 16-20-0, 33.5-0-0, 34-0-0, and others, and even after fairly light applications, there were some increases in wheat yields. Unfortunately, the results were often inconsistent. Unaccountable differences occurred between years, soil types, and cultural practices. But as Sidney Barnes had predicted more than 40 years ago, the research pointed to the probability that commercial fertilizers would play an increasingly important part in the production of both annual and perennial crops.

The Field Husbandry Section was as much concerned with fallow substitutes in the 1950s as it was in the 1920s. One ten-year study is of interest. On fallow, latesown cover crops such as wheat, oats, or barley reduced wheat yields the following year by ten percent, whereas oats, barley, or corn seeded in May and harvested for hay in July, reduced the yield of the succeeding wheat crop by nearly 25 percent. Continuous cropping with wheat produced yields that were nearly 45 percent less than the yield from fallow in a fallow-wheat rotation. Early in the spring of 1947, the local branch of the Agricultural Institute of Canada organized a public meeting to consider the use of 2,4-D in dryland agriculture. Reports from research institutions in Eastern Canada, the United States, and Europe, and from companies manufacturing the product, were presented by Ed Tisdale, Arn Platt, and a representative of a manufacturing company. (I regret that I cannot remember his name or the company he represented, but we appreciated his contribution.) The meeting was attended by district farmers, local businessmen, agricultural representatives, and provincial and federal employees. The Station started testing 2,4-D in 1947. The objectives were to determine rates and times of application to control weeds without harming crops and to assess the value of herbicides as fallow substitutes.



Some of the earliest research reported from the Swift Current Station was that directed by Sidney Barnes. His recommendations on moisture conservation, weed eradication, and wind erosion control were readily understood and appreciated by farmers. His research had an immediate impact on the economy of individual farms, and it was unfortunate that many farmers were not well enough equipped to apply his recommendations till many years later. Sidney Barnes died in 1935.

Though soil investigations were part of the Station's responsibility, Mr. Barnes was not a staff officer. He reported directly to the Field Husbandry, Soil and Agricultural Engineering Division, Central Experimental Farm, Ottawa. This centralization of responsibility was unsatisfactory for several reasons, but it continued until the late 1950s, when the Soil Research Laboratory became the Soil Science Section of the Swift Current Research Station.

To develop and refine Barnes' concepts, the Soil Research Laboratory was set up in 1936 as a contribution of the PFRA cultural program. Dr. J. L. Doughty was appointed Director, and he brought a broad knowledge of soil research from his studies in the United States, from his teaching experience at the University of Alberta, and from his direction of soil surveys as a soil specialist with PFRA. Bill Chepil was transferred from the Regina Substation to continue his work on wind erosion principles. He remained a staff member till he joined the faculty of State College, Manhattan, Kansas, about 1950. Bill Staple was appointed to undertake studies in soil physics, particularly the principles of soil moisture reserves. His associate, Joe Lehane, joined the staff in 1937 and remained till his retirement in 1968. Reg Milne was appointed soil chemist in 1937 and Frank Warder in 1940. Later appointments included Fred Bisal, Willard Hinman, and Alf Stalwick. Staple, Lehane, Milne, and Warder were in Canada's Armed Forces during the Second World War. Shortly after he returned, Milne joined the Horse Co-operative Marketing Association as chief chemist, a position he held till he associated himself with PFRA to study soil salinity problems on irrigated land at Taber, Alberta. Dave Harding and Archie Budd were two of the first technicians. Dave left to join the Horse Co-operative Marketing Association and

Archie transferred to the Pasture Section. Alvah Earl, Peter Rymes, Joanne Torrans, Art Dueck, Ernie Schlichting, and Kay Williams now have attained the longest service as technicians.

After Dr. Doughty retired in 1957, Bill Staple was Acting Director until he was transferred to the Central Experimental Farm. At that time, the Soil Research Laboratory became the Soil Section within the Experimental station organization. The Soil Section absorbed officers and projects of field husbandry. Ken Nielsen moved from Ottawa to be Head of the new section, a position he held until 1966, when he resigned to join the Federated Co-operative and to undertake fertilizer research. Ken was succeeded by W. S. (Wilf) Ferguson, who had been directing soil studies at the Brandon Experimental Farm. He is presently at the Central Experimental Farm, Ottawa.

Again came more people, but often, soon after an officer arrived he resigned to accept a new post. Jim Beaton, a physical chemist, went to Trail, British Columbia. Dr. F. D. (Ted) Cook moved to Ottawa and later to the University of Alberta. Dave Stevenson transferred to the Lethbridge Research Station, and Norm Korven joined the Parks Department of the City of Winnipeg. A. G. Kempton left in 1960. W. L. (Bill) Pelton was appointed in 1958 as an agrometeorologist, a position he now holds. Don Read left plant work to undertake studies with fertilizers on dry and irrigated land. C. H. (Hank) Anderson came from the Fort Vermilion station in 1963 to ask new field-husbandry questions. More recent staff additions are C. A. (Con) Campbell, soil chemistry; D. G. (Dave) Green, plant physiology; V. O. (Bix) Biederbeck, soil bacteriology; and D. W. (Doug) Stewart, agrometeorology.

Interest in agrometeorology has always been great. Particularly has the effect of the summer climate on the growth and yield of annual and perennial crops been long observed. The interest was evident years before the House of Commons appropriated \$15,000 in 1920 to establish this research station. Bill Pelton's reports, as well as precipitation data collected since 1886, show that many atmospheric agents affect production. When, during the growing season, moisture from a free-water surface evaporates at a rate of three to four times the amount of rainfall, moisture available



Sidney Barnes pioneered soil and crop research at the Experimental Farm

for successful farming becomes critical. In the Triangle, about half the summer rainfall occurs as showers of less than a quarter of an inch; little of it is useful for the growth of crops. As well, in most of the Triangle only June has an average rainfall of two or more inches. In Palliser's Fertile Belt average precipitation is two inches or more per month from May to October.

Control of weed growth is necessary for optimum moisture storage. When fallow is delayed until mid-June, there is 25 percent less stored moisture at seeding time the following spring. A 50 percent decrease can be expected if fallow is put off till mid-July. Because each bushel of harvested wheat has depleted about half an inch of water from the soil, delayed fallow can well be considered to reduce wheat yield by as much as, or even more than, ten bushels per acre.

The first question many farmers asked the Better Farming Commission in 1920 was: "What is the rainfall in my locality?" Though since 1886 precipitation had been recorded for a few years in many communities within the Triangle and at Swift Current, yearly variations and seasonal patterns were unknown even by 1920. But one thing was certain: rainfall was unpredictable from year to year, from district to district, and even from farm to farm. The yearly and season totals for the 84-year period are summarized in the following chart.

Meteorological records taken solely at the Research Station are of limited help to farmers living in the 55,000 square miles that make up Palliser's Triangle, when they are planning their yearly cropping programs. But now, a useful pattern has been shown by precipitation records obtained at substations located on farms throughout the area. An extensive area along the Alberta-Saskatchewan boundary, both north and south of the Cypress Hills, has less than 11 inches of average annual precipitation. Greater amounts are recorded in all localities adjacent to Palliser's Fertile Zone. Agricultural production varies from cattle ranching in the driest area to a cereal-livestock economy wherever summer rainfall is sufficient and less variable. Bill Pelton's analyses of the peculiarities and patterns of precipitation within the Triangle and results of the cultural and production research of his associates show many of the climatic stresses the agricultural industry in this area has to endure and overcome.

Fred Bisal demonstrated that the infiltration rate of water is reduced by splash and, subsequently, by surface sealing. When rainfall energy increases, say, during a heavy shower or a storm that lasts several hours, greater sealing occurs. In turn, the infiltration rate is reduced even when the moisture-holding reservoir of the soil is not completely filled. Also, the splash of the raindrops creates miniature craters and detaches soil particles, which are carried downhill to join the runoff water. The trickles of runoff water then start sheet erosion; the trickles form rills, which grow into small streams; finally, several small streams unite to become torrents that create gullies. On level land, raindrops cause the detached soil particles to bounce back and forth, and though sealing and ponding occur, erosion is only slight.

Bill Chepil and Fred Bisal have reported on the mechanics of wind erosion, and their wind-tunnel observations have complemented field measurements. These officers have shown that wind erosion is a surface phenomenon that detaches, transports, and deposits soil particles. Three types of movement are recognized: suspension, saltation, and surface creep. Movement can be expected on unprotected surfaces when the wind velocity is about 15 miles an hour at one foot above the surface. Crop stubble, clods, and shelterbelts help to reduce surface movement. However, the fallow that is best for conserving trash and creating clods on one soil type is often ineffective on another.

The story of the gradual decline of soil fertility is an absorbing one. The rapid decrease in organic matter and the gradual unavailability of nitrogen and phosphorus have concerned soil chemists since soil studies started in 1922. With few exceptions, commercial fertilizers had little influence on wheat yields during the first 25 years of this station's history. As I stated in "Field Husbandry," in 1930 Sidney Barnes predicted that within 40 years assured high yields would depend as much on fertilizers as on improved varieties. Field and laboratory studies by J. L. Doughty, Frank Warder, Willard Hinman, and Con Campbell proved that Barnes' forecast was valid. But it is not simply a matter of applying fertilizer at all times and on all crops. Available nutrients in the soil differ from year to year between soil types, farms, and cultural practices on any one farm - all because of climatic forces. Our research officers have devised techniques to simplify soil sampling and laboratory analysis and thereby more easily measure the amount of available nitrogen and phosphorus. Recent studies reported by Con Campbell show the need for soil aeration because of its effect on both yield and quality of wheat. Don Read's soil fertility work with perennial crops has had an impact on grassland management.

Hank Anderson has studied soil management since he arrived from the Fort Vermilion station in 1963. His work with chemical and machine summerfallow has proved valuable in increasing moisture reserves in the soil reservoir. His recent work with fall applications of herbicides to control winter-annual weeds has been accepted by farmers because the practice reduces production costs and increases moisture reserves and the work can be done during a slack period.

#### PRECIPITATION AT SWIFT CURRENT · 84 YEARS 1886-1969



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Far too often I've heard the complaint, ''If we could get rid of administration, we could have many more technicians to do our field and laboratory work.'' But at the Swift Current Research Station, as at other research centers, the administration office performs many necessary duties. There are the jobs of keeping the grounds, buildings, and machinery in repair, and supplying the equipment needed for research. The office looks after other important matters: hiring research and support staff, keeping accurate personnel records, typing and retyping research manuscripts, providing feed for cattle and sheep and turkeys, maintaining files and, above all, distributing the fortnightly pay checks. But the two most important tasks of administration are to put into effect the policy for agricultural research within Palliser's Triangle, and to maintain good public relations with the agricultural community.

Administration has a lengthy agenda. The list includes many activities, from the work of the Superintendent or Director who sets policy to the man who mows the lawns and the girl who types our manuscripts. Earlier in this report some of the contributions of each have been mentioned, but their work merits further words. J. G. Taggart established excellent public relations with the farmers and ranchers throughout the Triangle. L. B. Thomson led a fight to end wind erosion and to develop irrigated agriculture. Grant Denike set standards for staff qualifications and built the Station's modern research plant. Ed Andrews completed the difficult job of reorganizing administration in line with directives from the Research Branch. Art Guitard is working with farmers and ranchers to increase their confidence in the Station's research program. But all of these men have had to have people to do the day-by-day chores that research policies demand.

Undoubtedly, the first administrative support was given by T. Chalmers, who came from Indian Head to supervise the limited building program and to prepare 480 acres of land for experiments. Regrettably, Dr. Archibald and Mr. Chalmers were often at loggerheads, partly because Chalmers was not accustomed to working under centralized authority. He was used to doing things without authorization. He graded the road between the Station and the Alexander farm, and allowed the Swift Current Board of Trade to hold a field day on the Station without first getting the approval of Dr. Archibald. But Chalmers had a lot of administrative ability, and his supervision of the work in 1921 made it possible for J. G. Taggart to implement experimental projects in 1922.

Mr. Taggart gathered a small staff for administrative support. Unfortunately, there are few permanent records about these people, but the memories of Corny Smith, Jim Milne, and a few others have provided a more of less complete story. However, it is generally the exceptional circumstance or incident that is recalled. Z. N. Mack was hired to keep records, but he is best remembered for his noon-hour Bible classes. John Koski was barn foreman, but we remember less about his work performance than we do about his expressive use of the English language. L. M. Bryenton looked after the cattle herd, and Mrs. Bryenton managed the boardinghouse. There was a succession of foremen, one of whom was an ordained minister. Corny Smith ended the long line when he was made foreman in 1929. Miss Jessie Bain was the accountant-secretary for several years. John White was a teamster before he was promoted to bus driver, and later to chief clerk. Amongst other field workers were Bill Bell, Jim Milne, Taffy Morgan, and Dave Morgan.

There was no administrative officer during either J. G. Taggart's or L. B. Thomson's superintendencies. Mr. Taggart acted as his own administrative assistant. But with the tremendous increase in staff and responsibilities after L. B. Thomson's appointment, greater administrative supervision was delegated to one or another of the senior research officers. including Grant Denike, Shorty Kemp, and Peter Janzen. G. E. (Gil) Kerley was appointed Administrative Officer in 1953, a position he now holds.

Many changes have occurred in the accounting staff during the five decades. Helen Mitchell succeeded Jessie Bain, but left in 1941 to join the Armed Forces. Mary Ellen Hayes was senior accountant for a short time till Bernice Downing was appointed. She was assisted by Iverna Jensen, who became head of the staff after Bernice was married in 1953. Mona Collinson was appointed to work with Iverna, and Mona acted as senior accountant until Howard Schwab came from the Summerland Research Station to direct the accounting work.

Barbara Morice headed the secretarial staff from early 1935 to 1967, when Susan Wagner was appointed to succeed her. Few secretaries have stayed for very long. The training the secretaries received under Miss Morice's tutorage was more than they needed for business organizations to offer them better salaries and opportunities. As might be expected, many married and left the Station. I recalled the names of several of our secretaries in an earlier chapter, but a few others are remembered. Phyllis Longmore, Helen Warder, Betty Yager, Arlene Pendleton, Pat Shields, Pat Woychuk, Fay Rude, Joyce Camphaug, Nesta Bruce, Karen Lapaire, Nellie Torrans, Marlene Schillinger, and Beulah Ferridge were with us for several years. But the secretary with the longest service at present is Lillian Jensen who joined the staff soon after her discharge from the RCAF. For many years Lillian typed annual and special reports, a job that kept her busy all the time. Since 1965, she has been secretary to the Director and the Administrative Officer. The secretarial staff at present comprises Marie DaSilva, Dolores Jacobson, Sharon Hansen, Mona Collinson, and Bea Foreman.

Miss Morice only recently told me that the filing system was reorganized in 1940. Perhaps it would be more correct to say filing was organized at that time because, according to Miss Morice, there was no system. Correspondence, directives, and reports were hard to find. Grant Denike was the one who added order to the files after he discovered. a six-month-old directive about employment lost in a pile of paper on the desk of one of his associates. Grant acted as chairman of a file-improvement committee that organized a system to simplify and greatly improve administration. His method was so satisfactory that it was used later by the Canada Department of Agriculture as a guide for the filing system that came to be used through the whole Department.

A computer service to refine and analyze experimental data became a reality in 1958. For nearly 40 years, research officers and technicians had struggled with adding machines and calculators to express their observations in meaningful mathematical terms. Harold Moen left the Animal and Pasture Science Section to undertake computer training, and later to write programs and handle data. Computers at the Suffield Research Station, Ralston, Alberta, and at the Central Experimental Farm were available for our use. Since Harold's departure for Ottawa, Darrell Stokes has directed this work. He is assisted by Miss Lessmeister.

The establishment of the library is not recorded in any of the early reports of the Station, but probably Mr. Taggart, Grant Denike, Mr. Mack, and Miss Bain gathered and classified bulletins, books, journals, and reports to start this important research adjunct. As far as I can determine, the late Mrs. Sidney Barnes was the first full-time librarian. After she retired in 1946, librarians came and went, but Merle Tache, Irene Schatkoski, or one of the secretaries gave part of their time to clear away the trash and classify and file material of permanent value. A library committee composed of research officers was appointed about 1940; Bob Blakely chaired this committee for many years. Increased library space was provided when the staff moved to the new Research Building in 1965. Aileen Laird moved from the secretarial staff to become the librarian and Elaine Kimber was made her assistant. After Aileen took over the work she received much assistance from the officers at the Regional Library at Saskatoon.

The horticulture program at the Swift Current Research Station has been closely associated with the research at the Morden Experimental Farm, and the forest nurseries at Indian Head and Sutherland. We are interested in vegetables, flowers, shrubs, and trees being assessed in regional and national tests. As a result of this work, we are able to recommend varieties for gardens, plantations, and shelterbelts anywhere in the Triangle. Moreover, when Bob Blakely was in charge of horticultural work, he started hybridization with vegetables. One of his projects was with tomatoes. Carl Carlberg selected on the basis of Blakely's specifications, and in consequence the variety Swift was licensed as a contribution from this station in 1960.

At present Carl's work combines regional tests and station beautification. The landscaping is a big job for him and his staff. The lawns and orchard, the shelterbelts and flower beds, and the hedges and trees require constant care from April through November. As usual, staff training has provided opportunities for advancement. And this is why the Station The present Research Building contains four large growth chambers This picture shows the complex controls that regulate temperature, humidity, and light, and, in the foreground, the growing plants that are used in a hydroponic study



Greenhouse facilities speed the selection of crops to be grown within the Palliser Triangle
lost Ron Ansell to the positon of head gardener at the headquarters of the R.C.M.P., Regina. Three other employees who worked with Carl for several years, and who retired recently, are Andre Mouly, Taffy Morgan, and George Torrans.

The 20,000 square feet of greenhouse space and the ten environment-controlled growth rooms in the Research Building have made possible an increase in fundamental and introductory research. Allocation of space is coordinated by a committee of research officers. As I recall, Frank Reynolds was the first greenhouse technician, both before the Second World War and after his discharge from the Canadian Army in 1945. John Penner succeeded Frank in 1959.

The drafting laboratory was part of the Agricultural Engineering Section till it was transferred to administration in 1965. During the first decade of this station's history, the interested research officers did most of the drawings for the machines they designed or modified. Grant Denike and Shorty Kemp, as well as others, had drafting boards in their offices. But with the advent of PFRA a drafting laboratory was established. Roderick ''Hank'' Hankinson was our first welltrained draftsman. He was succeeded by Hugh Caswell. Hugh, Ray Bunnell, and Tony Bailey make up the present staff. Several other draftsmen trained by Hank and Hugh have joined business organizations.

We were our own photographers for many years, and many research officers became adept at taking pictures of machinery, plants, and animals. A library of our better photos contains many prints that have been used to illustrate bulletins and scientific papers. John White supervised the collection and added photos we thought were worth keeping. But as research became more detailed, illustrating work required professional help. Ray Bunnell set up a photo laboratory after he returned from study in the United States. He was succeeded by Gorden Evjen, who is in charge at present.

Stationary engineers were added to the staff when the Research Building became ready for occupation in 1965. With a steam-generating power plant producing 1300 horsepower and an environmental control unit producing 400 tons of refrigeration every 24 hours, a qualified engineer has to be on duty 24 hours a day, 7 days a week. The Station was lucky to get Lewis McLaughlin as Chief Engineer. Lew came from the Research Station, Fredericton, N.B., and brought with him ability, experience, leadership, and humor. Among the recruits of Grant and Lew was J. D. Youngman, who after a short time with us won the competition for Chief Engineer at the Research Station, Harrow, Ontario, and, of course, left us.

The busy shop has a simple design. There is a service area near the center of the building, which measures 228 by 86 feet. The repair area is at one end, the development and construction sections at the other. The shop is equipped with modern machine tools, and the space is organized for efficient handling of materials. When the construction of this building was completed several services were brought under one roof. The change made it possible to co-ordinate the skills of many tradesmen who were responsible for the construction and testing of new research tools and for the improvement of farm machinery.

Six general divisions of work have headquarters or are permanently located in the shop. The stores unit is also an inventory center, and it expanded rapidly after the shop was completed. Foy Johnson, Harry Smith, and Art Rorman were recruited from other work to maintain inventories and to distribute the supplies and equipment needed by field and shop technicians.

No one knows for sure whether the services of the machine shop or the carpentry shop were first to be made available. The structure in which both were housed for many years was redesigned and it became the headquarters for the Agricultural Engineering Section. The enlarged building is now the supply and work center for the technicians of the Plant Science Section. In any case, carpentry and machine services were both made available to the research officers early in the 1920s.

Joe Kunzel was the first machinist to have his name on record. Even with inadequate machine tools and a cramped work area, Joe built the plot threshers and seeders, as well as the grain elevators and seed cleaners that Shorty Kemp designed. Joe was an expert craftsman, and no job was impossible if he could make the necessary parts on the small lathe, the only one available. He was also the electrician during his 12 or more years at the Station. He was succeeded by machinists Roy Harden and A. G. Schuldt. With some 150 electric motors, over 200 miles of wire carrying electric power, and numerous transformers to be serviced. Joe had to be assisted by a full-time electrician. Ralph Nayler and Tom Lindsay have worked as electricians in recent years.

Many part-time carpenters were employed during the first decade of this station's history. Ed Tanguay was the first carpenter to have year-round employment here. After he retired he was succeeded for short periods by Walter Burden and Jack Robertson, for several years by Nels Wallner, and recently by Art Gibbs. Jim Dawson and Lloyd Gloeckler have been with the carpentry service for more than 20 years. Most carpentry today consists in converting or remodeling existing structures to meet research needs, making small experimental tools, and repairing buildings.

Joe Dickie, who has been field foreman for several years, has his headquarters in the shop. Joe and his small staff do all the field work not directly associated with the research plots. Plowing, cultivating, earth-moving, haying, and truck-

ing during the summer, and snow removal and related jobs during the winter, keep Joe and his crew busy all year. Joe is one of the few employees with 30 or more years of service. He started as a drag-line operator on the Val Marie irrigation project in 1939 and, except for a few years during the Second World War, he has been employed continuously. Some others who work or have worked with him are Joe Buist, John Heinrichs, Selmer Tangen, Adrian Lapalme, and Bill Maley. As far as I know, John White was the first bus driver; Don Shaner took over from him in the late 1940s.

Administration has made many physical moves since the first office was built by T. Chalmers in 1921. For a few years, part of the present residence of the station director provided office space. In the mid-1920s, a building was erected to house administration and the small research staff. As the staff increased, so did the building. It was torn down in 1966 and on its site are now flower beds, trees, and shrubs. When the Research Building was completed in 1965, administration moved again, this time to commodious quarters designed for an efficient work flow. But no matter what its location, administration has always given strong support to ease the paper work and to play an active role in the research program. 15 other interests Members of the Station have followed many activities not directly related to agricultural research. On occasions, only one or two officers were involved, but at other times, many station officers were engaged in extra programs that were vital to the agricultural economy of southwestern Saskatchewan. Some of these activities have been reported earlier in this story, particularly the work with PFRA on irrigation and community pasture development. Some others are mentioned here.

Twelve of the Station's research scientists have served with the Food and Agricultural Organization (FAO) and other international organizations for periods of a few months to four years in Africa, Asia, and Europe. During the late 1940s Dr. Bill Chepil worked in China for two years as an advisor on wind and water erosion control. This assignment came just before he accepted a position at State College, Manhattan, Kansas.

During the summers of 1954 and 1956, I was an advisor to the Government of Iceland on land use and range management. After my 1954 report was accepted, the Soil Conservation and Extension Services of Iceland developed extensive testing programs with grasses and fertilizers to supplement the results from the four experimental farms that had given guidance to Icelandic farmers for many years. Before this assignment, I was in Australia and New Zealand on a study tour. During that time, I noticed how much the exchange of ideas benefited both the research program at the many experimental stations I visited, and the research at home. Dave Heinrichs reported the same mutual benefit after his return from a work-study tour of Australia.

Alex Johnston, a former member of the staff who is now at the Lethbridge Research Station, joined FAO to organize a range management program in Pakistan. In the twoyear assignment he provided field, classroom, and laboratory training. Bob Lodge succeeded Alex and he also stayed in Pakistan for two years. Ralph Melvin left the Station to work on irrigation development in East Africa. Kaljo Pohjakas was in Iran for four years working on irrigation and drainage schemes. Stu McBean and Grant Denike joined Ted Hurd in East Africa to assist Kenya and adjacent countries in a cereal improvement plan. More recently, our station was made responsible for organizing dryland agricultural research in India. To date, Ed Andrews, Frank Warder, and Bill Pelton have been to India to organize the program with officers of the India Department of Agriculture.

Shortly before Dr. S. E. Clarke retired, he directed a program to establish grass and soil study areas in PFRA community pastures. In this work, he was associated with officers in soil and entomology research from the University of Saskatchewan. Those of us on range survey selected five areas, each about two sections in size, that represented the vegetation on sandhill, eroded clay, heavy clay, and loam soils. Officers at this station have used all of the sites to study grass yield and plant succession under different management techniques.

After the Second World War, the Kamloops Range Experiment Substation was reopened and redesignated the Range Experiment Station. Three former employees of the Swift Current Station were appointed to continue the work Dr. S. E. Clarke and Ed Tisdale had directed from 1935 to 1941. Tom Willis and Al McLean were made Superintendent and Range Ecologist, respectively. Al Macdonald was named Livestock Supervisor, but he stayed only a short time then went back to postgraduate studies.

Shortly after the Kamloops Range Experiment Station began operating, the Western Pasture Committee recommended establishing a range substation in the foothills of the Rocky Mountains. After exploration of some 200 miles of foothill country between the International Boundary to north of the Bow River, a site was chosen on the Flying E ranch about 12 miles west of Stavely, Alberta. Alex Johnston of the Lethbridge Research Station, Scotty Campbell, from the Alberta Department of Lands and Forests, and I made the choice. Our decision was based on grass cover, water supply, natural shelter, and accessibility. The Flying E ranch was owned by the Burns Company, and its senior officers were most co-operative when land exchanges were being negotiated. Local ranchers were equally co-operative. An interesting sidelight of the three-month survey was a study with shrubby cinquefoil (Potentilla fruticosa L.) because some of the plants we examined were over 100 years old.

I recall the meeting when the decision was made to undertake the Stavely Substation project. Dr. E. S. Archibald attended and asked questions concerning budgeting of funds in the estimates for this Substation, obtaining land control, the adequacy of the stock-watering supply, the grass cover and whether or not it was representative of the ranch lands throughout the foothills, and the interest of ranchers in the project. After we had answered ''Yes'' to all his questions, he said, ''Go ahead, what are you waiting for?'' This response was quite typical of Dr. Archibald, who gave strong support to well-documented and needed research studies.

Of particular interest is the Land Use study, which was directed by this station in the late 1940s. The Better Farming Commission had made a report 25 years earlier, and new guidelines were necessary to formulate legislation advantageous to Saskatchewan agriculture. A Land Use Committee was appointed by the Hon. L. F. McIntosh, Minister of Agriculture. It comprised L. B. Thomson, Superintendent, Swift Current Experimental Farm; L. M. Ogilvie, Agricultural Representative, Swift Current; G. N. Munro, PFRA, Regina; Herb Wiebe, rancher and businessman, Herbert; Prof. Hedley Van Vliet, University of Saskatchewan; and myself as Secretary. Our functions, as outlined by Mr. McIntosh, were to collect, assemble, and study information to formulate sound plans to guide the course of agriculture in Saskatchewan. Our study area comprised 16 municipalities contiguous to Swift Current. The resources of this station were used in field studies that complemented information available from other sources, and officers from the Forage, Soil, Field Husbandry, and Engineering sections worked on this project. The Land Use Committee report became the policy reference for agricultural legislation for nearly 20 years after it was presented to the Saskatchewan legislature in 1949.

Another off-station project was the creation of the Eastern Rockies Forest Conservation Board. Wally Hansen joined the new organization as the range specialist, and Archie Budd and Bob Lodge worked with him to establish grazing patterns and ecological trends. During the preliminary field work Wally found the only known stand of big sagebrush (*Artemisia tridentata* Nutt.) east of the Continental Divide in Canada.

The Swift Current Station was also associated with the Sage Creek land use study in southeastern Alberta. This creek is the source of water for irrigation on the Sage Creek flats. Though Sage Creek rises in the Cypress Hills and 90 percent of the irrigable land is in Canada, the surplus water evaporates from a large saline flat in Montana. Because it crosses the International Boundary, the use of this water is a responsibility of the International Joint Commission (IJC). A land use committee, comprising Prof. O. M. Monson, State College, Bozeman, Montana, and myself, was appointed by the IJC to report on the agricultural potential of the irrigable area and the adjacent dry land. We directed teams of englneers, and soil, forage, and range specialists. From the information gathered we prepared a report that was presented at a meeting of the IJC in Washington, D.C., in 1953. The Committee recommended certain improvements, but before these could be implemented all of the 5000 acres of irrigable land In Alberta were controlled by two ranchers, and the Government of Canada decided not to rebuild a \$250,000 dam for the benefit of two people.

Station employees have a staff organization. Its present name, after several changes, is the Research Station Employees Association (RSEA). Its main purposes are to coordinate staff interests and to report on interesting activities of members. It was organized during the early 1940s in an effort to overcome the 25-cent collections to purchase gifts for staff members upon their joining the Armed Forces during the Second World War. Later it organized social and athletic activities, including the Children's Christmas Party, which was started by Taffy Morgan. One of its first activities was a Saturday-afternoon work detail to insulate and line the inside of the Assembly Hall so that the building could be used as a social center. Over 30 of us were in each other's way as we carted boards and drove nails.

Many of the Station's officers have taken an interest in civic affairs. Archie Budd, Dave Heinrichs, and Bob Lodge have served on Swift Current city councils. Frank Warder worked as a member and chairman of the school board for many years. Others have served on committees and many are members of service clubs and the Chamber of Commerce. The Swift Current Agricultural and Exhibition Association (Frontier Days) provided a means for civic participation. During its formative years in the mid-1930s, when it was known as the Kinetic Club, the names of Bill and Dave Harding, Herb Purdy, Arn Platt, Reg Milne, Walt Burns, Pat Metheral, and Dave Heinrichs occurred often in the minutes of the Sunday-afternoon meetings. When a reorganization incorporated the inactive Agricultural Society, the names of Grant Denike, L. B. Thomson, Cliff Shirriff, Joe Ficht, Murray Dodds, Peder Myhr, Gil Kerley, and myself often appeared in the lists of officers and directors. When the local Horticultural Society amalgamated with Frontier Days, other station employees became members of the Association, including Carl Carlberg, George and Betty Torrans, and Bob Blakely. All of our civic and club activities promoted good public relations.

But we had to direct our research information to the agricultural community. Several of the extension methods have been reported in earlier chapters, including speaking at public meetings, the publication of weekly letters and articles in the farm press, radio interviews, and regular field days. These methods of communication have continued, but more recently this station has used TV to complement the other media. In May 1959, the local branch of the Saskatchewan Institute of Agrologists (SIA) joined Frontier Days and CJFB-TV to present "Farming Today." In 1964, the SIA sponsorship was taken over by the Research Station, and Peder Myhr and Mark Kilcher succeeded Agricultural Representative Doug Grant and myself as hosts on the program. To date, 700 15-minute programs have been televised. They have embraced a wide range of interests that appeal to both rural and urban viewers.

Another way of presenting topical information was inaugurated by the SIA when Farmers' Night was started in 1957. Though this project is still sponsored by the SIA, it is basically a Station responsibility. The purpose of Farmers' Night is to invite well-known agricultural personalities to address farmers and businessmen on current subjects. The late Prof. Hedley Van Vliet was the first of 15 speakers who joined our local to provide an evening of informal discussion and association. The branch has been fortunate in having speakers who presented timely information about crops, livestock, economics, machinery, and other subjects of value to our rural and urban guests.

Direct communication with the farming community has been only part of the picture, because many articles, bulletins, and special reports have been published. To date, the 360 articles published in scientific journals have covered the entire range of disciplines our station's research scientists pursue. In addition, 384 miscellaneous articles have been published; they include books, bulletins, newspaper articles, and reports for national and international meetings. These publications complement the information prepared for local use, but, more importantly, they enlarge the stature the Swift Current Research Station presents in the world's agricultural community.



Though scientists will continue to relate their work to their disciplines, the local versus the international markets may well determine the service that each performs. The environment of Palliser's Triangle precludes few alternative crops and agricultural practices. On fertile, stone-free, fairly level land, the production of high-protein wheat, other cereals, flax, and drought-tolerant grasses and legumes has comprised the array of crops. These crops will continue to be grown. On poorer soil or rougher topography that occurs in large blocks, cattle-raising under range practices is the only sure resource at present and in the foreseeable future. Limited irrigation complements the dryland cereal-beef production with seeds, forages, fruits, and vegetables. Though the environment limits immediate and drastic production changes, research continually provides knowledge for an orderly transition to a more viable, stable, and balanced agriculture.

Because the Canadian market cannot absorb the quantity of high-quality wheat and beef produced in Palliser's Triangle, an international market is essential for rural and urban prosperity. But at present and possibly for many years to come, farmers and ranchers in Western Canada must compete on a world market with countries that subsidize their own agrarian policies. These policies support cereal production to twice that of international trade and offer long-term loans to farmers as an incentive to increase their beef cattle inventories. To help offset subsidized competition and critical markets, agricultural research will supply knowledge to meet the change in market demands during the next half-century.

Changes in research can be expected—not in the research objectives, but in the implementation of those objectives. The horse became obsolete when the rubbermounted tractor proved a more efficient power unit. The binder, the separator, the plow, and the disc were superseded by the combine, the swather, the one-way, and the cultivator. Marquis and Red Fife bread wheats are remembered by only the eldest of Prairie farmers. Grimm alfalfa, brome, and western rye have lost out to new species and varieties of forage crops. New techniques of communication have quickly brought research results to the agricultural community. All of these benefits, proved by research, have assured a better use of soil, water, and solar energy, and of machinery, crops, herbicides, and fertilizers. Research has made it possible for farmers and ranchers to produce much more on the same amount of land with less labor than they used 50 years ago. At the same time research has decreased the harsh realities of the environment.

Change to meet the needs of the agricultural community, caused by economic trends, production patterns, and international competition, must be recognized as a basic tenet of research. Scientists concerned with plant improvement will release new varieties more resistant to the stresses of the environment. Engineers will design improved machinery to sow and harvest the better crop varieties. The agronomists and soil specialists will test new ideas about land and soil management and, from this research, will develop cultural practices that conserve more moisture during the fallow year and decrease the destruction caused by the power of uncontrolled wind and water. Though there will never be an end to change in the experimental program, the objectives will remain the same.

These are some of the several objectives of the Swift Current Research Station, but an ever-present one suffices as a statement of the basic philosophy of its research. The Station aims to provide sure information about agricultural problems that will help to improve the standard of life in rural and urban communities throughout Palliser's Triangle, throughout Canada, and throughout the world.

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