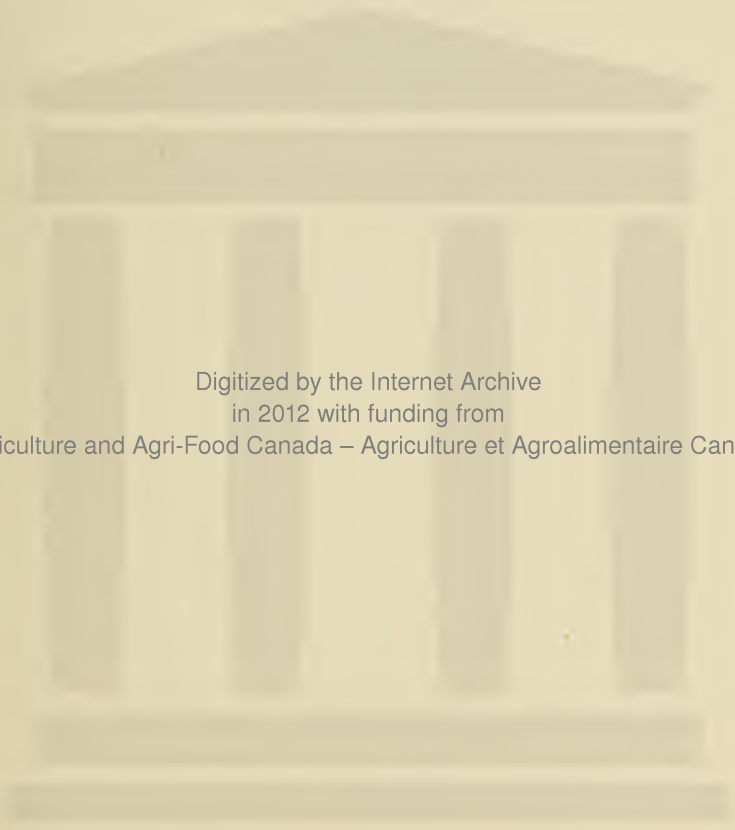


# SURVIVAL OF A VISION

George Spence





Digitized by the Internet Archive  
in 2012 with funding from  
Agriculture and Agri-Food Canada – Agriculture et Agroalimentaire Canada





# SURVIVAL OF A VISION



1967

# SURVIVAL OF A VISION

George Spence

Historical Series No. 3



CANADA DEPARTMENT OF AGRICULTURE

© Crown Copyrights reserved

Available by mail from the Queen's Printer, Ottawa,  
and at the following Canadian Government bookshops:

OTTAWA

*Daly Building, Corner Mackenzie and Rideau*

TORONTO

*221 Yonge Street*

MONTREAL

*Æterna-Vie Building, 1182 St. Catherine St. West*

WINNIPEG

*Mall Center Building, 499 Portage Avenue*

VANCOUVER

*657 Granville Street*

or through your bookseller

A deposit copy of this publication is also available  
for reference in public libraries across Canada

Price \$2.50

Catalogue No. A54-2/3

*Price subject to change without notice*

ROGER DUHAMEL, F.R.S.C.

Queen's Printer and Controller of Stationery

Ottawa, Canada

1967

*To the sacred memory of my beloved wife.*



## FOREWORD

“Survival of a Vision” is a synthesis of the personal experience of George Spence and the records of surveys, proposals and plans for the conservation and use of water in the southern prairie region of Western Canada. The “Survival” is materialized in the South Saskatchewan River dam near “The Elbow.” The dam itself, now named the Gardiner Dam, is virtually complete in the early months of 1967. Remaining to be completed but under construction are power generating facilities and major irrigation canals. Construction of dams and other works necessary for the creation of an eight million acre-foot reservoir has extended over eight years. Surveying, planning and design covered a period of at least equal length before the first actual construction work began.

The author seems to regard the dam and reservoir as the almost inevitable, if not the foreordained, fulfillment of the “Vision.” The vision was in the minds of many men; among the earliest of them were John Palliser and Henry Youle Hind, who, more than 100 years ago, explored and surveyed “The Great Lone Land” for the British and Canadian Governments. Both men, and others before and after them, observed the geological conformation near the Elbow of the South Saskatchewan River, and thought it might make possible the diversion of the river waters into the Qu’Appelle, the Assiniboine and the Red. Such diversion, it was suggested, would provide for safe and economical water-borne transport from Fort Garry westward to the Saskatchewan system. The primitive state of the economy of the prairie region more than one hundred years ago clearly did not justify serious consideration of such a project. Later, the coming of the railway offered a more acceptable alternative to the Red River ox cart.

But the vision survived, if only in changing forms. In this record the author traces the continuing vision of water conservation in a newly settled region of low and variable rainfall. The great plans of William Pearce, pioneer advocate of irrigation by means of vast schemes for impounding and diverting the waters of the South Saskatchewan system, are described with genuine appreciation of their significance for future developments. The vision shifted from transportation to irrigation. Later, with the growth of urban population, particularly in centers not located on “live streams,” water for domestic and industrial use came to be of urgent importance. The studies, proposals and efforts to find solutions to the water problems of Moose Jaw and Regina are brought into focus as part of the vision. But solutions had to await the major undertaking by the Federal and Provincial Governments—the South Saskatchewan dam.

In recent times, recreational use of impounded water has been much in evidence in public discussions of water conservation. This possible public benefit from storing water was given little thought by pioneer visionaries. Times have changed! Perhaps, apart from assuring water for domestic and industrial use, this will be one of the most lasting benefits of the dam.



In his book the author has drawn heavily on the work and reports of engineers and commissions to support the broad proposition that large expenditures of public money are justified to conserve the relatively limited supplies of surface water available in the prairie region. The chapters presenting this evidence are worthy of study by every Canadian who is interested in water conservation—and who among us is not or should not be interested?

The sections detailing the surveys and soundings that necessarily preceded final determination of a site for a dam give an excellent picture of the important work that must be done before construction can be authorized. The dangers of inadequate prior studies of geology, soil mechanics and proposed uses of materials are made abundantly clear. While chiefly of value to students and engineers, many general readers will find much of interest in this portion of the book.

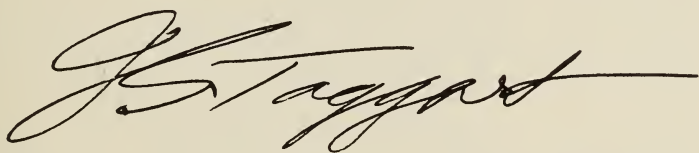
Perhaps a word of caution for the general reader might be in order, lest he gain the impression from the enthusiasm of the author that the construction of the dam will, by itself, solve the drought problems of prairie agriculture. No one who has witnessed the expansion of irrigation in Alberta in the past sixty years can doubt its value. Neither can he believe that its application can be sufficiently widespread to mitigate the effects of a drought such as prevailed in the early and mid-1930's.

In 1966, after more than sixty years of active development, just over six hundred thousand acres were irrigated out of a total of about forty-six million acres of crop land, not to mention the twenty-five million acres of summerfallow. It may be doubted that one-half of one per cent of the 1966 prairie grain crop was produced on irrigated land. But, of course, irrigation is not primarily intended for grain crops. Alfalfa, sugar beets, canning crops and other high-value specialties are more likely to offer profitable use of irrigation water, leaving grain production to extensive low-cost, dry-land farming. However, in 1966, grain crops, mainly wheat, occupied perhaps 40 per cent of the irrigated acreage in Alberta. Much of the grain production, of course, would be used for livestock feeding in conjunction with alfalfa and by-products from the beet sugar and canning industries. In southern Alberta, irrigation has contributed much to a stable and prosperous economy. But progress has been dependent upon the availability of markets which can be supplied economically by specialized, high-value crops and the provision of a certain supply of livestock feed.

These observations are not made in criticism of Mr. Spence's book, nor to discount or discredit irrigation. They are merely intended as a caution against undue optimism as to the speed and extent of irrigation development which may follow the availability of water from the Saskatchewan River dam. It seems to the writer of this Foreword that the major value of the dam for a long time to come will be for the generation of power, for urban and industrial water supply and for recreation. Should this observation be taken to mean that the construction of

the dam—the *physical* survival of the vision—was not justified? Not at all. It merely means that human foresight often is not equal to the demands made upon it. Were Palliser and Hind lacking in foresight when their visions were mainly of navigation from the Red River to the Saskatchewan? Hardly! They were among the earliest of a long line of visionaries whose efforts finally resulted in the building of this great work which will contribute to the strength and stability of the prairie economy for generations to come.

Western Canadians owe a debt of gratitude to George Spence for producing this book. Much of the work was done after his eightieth birthday—sure proof of his zeal for the cause of water conservation and of his tireless devotion to that cause.

A handwritten signature in dark ink, reading "J. S. Taggart". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Ottawa, March 1967

Dr. James Gordon Taggart was Minister of Agriculture in the Saskatchewan Government during the years when the Prairie Farm Rehabilitation Administration was being established. A graduate of agricultural colleges in Nova Scotia and Ontario, he was for a time Superintendent of the Swift Current Experimental Farm, and then Principal of the School of Agriculture at Vermilion, Alberta. He thus became intimately acquainted with the problems examined in this book. After valuable war service, his career was capped by ten years (1949-59) as Deputy Minister of Agriculture at Ottawa.

## CONTENTS

CHAPTER 1.	The Early Years .....	9
CHAPTER 2.	Federal Diversion Surveys .....	22
CHAPTER 3.	Provincial Measures .....	35
CHAPTER 4.	Grappling with Severe Drought .....	50
CHAPTER 5.	The Black Thirties .....	61
CHAPTER 6.	The Prairie Farm Rehabilitation Act .....	74
CHAPTER 7.	Large Development Programs .....	84
CHAPTER 8.	The William Pearce Proposal .....	99
CHAPTER 9.	The South Saskatchewan Project is Revived .....	114
CHAPTER 10.	The Search for a Feasible Site .....	124
CHAPTER 11.	The Winning of Public Support .....	138
CHAPTER 12.	The Project Gets Under Way .....	150
POSTSCRIPT	Shaping the Future .....	160
ACKNOWLEDGMENTS	.....	166

## CHAPTER ONE: THE EARLY YEARS

### EXPLORATIONS

Geologists say that, in all probability, at one time in the last Ice Age, when a vast sheet of ice lay across the North American Continent, the south branch of the Saskatchewan River flowed down what is now the Qu'Appelle Valley.

The main support for this theory comes from the fact that the headwaters of the west branch of the Qu'Appelle River lie in a deep wide valley, separated only by a short low divide from a creek which empties into the South Saskatchewan River at "The Elbow." This is Aiktow Creek, the Indian name signifying "the river than turns."

This particular feature of the topography aroused the interest and fired the imagination of early explorers. It seemed to point to the possibility of creating water transportation across the prairie region, by linking up the Qu'Appelle River with the South Saskatchewan, at the Elbow.

In 1857, the British Government commissioned Captain John Palliser, geographer and big game hunter, to head a scientific expedition with instructions to explore "that portion of British North America which lies between the Northern branch of the River Saskatchewan and the frontier of the United States, and between the Red River and the Rocky Mountains."

Palliser was also enjoined "to ascertain whether one or more practicable passes exist over the Rocky Mountains within the British Territory, and South of that known to exist between Mount Brown and Mount Hooker." (This was the Athabasca Pass, used by Thompson and later explorers to reach the "Big Bend" of the Columbia River.)

In addition to recording the physical features, principal elevations and the like, Palliser was also required to report upon the geology of the region and "the nature of its soil, its capacity for agriculture, the quantity and quality of its timber and any indications of coal or other minerals." In his instructions, Henry Labouchère, Secretary of State for the Colonies, stressed one point in particular. "The limits of expense," he wrote, "prescribed for the expedition cannot be exceeded unless under circumstances of urgent necessity, which you will at once report for the information of Her Majesty's Government."

It was foreseen by the Secretary that Palliser would finish his explorations in British Columbia, and consequently might want to visit Vancouver Island. The Secretary was generous enough to grant Palliser that privilege, provided he paid his own expenses. Evidently the "expense account" was suspect even in those early days!

A complete record of the historic expedition, in the form of journals, maps, profiles, sketches and other supporting data, was "presented to both Houses of Parliament by command of Her Majesty—19th May 1863."

Palliser recorded, among much else, that the expedition first came in sight of the South Saskatchewan River "at sunset on the 21st September" (1857), while on its way to Fort Carlton, where the expedition spent the winter of 1857-58.

On September 22nd, "immediately after breakfast" we are told, "Dr. Hector started with a branch party to explore the country to the East of the elbow and found a small stream [Aiktow Creek] descending to the Saskatchewan from swampy lakes to the eastward. These lakes send off waters to the Qu'Appelle, flowing in the opposite direction; and a very remarkable feature exists here, viz., that the summit level which divides these two streams lies in a valley more than 100 feet deep, and continuous with that of the Qu'Appelle, only 90 feet above the Saskatchewan." More precise investigations, by engineers, since, have found that Palliser was substantially correct. Any difference could be accounted for by the stage of water level when the measurements were taken.

Based upon the findings of the "branch party" under Dr. Hector, Palliser reached the following conclusion: "Hence I have been able," he reported, "to ascertain that there exists a valuable water communication between the South Saskatchewan and the Red River, and that a good sized boat, and even perhaps a small steamer, might descend from the South Saskatchewan, ascend the West Qu'Appelle River, cross the Qu'Appelle Lakes, and then descend the Qu'Appelle into the Red River." The inference is plain. Water cannot run uphill. The word *ascend* implied the construction of works to accomplish the desired objective—a dam across the river, a cut through the divide, or preferably a combination of the two. Palliser was the first explorer to draw public attention to the potential of such a project.

After completing investigations of the Qu'Appelle-Elbow section, Palliser crossed the Saskatchewan some distance upstream from the Elbow and lost one of his wagons in the operation.

The expedition was now on the left bank, or west side of the river—a circumstance which was going to have some historical significance after the lapse of a century or more.

In view of these later developments and in the interests of historical accuracy, the following is quoted from the report describing the incident in Palliser's own words: "October 2nd—started at 6:30 a.m. and arrived at Red Deer Lakes at 3:00 p.m. . . . The Red Deer Lakes six or eight in number, extending some 20 miles in a north-westerly direction, are connected with the Saskatchewan by a small stream from the south-eastern extremity, sweeping round in a north-eastern direction to join the river. . . . The valley containing Red Deer Lakes resembles in width that of a large river; it is said to cross the Saskatchewan 12 miles below the elbow, and is said to run continuously, and to join the valley of the Qu'Appelle by the Last Mountain Lake. I was assured by the half-breeds that there was hardly any obstruction, beyond that of one short low



portage existing to cut off communication by this route in spring with those lakes which are west of the Qu'Appelle River\*; information which is highly suggestive of a more minute engineering investigation, as to the expense and feasibility of a connection, by canal or otherwise, with a view of establishing communication between the Assiniboine and the Saskatchewan, should the progress or population of the country ever increase sufficiently to warrant the necessary outlay."

As already pointed out, the Palliser expedition was now on the west side and for that reason Palliser was not able to determine the true physical nature of the country on the east side of the river. After his unfortunate experience at the first crossing, doubtless, Palliser was reluctant to risk another crossing just to check on the accuracy, or otherwise, of the topography as described by the half-breeds. Had Palliser made an investigation he would have found that the half-breeds were mistaken. There is no such low divide at that particular location on the river.

Anyway, the record stands. Palliser was the first explorer to suggest that an engineering investigation should be made in an effort to determine the potential of the location when the "progress" and growth of the population justified such an undertaking.

Palliser's use of the word *otherwise* than by a canal could only mean one thing—a dam across the river.

The incident, as recorded in the report, is of particular historical interest, in that the lakes to which Palliser made reference as "Red Deer Lakes" have been renamed and are now known as the Anerley Lakes and the "small stream" is Coteau Creek!

The "minute engineering investigation," first suggested by Palliser, has been made by engineers of the Prairie Farm Rehabilitation Administration, and the work of constructing a high dam on that identical site on the river is now about complete. Thus the march of events has come full cycle—after a lapse of one hundred years!

Because of the influence which Palliser's delineation of the drought area had, in later years, on public policy in such matters as land use, water conservation and development, his delineation of the now famous "Palliser Triangle" is herewith quoted as follows: "The fertile savannahs and valuable woodlands of the Atlantic United States are succeeded, as has been previously alluded to, on the West by a more or less arid desert, occupying a region on both sides of the Rocky Mountains, which presents a barrier to the continuous growth of settlements between the Mississippi Valley and the States on the Pacific Coast. This central desert extends, however, but a short way into the British Territory, forming a triangle, having for its base the 49th parallel from longitude 100° to 114°W., with its apex reaching to the 52 parallel of latitude."

This low rainfall area, described by Palliser as a desert, has since

---

\*Existence of this valley is shown on early maps.

been defined as comprising an area of approximately 50,000,000 acres.

Another noted explorer, assigned to explore some of the territory covered by the Palliser expedition, this time by the Canadian Government, was Henry Youle Hind, M.A., Professor of Chemistry and Geology in the University of Trinity College, Toronto.

One year after Palliser, or in 1858, to be exact, Professor Hind was placed in charge of a division of the S. J. Dawson Exploration Expedition. A record of Professor Hind's investigations is contained in a report, "Assiniboine and Saskatchewan Exploring Expedition—Canada." This report contains special reference to his investigations of the Qu'Appelle-Elbow area.

Professor Hind set out his findings of the section as follows: "A dam 85 feet high, and 600 to 800 yards long (a few miles lower down the length of the dam would be much less) across the deep narrow valley in which the South branch flows, below where the Qu'Appelle Valley joins it, would send its waters down the Qu'Appelle Valley, thence down the Assiniboine past Fort Garry, and thus establish a splendid and probably uninterrupted navigation, for steamers of large size, for a distance exceeding six hundred miles."

So it came about that at an early period in the history of the North-West, two competent explorers, working independently, came to the same conclusion as to the possibility of creating water transportation across the prairies via the Qu'Appelle-South Saskatchewan Rivers.

As early settlement was confined to the natural waterways, navigation was a matter of supreme importance in those days. But as the chronicle of later events unfolded over the years, this condition of affairs ceased to be an important factor in communications. In spite of this circumstance, the dream, or vision, call it what you will, first advanced by the early explorers—a dam across the South Saskatchewan River—never died, but it lived on for a different, and a more vital and compelling reason. A new nation was coming into being. Big events were in the making. Men there were, who had vision and courage and, best of all, faith; who by taking an adventure into the future helped to weld that nation by uniting its peoples with a band of steel from sea to sea.

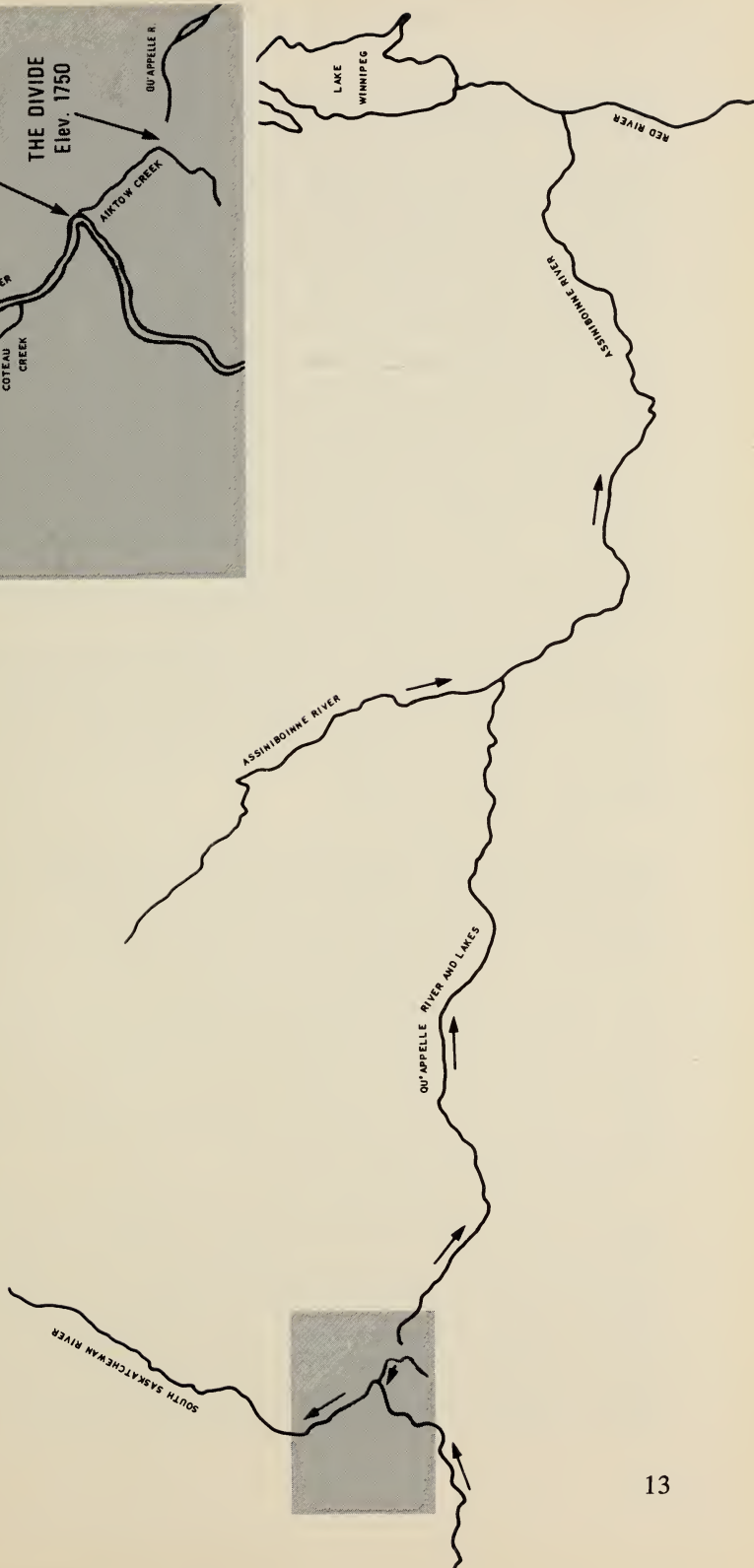
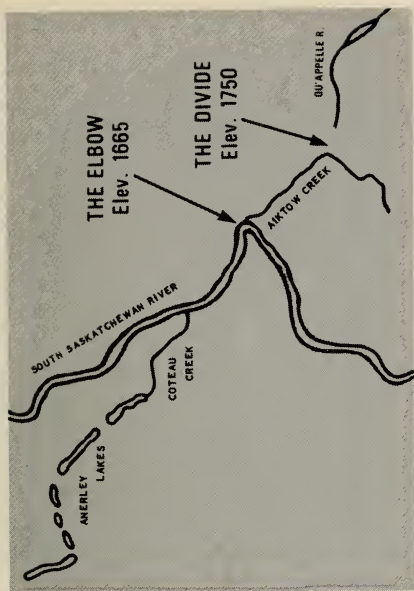
Investigations for the location of the Canadian Pacific Railway across the country started in 1871. These investigations and studies included both engineering and economic feasibility.

Sandford Fleming of the Intercolonial Railway was placed in charge of the great undertaking as Engineer-in-Chief. Sandford Fleming was more than an engineer—much more! Certainly a man of great versatility who championed causes of both national and international import: Standard Time and the Pacific cable, to mention only two of

---

The map and elevations show how, by overcoming the low barrier between the two river systems, the waters of the South Saskatchewan could have been diverted into the Qu'Appelle and Assiniboine valleys to flow finally into the Red River. This was noted by such early explorers as Palliser and Hind.





his many and diversified interests. At the time of his appointment by Sir John A. Macdonald, as Engineer-in-Chief of the Canadian Pacific Railroad in 1871, he was engaged in building the Intercolonial Railway. This, while he was still Chief Engineer of the Newfoundland Railway!

The weighty responsibility of building a railroad across so much unknown and forbidding territory required engineering ability of no mean order. The location of the railway had to take into account the economic together with the physical features involved.

With methodical thoroughness Sandford Fleming enlisted the services of scientists and other authorities versed in the many and various matters that had to be examined and appraised in an effort to get the most reliable information on the natural resources of the country: its soil, water resources, minerals, timber and the rest. As time was an important factor, the investigations were all conducted at the same time: during the seventies of the last century. The result was that in the voluminous reports which Fleming made from time to time to the Government over that period, the most authentic and detailed information was gathered together, from many sources, covering the economic as well as the physical aspects of the gigantic enterprise.

As Engineer-in-Chief, Fleming was not content to rely solely on the reports of engineers and scientists for all his information. In the summer of 1872, he crossed the "Plains Country" at the head of a party to see conditions for himself. One of the notable members of his party was John Macoun, M.A., F.L.S., Professor of Botany at Albert University, Belleville, Ontario.

Professor Macoun also made extensive explorations of the North-West at a later date for the Government. His conclusions on the agricultural possibilities of the prairie region are set out at considerable length in his book, *Manitoba and The Great North West*. Macoun's report was much more favorable on the agricultural possibilities of the country than that of Palliser who had preceded him. Indeed, Macoun took issue with many statements in Palliser's report with reference to desert conditions in much of the country, as described by Palliser. The Macoun report does, however, make special reference to a "scarcity of water on the surface" in certain localities, particularly in the south-central portion of the territory—a problem which could be largely solved, he thought, by sinking wells.

Because of its significance in the orderly course of events, as herein recorded, and the fact that Fleming included, in one of his reports, Macoun's reference to the investigations which he undertook of the Qu'Appelle-Elbow section, to which Palliser and Hind had drawn attention twenty-two years previously, it is quoted here. The reference follows: "It having been supposed, and even stated as a fact during my stay in Winnipeg, that the waters of the South Saskatchewan could be easily let into the Qu'Appelle River. I considered it of so much importance to ascertain the correctness of this, that my assistant, an engineer,

levelled back 15 miles from the elbow, and found at that point the water surface of the Qu'Appelle was 73 feet higher than the Saskatchewan, on July 16, 1879."

Sandford Fleming also makes reference to his own experience, in an early report to the Government. "When the writer was travelling through the Prairie Region in 1872 difficulty was occasionally experienced in finding water suitable for the daily wants of the party," he writes. "The subject was brought under the notice of the Government, and recommendation was made to have the water-bearing qualities of each locality tested, and at points where a sufficient surface supply was not found, to sink experimental borings. By this means it was hoped that the possibility of obtaining water by ordinary, if not by artesian wells, would be established." This duty was placed under the supervision of the Director of the Geological Survey, who undertook an investigation with regard to the water supply along the entire length of the line on the prairie section.

So it came about, at an early period in the development of the country, that the water shortage problem on the prairies was recognized as a great handicap to the continuous growth of the region. That master of organization, Sandford Fleming, was the first to suggest a means of dealing with the situation in a practical way, a means which was the forerunner of what was to become public policy with respect to water conservation and development on a gigantic scale, years later.

## LAND SETTLEMENT

With the completion of the Canadian Pacific Railway across the prairies in 1882-83, the whole region underwent a social and economic revolution. Gone were the days of the "buffalo hunt" and the barter economy of the fur trade. A new era had dawned; a new way of life came into being.

There was free land to be had for the asking. Unfortunately, one important element was deficient. As before stated, water was in short supply. This was the case both as to underground and surface supplies. In many localities, on the open plains, wells were few and far between. Often, too, when water was struck in deep wells, the water was so highly mineralized as to be unfit for human use, or even for stockwatering purposes.

There is the story of the man from the East who was on his first visit to the prairies. On the road to town, one day, he met a settler driving a team of horses hitched to a water-wagon. In the manner of the times, the Easterner stopped to speak with the settler. "Do you have to haul all your water?" he asked. "Yep," the settler replied, tersely, tightening the lines. "How far do you have to haul it?" the Easterner then asked, with understandable curiosity. "Five miles," the settler replied as he gave his questioner a desultory side glance. "Five miles!"

the Easterner exclaimed in astonishment. "Why don't you sink a well?" "What the hell good would that do?" the settler retorted gruffly. "It would be the same damn distance," he added lugubriously, as he flicked his team and swish-swashed on, down the rough wagon road, dribbling precious water as he went.

As settlement fanned out from points along the main line and from branch lines then building, the water shortage problem was, to a greater or lesser extent, being experienced by many of the new settlers. The Dominion Government, which was responsible at the time for the administration of the territories, was offering special inducements to prospective settlers, including a grant of 160 acres of free land in a colonization drive to get the country settled and agriculture established in the region.

It follows, therefore, that the Government had a moral responsibility in the matter of ensuring that the settler had, at least, a reasonable prospect of being able to establish a home for himself in his new surroundings.

Evidence that the Government was conscious of some responsibility in this is found in the institution of its well-boring program by the Department of Public Works, which also included the construction of small dams and the excavation of dugouts to trap and store the run-off.

These small projects were located at strategic points, for the most part in the Regina-Moose Jaw area. One of the early reports lists a total of 196 projects constructed prior to 1898. In addition, 30 deep wells equipped with pumps were completed during the period 1885-98 inclusive.

In view of what came about in later years in this regard, it is not without interest at the present time to recall that it was at this early period in the history of land settlement that the Government of that day instituted the principle of spending money from the public treasury for the purpose of conserving and developing the water resources of the prairie region.

In later years, as had been foreseen by Sandford Fleming, the railways were also experiencing difficulties in securing an adequate water supply suitable for their engines on certain sections of their prairie lines. In an effort to overcome this deficiency, the railway also had recourse to the construction of dams, when the topography and foundation conditions were favorable.

It was found that the dams provided a very satisfactory source of water supply for their purpose. These railway projects also served to demonstrate to the communities in which they were located a practical means of conserving the run-off for such purposes as stockwatering. When filters were installed, the projects were made to serve domestic use as well.

While mother nature has been niggardly in bestowing the blessing of a plentiful water supply on the open prairies, she has compensated in



another way by laying down an impervious clay sub-soil—a sub-soil that will hold water like a basin in which the run-off can be stored and put to beneficial use. This condition is found over most of the prairie country. Then, too, this tight sub-soil condition retains the precipitation that falls for the benefit of growing crops, if proper tillage practices are followed.

This particular characteristic of prairie soils has made Western Canada one of the great wheat-growing regions of the world, a circumstance which could hardly be foreseen by the early explorers.

So began the first phase of the grand experiment to establish agriculture on the “Great Buffalo Plains.” At the turn of the century, and for a decade or more thereafter, the great influx of land-hungry settlers continued. The baker, the butcher and the candle-stick maker flocked to the “new West,” the land of promise. Optimism was in the saddle, and riding high.

With the rapid growth of the population, as hamlets grew into villages, villages into towns, and towns into cities, the water shortage became an urban as well as a rural problem.

The truism that a country cannot grow beyond its water resources was brought home to rural and urban residents alike; and nowhere more than in the cities of Moose Jaw and Regina, where the situation had become extremely critical. The residents of both cities were much concerned, not only for the future of their industrial development, retarded because of the inadequate water supply, but for their domestic requirements as well.

Most of all, they were concerned about the fire hazard, always present. Should a fire break out in either of the two cities, it could burn out of control for lack of sufficient water with which to extinguish the flames. Such a conflagration might conceivably devastate the greater portion of the city before burning itself out.

Little wonder, therefore, that the citizens of Moose Jaw and Regina should join in efforts and become the spearhead of a movement designed to obtain a more adequate and dependable water supply, a supply sufficient not only for foreseeable future needs of the two cities, but a supply which would also serve adjacent urban centres and rural communities in a great farming area as well.

It is right to record, too, at this juncture, that the Dominion Government, which was fully conversant with the situation then existing, never relaxed in its efforts to find some feasible means of diverting water from the only known source of unlimited supply—the South Saskatchewan River.

## LAYING THE GROUNDWORK

For such information as was available, at the time, on the proposal to divert water from the South Saskatchewan River, credit rightly goes to a few senior officials of the Irrigation Branch, Department of the

Interior, who were the first to conduct surveys and investigations in the area.

In ascribing credit to individuals rather than to the Government, or to the Department from which these officials took their instructions, the writer is mindful of the fact that it was the carefully prepared reports, together with the persuasive powers of these imaginative and foresighted men, which influenced and guided the Government of that day in formulating policy, and in laying the groundwork for the conservation and utilization of the water resources in the North-West Territories, the settlement of which, as already recorded, was then taking place.

Theirs was a service rendered at the unpretentious grass-roots level, outside the range of public notice or popular acclaim, but none the less impressive for all that.

The only recognition these faithful public servants craved, for the outstanding contribution which they made to the progress and advancement of the country, was that the Government should pay some heed to their counsel—that and no more than that.

In a true sense, these pioneers on the frontiers of progress were nation builders too, for by such were the foundations of our free society laid.

In this connection, it is appropriate to single out for mention here two senior officials: J. S. Dennis, D.L.S., and William Pearce.\* Both of them were dedicated men who espoused the same cause, namely, the artificial application of water for crop production in the low rainfall area of the Territories, a cause in which both men persevered over their years of public service with undiminished devotion.

J. S. Dennis, by reason of the knowledge which he had acquired of water administration in the western United States, was able to make, and did make, valuable contributions “in some important particulars” when the North-West Irrigation Act was being drafted.

The enactment of the North-West Irrigation Act, in 1894, was an important milestone in the development of the water resources of the country. The Act was intended, according to a report by the Deputy Minister of the Interior at the time, to “provide for careful supervision

---

\*Dennis and Pearce were both natives of Ontario. Dennis was the son of a Deputy Minister of the Interior, and learned surveying from his father. He went West in 1872, and conducted surveys for the Hudson's Bay Co. and organized the Company's Land Department. In the Saskatchewan Rebellion he commanded Dennis's Scouts, an intelligence corps. He became Inspector and Chief Engineer of Surveys for the Dominion Government in 1887. In 1912, after a long and brilliant career in irrigation management and engineering, he was described as “one of the leading irrigationists in the world.” Pearce, also a D.L.S., was placed in charge of Dominion Land Surveys in Manitoba and the Territories in 1873, later became Inspector of Dominion Lands Agencies, Superintendent of Mines for Manitoba and the North-West Territories, and Chief Inspector of Surveys. He was described as “a walking encyclopedia on the resources, development and possibilities of the Great West.”

by the Government of the first distribution and the subsequent use of the available water supply in the arid region."

As the legislation was a new venture, as far as Canada was concerned, it was highly desirable that the best information procurable should be gathered together for the guidance of those charged with the drafting of the bill. This important responsibility was, in part, entrusted to J. S. Dennis, Chief Inspector of Surveys, who was instructed by the Minister to visit the different irrigation systems in the various states in an effort to determine from the experience gained with water laws in these States, the provisions best suited to Canadian conditions, what to copy and, equally important, what to avoid.

William Pearce was closely associated with J. S. Dennis in the research involved. The Sessional Papers, Volume XXVII, 1894, contain a report by the Commissioner of Lands to the Minister which contains the following statement:

"Mr. Superintendent Pearce deals with this subject in his report. He has also prepared an elaborate treatise on irrigation in conjunction with the draft bill which it is said to be your intention to lay before Parliament at the approaching session. I have studied with a great deal of interest the information collected by Mr. Pearce bearing on this matter, and am persuaded that the material which he is about to submit for your consideration will be of valuable assistance in legislating on the subject, which is of such prime and vital importance in Alberta and Assiniboia. I am confident that if irrigation can be supplied at moderate cost in these provisional districts, it will have an immediate beneficial effect on their pastoral and agricultural resources."

Information on the same matter was also obtained by other means. William Pearce was "requested by the Minister" to represent Canada at the International Irrigation Convention held at Denver, Colorado, commencing on September 3, 1894. J. S. Dennis was present at the same meeting in his capacity as a member of the Institute of American Irrigation Engineers.

It will be seen, therefore, that both officials kept themselves informed on the practical as well as the scientific and legal aspects of all matters relating to water development for agricultural and other purposes. The bill was first "introduced and read before the House during the Session of 1893," but was held over until the next Session, during which time copies were "circulated amongst a large number of interested parties, and criticisms and suggestions solicited."

As a result of all the consultation and research which went into the drafting, an Act was finally passed in 1894 that embodied provisions which have stood the test of time. Indeed, many of its principal features were carried into other acts later introduced by some of the western provinces. Then too, the authorities on water law in the western states had nothing but commendation for the Canadian legislation. It is not



too much to say that the North-West Irrigation Act became a model for similar legislation over the years.

Previous to the passing of the North-West Irrigation Act, William Pearce had been devoting much of his time and abilities in energetic research directed to that "section of the North-West lying adjacent to the Rocky Mountains, from Calgary southward to the International Boundary." The investigations were conducted with a view to furnishing authentic information on which systems of irrigation could be established, and which were later established.

Oddly enough, William Pearce's official position was currently Superintendent of Mines. This circumstance did not lessen his interest, or deter him from the most active participation in matters connected with the development of the country's water resources. Evidence of his activities, in this regard, is found in the numerous reports which he submitted to the Department, dating back to 1885; and in some instances he made specific reference to the same matter even before that early date. The official reports, however, were only an infinitesimal portion of the total correspondence which he had with the Department on the subject.

William Pearce foresaw, as few men of his time did, the need for basic measures laying down a proper groundwork, so that the development of the region's water resources should proceed in orderly, progressive stages.

In a paper read before the Association of Dominion Land Surveyors in 1890, and in subsequent articles, Pearce advocated, among much else, "the necessity of a complete topographical survey, the gauging of streams, etcetera, etcetera"—measures which were afterwards instituted by the Irrigation Branch, and placed under J. S. Dennis.

This important work of stream flow measurements and contour mapping, first suggested by Pearce, became, and is today the basis for the location of reservoirs and the construction of dams across rivers and streams, as well as for the location of canals for the conveyance of water to serve agricultural and industrial purposes.

In a report to the Department dated October 31, 1894, Pearce suggested surveys to determine the feasibility of constructing "Storage Reservoirs" on "the sources of the main rivers proper," and likewise named the principal rivers where such investigations should be made.

The report also specifies roughly the location of the lands that could be irrigated from the waters of these rivers, all of which, Pearce affirmed, "contain soil of first-class quality."

The proposal for "Storage Reservoirs" in the head waters of the rivers and principal streams, first enunciated, as far as the writer is aware, by William Pearce, has special significance, as later events to be recorded will show.

The point to be stressed here is that Pearce, in that early report, when water development in the Territories was in its infancy, outlined

a sound water conservation policy, and moreover named the rivers and streams in the region where the physical possibilities offered a good prospect for the development of such a policy.

The rivers and streams he named are, for the sake of the record, here given in part, as follows: the North Saskatchewan and Red Deer Rivers, Bow and St. Mary Rivers, Waterton, Belly and Old Man Rivers, all in what is now the Province of Alberta. Coming to what is now the Province of Saskatchewan, Pearce included the Souris River and Moose Jaw Creek and also suggested the advisability, wherever feasible, of "impounding" the run-off in the Cypress Hills and Wood Mountain areas, and by "such action," he wrote, "it is probable a very considerable area of first-class country will be rendered highly productive."

In the same report Pearce made this reference to the South Saskatchewan River: "It is worthy of consideration whether or not the waters which will remain in the South Saskatchewan could be taken out of its bed and carried into the source of the Qu'Appelle River and taken out of it and again utilized for irrigation purposes."

Pearce concluded the section of the report, from which these quotations are taken, in these words: "The surveys necessary to determine to what extent the foregoing suggestions are feasible should be made as soon as funds for the same are available."

Further proof, if such be necessary, that William Pearce, with a prescience not short of genius, played an important role in laying the groundwork for the future development of the water resources of the "great prairie West," is the fact that not only was his counsel sought by those in authority, but the views which he so forcefully expounded became embedded in water administration policy, and even the projects which he advocated on rivers and streams, as before outlined, were, for the most part, in the course of time constructed. Time, too, was to prove that the South Saskatchewan River scheme would not be an exception to the general trend in this regard.

## CHAPTER TWO: FEDERAL DIVERSION SURVEYS

### EARLY STUDIES OF THE RIVER

The building of the Canadian Pacific Railway across the treeless plains in 1882-85 opened up a vast territory for farm and ranch settlement. The region had some attractive features but much of it was deficient in reliable water supplies. Officials of the Irrigation Branch, Department of the Interior, as before stated, were the first to draw attention to the South Saskatchewan River as a possible source from which an abundant supply of good water might be obtained.

Later, when the communities of Regina and Moose Jaw grew, first into towns and then into cities, and when the Territories were organized into two provinces, enjoying autonomy in a number of fields of jurisdiction, the federal interest in water supply was increasingly supplemented by municipal and provincial activity.

For the sake of clarity, the earlier studies of the Ottawa Department of the Interior will be related first, and in subsequent chapters the provincial and municipal surveys will be examined.

The possibility of tapping the South Saskatchewan River for ample supplies of water was referred to as early as 1894 by J. S. Dennis, then Chief Inspector of Surveys, in the official report on irrigation in the North-West Territories. He returned to the same theme in the general report of 1895.

His interest was based upon the knowledge he had acquired from "an examination of the river, in this part of its length," even some years previous to that early date. What Dennis had in mind was an instrumental survey to determine, beyond doubt, the possibilities of diverting water at some point, upstream from the Elbow, and then conveying the water in a gravity canal, over the Aikto Creek-Qu'Appelle River height of land, "then following the south bank of the Qu'Appelle Valley until sufficient elevation is reached to bring the water out on the bench land or plains."

In support of this proposal Dennis made reference to the findings of Henry Yule Hind, who had, as already indicated, explored the section back in 1858, and who had avowed the possibility of creating a navigation channel connecting the Qu'Appelle and the South Saskatchewan Rivers at that particular location.

The report goes on to say that it was "found that the highest point in the valley was about 11½ miles east of the elbow of the South Saskatchewan, which attained an elevation of 85 feet above the summer flow in that stream."

Dennis also comments on the fall in the river as follows: "It is impossible to say how far up the stream would have to be tapped by the canal to reach the height of land mentioned," but it "would be at least thirty miles." Then follows: "Having reached the height of land, the

problem of carrying the water along the south slope of the valley until the bench level can be reached has to be solved."

Dennis concludes his statement on the matter in these words: "However, these are all questions which can only be settled, or intelligently discussed, after the necessary surveys with accompanying careful levels to determine the ground work data have been made, and in view of the important bearing which this question will have upon the future prospects of the district, it is desirable that this investigation should be made at an early date."

In response to his recommendation Dennis obtained the necessary authority, and the following year (1896) a line of levels was run from a point on the bank of the South Saskatchewan River, straight north of Rush Lake Station on the main line of Canadian Pacific Railway, to the Elbow, a distance of 55 river miles.

Much to the disappointment of its originator, the survey disclosed that the "small fall in the stream" made the diversion of water from the river by means of a gravity flow through a canal over the height of land an impractical undertaking, with the result that "the whole scheme was reluctantly abandoned."

While the proposal for diverting water from the South Saskatchewan by means of a gravity flow through a canal at some point upstream had been ruled out, by reason of the survey conducted by J. S. Dennis, there still remained the possibility of diversion by pumping direct from the river to the required elevation, or, alternatively, constructing a dam across the river below the Elbow to an elevation sufficient for water from the river to flow by gravity over the height of land, or by a cut through the height of land and a pump lift, or by some combination of these methods.

There were, unfortunately, difficulties to be overcome in the matter of constructing a dam in the river. Even at that early time it was known to engineers, who had knowledge of the situation, that foundation conditions made the construction of a high dam across the river a hazardous venture. In any case, to determine the feasibility of any such scheme, whether a dam was constructed or not, field surveys would be necessary for the location of pipe lines and other structures comprising such a gigantic water distribution system.

In this, several influences were present to bring about the requisite investigations. The most pressing of these was, doubtless, the large increase in the population. Consequently the need became more urgent and the demands more persistent with the passing of the years. Then, too, there were independent investigations by engineers outside the Federal Government service, notably T. Aird Murray, C.E., Toronto, for the Provincial Government, and W. J. Francis of Montreal who conducted investigations for the City of Moose Jaw. Both of these recommended further investigations and studies of the proposed scheme. Senior officers of the federal Department were doubtless conscious of



the need for more complete surveys. All of these factors contributed to a realization on the part of the Ottawa government of the importance of the matter to the residents in the area.

In any case, one consequence was that in the autumn of 1911, Ben Russell, C.E., Chief Field Inspector, was instructed "to take certain levels and to make a reconnaissance of the river valley and banks between the 'Elbow' and the valley of Thunder Creek, developing such levels as would indicate where the lowest points in the height of land would be found."

The result was that the investigations disclosed possibilities of diverting water from the river at two principal locations, namely, at the Elbow and over the Aiktow Creek-Qu'Appelle River summit, and also at a point some 31 miles upstream from the Elbow over the Shellstone Creek—a small tributary of the Saskatchewan—and the Thunder Creek height of land.

Following the preliminary work carried on by B. Russell in the fall of 1911, T. M. Montague, B.Sc., "was placed in charge of a party of twelve men" the following year and sent into the Thunder Creek area. "Field operations were commenced on July 23, 1912." The purpose of this was to determine the most feasible route for the location of a pipe line, which would best serve the immediate and future needs of the cities of Moose Jaw, Regina and adjacent communities suffering from inadequate water supplies.

The results obtained from the season's work included the proposed means to be employed for diverting water from the river, together with a description of proposed pipe-line routes, and are outlined in two reports, both of which are contained in the general irrigation reports of 1912-13; one report is by F. H. Peters, Commissioner of Irrigation, and the other by R. J. Burley, Division Engineer.

The main features of the two reports can be greatly condensed without sacrifice of substance. The Commissioner's report explains the proposed scheme as follows: "The purpose to be attained by this scheme is to serve that dry country in what may be termed the Moose Jaw and Regina districts, and the basis of the study is the requirement to deliver a gravity supply as far east as Regina and at the elevation of the rails of the Canadian Pacific Railway in that city. The quantity of water to be diverted has been taken as stated in the application made by the government of the Province of Saskatchewan, which is about 200 cubic feet per second."

"It is submitted as a matter of opinion only, that the only feasible scheme is to place a dam in the South Saskatchewan River and develop there enough water-power to pump the required quantity of water to a sufficient height on the side-hill of the river from whence it can be run by gravity to meet the requirements of the situation."

A significant observation is also contained in the same report: "One fact alone which is liable to make the estimate of the cost of the dam

seriously in error is that the bottom of the South Saskatchewan River is known to be most treacherous for the foundations of any structure, and no definite information whatsoever has been gained on this point."

The report of the Division Engineer, R. J. Burley, gives more detailed particulars of the surveys and investigations carried on during the field season of 1912—investigations which included the selection of three potential damsites. The three sites, subject to conditions in the bottom of the river, were by reason of topography and other natural conditions considered the most suitable sites for a dam in that section of the river, namely, the Shellstone-Thunder Creek section. A fourth potential damsite, approximately 50 miles upstream from the mouth of Shellstone Creek, is also mentioned in the report; to be exact, "at some point to be chosen between Saskatchewan Landing and the west boundary of Range 12." The report further states that, "a dam at this point would be erected under quite different conditions to one lower down, as the bed here is apparently a solid, boulder clay with occasional pockets of sand or mud. The width is not more than one-third of the width lower down, so there is little doubt that the cost of construction would be much lower in relation to the dam and even though the increased height of lift would necessitate a higher dam, it is probable this would be compensated for by the shallower foundation."

Other considerations, however, weighed against this upper location, with the result that no development was undertaken at that time.

Mention is made here of this particular site for the reason that the stone which the builders rejected became the head of the corner, in the thinking of later years. Indeed, it proved to be the turning point in that thinking.

During the winter of 1912-13, the three damsites before mentioned were surveyed and soundings across the river, on the ice, were taken, thus "developing an accurate section."

As already indicated, without exhaustive drilling tests in the bed of the river it was not possible to make a definite selection of a damsite that would best meet the requirements. What was possible, in the circumstances, was duly carried out, namely, a careful examination of bank conditions and other natural features, such as the topography of Shellstone Creek valley, and the location of a reservoir, together with the location of a main gravity pipe line down Thunder Creek valley to serve the cities and districts in question.

This survey was carried out by two fully equipped parties, one under T. M. Montague, as before stated, and the other under B. Russell. The particulars are here quoted from the R. J. Burley report, in part, as follows: "The preliminary line was located from the river bank to a point some one and one-half miles east of Mortlach by Mr. Montague, from which point it was carried on into Regina by Mr. Russell." The report goes on to state that "the scheme adopted for purposes of estimation includes a dam in the river to generate sufficient power to

lift the required amount of water over the height of land, through a steel pressure pipe, to a settling basin to be constructed in Shellstone Creek valley. Thence a reinforced concrete pipe having about 25 per cent greater capacity than the estimated requirement of the district will be run to the large reservoir. The idea of the pressure pipe and reservoir supply pipe being of extra capacity, is to provide for the storage of water in the reservoir during high water periods, to supply the full demand during the low water months, and thus decrease the height of dam which would otherwise be necessary. A by-pass of such capacity as to supply the full estimated demand is provided around the reservoir and would be used in the event of it ever becoming necessary to shut down the reservoir for any reason." The report continues: "From the south end of the reservoir site a reinforced concrete pipe carrying the full quantity of water demanded by the district is carried to a point on the line nearest Moose Jaw, where delivery will be made to that city and the size of pipe reduced. From this going to Milestone, deliveries are made to the various towns and the pipe size is again reduced at the latter point to the smallest size, which is carried into Regina."

In making an estimate of capital costs, it was realized that a pump lift and pipe-line capacity designed to divert 200 cubic feet per second was much in excess of the known requirements at that time. Consequently, two estimates were made, one of which was based on the provision of supplying "60 cubic feet per second or 32,280,000 gallons per diem, which, it is estimated will serve the district until 1941 with a per capita supply of 100 gallons per diem.

"The second estimate, for 200 cubic feet per second, which will, it is thought, be the amount eventually demanded, is not so carefully carried out, and only rough approximations of the earth work and details of structures have been worked out."

In the first case, the total capital cost of the scheme was estimated at between \$11,500,000 and \$13,500,000, and the second, or "large scheme," at \$20,500,000. Both of these estimates included a dam and power plant, of which latter the report states that "no attempt has been made to design or work out a detailed estimate for a dam in connection with this scheme owing to lack of information regarding depth of quicksand which would be encountered and this cost has been included as a lump sum—\$1,500,000."

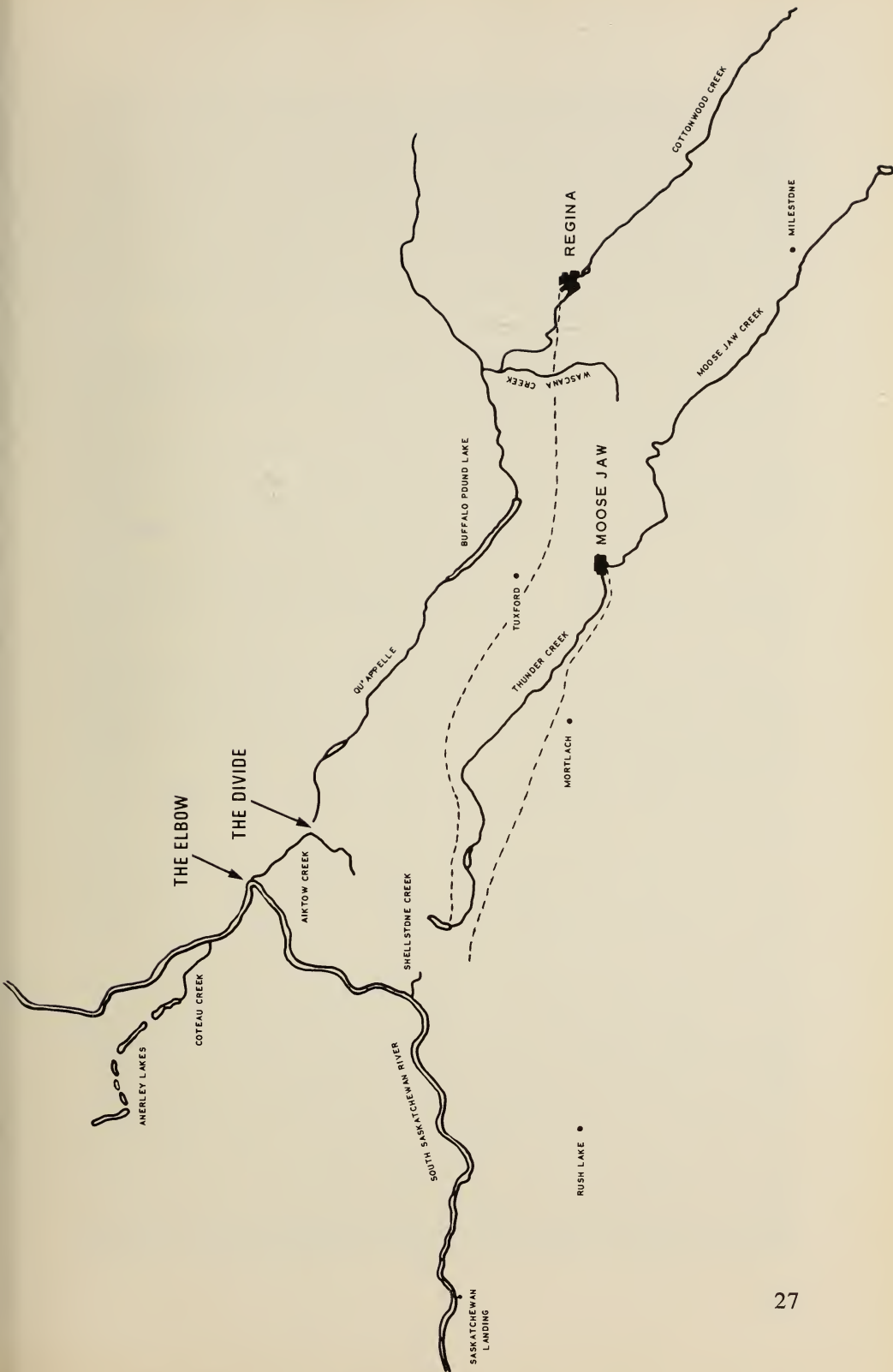
The pump lift from the natural water level in the river over the height of land at the Shellstone-Thunder Creek location was in the order of 304 or 305 feet. This high lift would "be reduced as much as the height of the dam, if the dam is built near the intake. . . . For purposes of calculation lifts of 261 and 271 feet were taken."

The report states further that "it may be said that a dam 35 feet high will provide enough power to raise a flow of 205 cubic feet per

---

The map illustrates the proposed routes for drawing a flow of water from the South Saskatchewan River to serve the Moose Jaw-Regina area.





second over the divide and that this flow has been taken as the ultimate requirement of the district." Continuing on the power aspects, the report contains this significant statement: "If the dam were constructed to full height it is probable that the excess power could be utilized in the district to such advantage as to more than pay the interest charges, depreciation and sinking fund on the greater amount of equipment necessary and that it would, within a very short period, prove a great benefit to the district in ways other than actual money return, being an inducement to industries to establish in the cities with available cheap power."

Truly, this was a glimpse into the future worth recording, foreshadowing, as it did, what was to become the beginning of a growing public awareness of a new need, a new purpose which a high dam in the South Saskatchewan River would serve.

As all the possibilities had not been fully investigated during the 1912 season, T. M. Montague was again placed in charge of a party, the following year, and resumed work in the Thunder Creek valley.

The operations which were carried out during 1913 are described, in part, by the Commissioner, F. H. Peters, in his annual report dated May 5, 1914, and also, in a general way, by B. Russell, Chief Field Inspector, under whose supervision the season's field work was carried out.

A special report, dated March 31, 1914, by J. M. Montague, C.E., the officer-in-charge of the surveys, gives a descriptive analysis of the complete scheme, covering all the investigations, together with comparisons of costs as between the two diversion locations on the river, pipeline routes and the like.

For the sake of simplification and to avoid reiteration of the same substance, reference will be confined, for the most part, to the Montague report.

At the beginning of part one, in a recital of the operations for the 1913 season, the report states that "upon starting the field work the outfit and party were assembled in Chaplin, Saskatchewan, and on May 23 were moved back to Thunder Valley, where active survey operations were started immediately. The line as located in 1912 from the river to a lake in Township 20, Range 6, West of the Third Meridian, which lake it is proposed to use as a reservoir, was considered the best possible route between these two points, so that a line starting at the southern end of the lake in Section 15, Township 20, Range 6, West of the Third Meridian, and following the northern side of the valley was surveyed.

"The first part of this course is on grade following, for the first 18 miles, the steep and stony side-hill of the valley, which is broken in places by coulees and draws. The country then flattens out and, from Section 32, Township 19, Range 3, West of the Third Meridian, the slope is gentle, and a long loop to the north is required to keep the pipe on an even gradient. Several long, inverted syphons are also necessitated

in this section of line on account of the country falling away to the north, where it would be impracticable to carry the pipe round on grade." The report continues: "The end of this section is at a point in Section 28, Township 18, Range 26, West of the Second Meridian, from which point it is impossible to keep the pipe on a grade line as the country falls away to the east and south. A direct line was then run to Regina, which followed mainly along the township line between 17 and 18, and is subject at all points to considerable pressure, which at Moose Jaw Creek, Cottonwood Creek and Wascana Creek becomes very high. . . . A branch was run from the main line starting at a point in Section 25, Township 18, Range 27, West of the Second Meridian, following along the range line to Moose Jaw, and was connected to the present high-level reservoir of that city; it was then continued south to intersect the line as located in 1912 in Section 16, Township 16, Range 26, West of the Second Meridian, as a means of supplying country adjacent to and the towns along the portal branch of the Canadian Pacific Railway and the Moose Jaw forward branch of the Canadian Northern.\* This branch is for the most part under considerable pressure and traverses a country in which water is very scarce."

From the standpoint of capital cost there was very little to choose between the two pipe-line routes: the route surveyed in 1912 and that of 1913. It was found, however, that the route located in 1913 was "capable of supplying a much greater area of country . . . nearly all good farming country, in need of water," for which reasons the route surveyed in 1913 was favored over the route surveyed the previous year, in 1912. Both routes were "developed on the basis that the water diverted from the South Saskatchewan River would always be free from serious bacterial contamination, and that it would therefore be desirable to conduct it from the river to the various points of use through entirely enclosed pipes, so that no contamination of the water could take place between point of diversion and the points of use." Such long pipe lines were of necessity very costly. But, who is there to say that a domestic water supply should not be maintained in all its pristine purity, or that money spent on such a project is not a wise investment in the future?

All the reports made it plain that the surveys and investigations were of a preliminary nature, intended to "develop all the possibilities" of a general scheme which included such possibilities as might exist of utilizing water courses and other natural features which would appreciably shorten the main pipe line and thus lessen the capital cost of the scheme. Diversion at the Elbow offered the best natural facilities in this regard. Wherefore, Montague also developed that section during the 1913 season.

---

\*The Canadian Northern and Grand Trunk Pacific systems were amalgamated with other railway lines and operated as one system from January 1, 1923, becoming the Canadian National Railways.

## SUMMARY OF THE "ELBOW" PROPOSALS

Because of the important bearing which the investigations embodying the Elbow-Qu'Appelle River section had on later developments, it might not be out of place to give a brief description of the different proposals outlined in the report for diverting water from the river at this location, and the means proposed for conveying the water to the districts in question. Specifically, the report lists four possible projects:

(1) A 40-foot dam across the South Saskatchewan River at a point near the mouth of Aiktow Creek, a 50-foot cut through the height of land between this creek and the Qu'Appelle River, allowing the water to gravitate from the river to Buffalo Pound Lake where it would be impounded.

(2) A 40-foot dam across the South Saskatchewan River, a 20-foot lift and a 30-foot cutting through the height of land, allowing the water to gravitate to Buffalo Pound Lake.

(3) A 40-foot dam across the South Saskatchewan River, a 50-foot lift over the height of land, allowing the water to gravitate to Buffalo Pound Lake.

(4) A 90-foot lift from the South Saskatchewan River to a point in Aiktow Creek valley, and a canal to the height of land, allowing the water to gravitate to Buffalo Pound Lake as before.

All four "alternatives" implied the conversion of Buffalo Pound Lake into a large reservoir. This could be accomplished by the construction of an earth dam "across the valley, at the foot of the lake," and a site at that location "was chosen as a desirable place for a dam." The proposed dam would have "a crest elevation of 23 feet above the present level of the lake . . . and a capacity of 92,046.3 acre feet, or 25,059,605,175 gallons." The report states further that "in order to make the reservoir as inaccessible as possible, to prevent trespassing, and to keep stock from getting into the river above the reservoir, thus polluting the inflowing water, it is proposed to build a fence the entire length of the river and around the lake. An amount covering the cost of this fence and also of a strip of land around the lake about half a mile wide has been provided for in the estimates."

In order to lift the water to an elevation where it would flow, by gravity, into the distribution system, a pumping station would be constructed at the reservoir, and "a pressure pipe would convey the water to a surge basin on the plateau above the lake." From the surge basin to the first distribution point, Section 3, Township 18, Range 25, West of the Second Meridian, the main supply pipe would have an inside diameter of 7 feet. "At this point a 5-foot diameter branch is taken off, which runs to Regina to supply that city and the towns and farms between. The main pipe is reduced to 6 feet diameter, and runs west as far as Section 6, Township 18, Range 26, West of the Second Meridian. Here a 2-foot diameter branch runs north west, to supply the country west of Tuxford and the towns along the Grand Trunk Pacific Railway. The 6-foot pipe is continued south as far as the Moose Jaw high-level reservoir, where a short branch line is taken off to supply that city. The



pipe is now reduced to 4 feet diameter, and runs south and south east as far as Milestone, supplying the farms, the towns along the portal branch of the Canadian Pacific Railway, and the Moose Jaw forward branch of the Canadian Northern Railway. At Milestone it is reduced to a 2-foot diameter pipe, running north east to a point in the vicinity of Regina, supplying the farms in that district. The capacity of this system is 60 second-feet or 32,400,000 gallons per day, which is the same as that used in the report on this project published in 1913."

Getting back to what is designated in the report as "the four most feasible alternative schemes of diverting water from the South Saskatchewan River," the report states that in the first three "alternatives" it was proposed "to develop hydro-electric power from the South Saskatchewan River. This could be accomplished by constructing a 40-foot dam across the river with an hydro-electric power-station in connection." This station would have sufficient capacity to pump the water from the river over the height of land into the Qu'Appelle River and Buffalo Pound Lake, and when transmitted to the pumping station at the lake or reservoir the power would also be sufficient to raise the water through the pressure pipe to the surge basin on the plateau.

The report goes on to state that "the construction of such a dam and pump-house, however, would be very costly, but as yet the information available is insufficient to make a close estimate of just what the cost of such an undertaking would be." In the case of "alternative number 4" the dam in the river was eliminated, and "a power station at the river, operated by coal and steam," substituted instead, "with steam turbines driving centrifugal pumps, a pressure pipe to a canal, a canal to the height of land, the conversion of Buffalo Pound Lake into a reservoir and a pumping station at the reservoir operated by coal and steam," to raise the water to the surge basin as before.

As it was thought that an open canal approximately 12 miles long might be exceedingly difficult to operate in the winter months, a modification of this feature was proposed, namely, to "substitute a 7-foot 6-inch gravity pipe on an even gradient from the end of the pressure pipe at the South Saskatchewan River to a point where the water would be discharged into Qu'Appelle River." This gravity pipe line was, therefore, included in the estimate of cost.

The report explains further that, in making up the estimates, "the unit prices of all materials are the same throughout, and it is assumed that the same quantity of water would be required for each scheme, which makes the different routes surveyed readily comparable." On this basis, "alternative number 4," diversion of water at the Elbow, which did not include a dam in the river, was estimated at a capital cost of \$8,850,000, as compared with a cost of \$14,500,000 to \$15,000,000 in the case of the Shellstone-Thunder Creek diversion.

Summing up the conclusions reached from the overall investigation and study, the report states "that scheme number 3" (alternative number

4), pumping direct from the natural level of the water in the river at the Elbow location, would be the best one to adopt for the following reasons:

- (1) It has the least capital cost.
- (2) It has the least annual cost, which means the cheapest water to the consumer.
- (3) It serves as great an area of country as any.
- (4) The main pumping plant is close to the centre of gravity of the system.
- (5) It can easily be enlarged.

The report does, however, make reference to one "great objection," an objection which is also taken in the reports of other engineers connected with the principal investigations. The Commissioner, F. H. Peters, makes reference to the matter in his report as follows: "By taking advantage of a natural water course and a natural reservoir, the water diverted from the river must necessarily be liable to more or less serious contamination, by the natural drainage of the surrounding country into the natural water course and reservoir which it is proposed to utilize." To meet such a problem the Russell report suggests that "filter beds to purify the water" might be provided, in which case the costs would be still "much less than any of the other proposed schemes."

It is not necessary to enlarge greatly on what has already been said in the matter of the "test borings" conducted in the river during the winter of 1913-14; reference to the report on the operations will, therefore, be confined to such matters as bring into focus the bearing which the information obtained had upon events in later years, when river-bottom conditions were under more intensive study.

The purpose of the borings was to test conditions for dam foundations in that stretch of the river between the Elbow and the Shellstone-Thunder Creek locations. The full details of the operations are contained in a report by L. J. Gleeson, the officer who was in charge of the drilling operations.

A summary of this report was made, at that time, by the Commissioner of Irrigation, from which summary the following is quoted: "Mr. Gleeson developed three cross-sections quite fully in that portion of river extending about 6 miles upstream from the elbow, and then made reconnaissance borings at intervals of about four or five miles in the river-bed upstream, so that reconnaissance borings were gained covering the whole stretch of river between the points already indicated, when information had been supplied by the Grand Trunk Pacific Railway Company.\*

"The general results of the borings have been to show that conditions, as regards dam foundations, are very much more favourable in the vicinity of the elbow than in any other location developed; but even at this point, the upper surface of the main body of clay underlying the

---

\*Borings for railway bridge foundations across South Saskatchewan River.

river is very erratic, and while possibilities exist of gaining a solid clay foundation at a reasonable depth in the vicinity of the elbow, it would require very close and careful test borings at close intervals to determine any location where a large dam could be safely constructed. . . . As indicated elsewhere, the scheme to be adopted for the diversion of water from the South Saskatchewan River, which is now looked upon with favor by this department, is one which does not anticipate the creation of a large dam in the river; but in connection with the test borings, the desire was, and the results accomplished have been to develop sufficient information along these lines to allow of the matter being advisedly considered at such time in the future as it is decided to carry out the scheme, and the many final considerations in connection with the location and design have yet to be taken up in detail and decided upon."

Another report that should be mentioned for the information it gives on the sources of power available for the undertaking was prepared by H. E. M. Kensit, M.I.E.E., of the Water Power Branch, Department of the Interior, and dated April 14, 1913. The information contained in this report is based on personal inspection and on previous investigations conducted by the authorities already mentioned and it "did not include any surveys or field work, which still remain to be dealt with."

The report, while dealing more particularly with the power aspects, also discusses the proposed method of conveying the water from the river overland to the points of consumption. In this connection, the report makes reference to the long gravity pipe line from the intake at Shellstone Creek to Regina, a distance of 170 miles, and suggests the substitution of a "pressure" pipe instead. In the words of the report: "A pressure system, if practicable, would permit of a much shorter pipe line and one embracing a much larger number of towns, thus probably diminishing the cost and distributing it over a larger number of towns."

It is appropriate to state, at this juncture, that the writer has been greatly impressed, after a close scrutiny of early reports put out by the Irrigation Branch, Department of the Interior, on proposed large-scale water development projects, with the diligence with which senior officials of that branch, charged with the responsibility of the preliminary investigations, sought out and made known the potential properties of such projects. Invariably, they took the long-range view and were concerned lest ill-advised or premature projects should be undertaken, which would jeopardize full or ultimate development, the possibilities of which they were at pains to point out.

As has been seen, by quotations from reports, this concern was also manifest in the case of the South Saskatchewan Water Supply Diversion Project.

The reports of the surveys and "other available data" was duly furnished to the provincial and local authorities, who had, in the meantime, become interested in the scheme.

The outbreak of the First World War, and Britain's entry into it on August 4, 1914, probably explains a temporary lull in federal government activity in this area after the summer of 1914. War demands soon ruled out all but the most imperative domestic capital projects, all over Canada.



## CHAPTER THREE: PROVINCIAL MEASURES

### THE GROWING NEED FOR MORE WATER

As was stated in an earlier chapter, the "Plains Region" was very rapidly settled after the turn of the century. Over 700,000 people were added to the population of what is now Alberta and Saskatchewan between 1901 and 1911.

Regina had only 2,300 citizens in 1901; and Moose Jaw only 1,500. In ten years, these figures had grown to 30,000 for Regina and 14,000 for Moose Jaw.

The rapid development of the Territories made the need for more direct control of their public affairs the outstanding issue of that time. To meet the popular demand, two new provinces, Alberta and Saskatchewan, were carved out of the Territories in 1905, and given self-government in their domestic affairs.

Among other pressing matters on the doorstep of the new Saskatchewan Government was the water shortage problem present in one of its most populous areas. The possibilities of diverting an abundant supply of good water from the South Saskatchewan River, which the surveys and investigations of the Irrigation Branch had disclosed, gradually became better known by the residents of the area, but it was realized by all who gave the matter serious thought that a project of such magnitude, involving the expenditure of many millions of dollars, went far beyond the financial resources of the communities concerned, either individually or collectively. It was, therefore, entirely fitting that representation should be made to the Provincial Government for action to bring about a solution of the problem, a problem which was not only retarding the industrial growth of the urban centers, but which was also impeding the full development of the agricultural potential in one of the largest and most fertile sections of the entire country.

Apart from the investigations which the engineers of the Irrigation Branch had conducted, other eminent engineers were called upon by the Province, and likewise by the two cities, to conduct independent investigations. While some of these were somewhat limited in scope and otherwise restricted, their findings did confirm the conclusions reached from the more extensive surveys and investigations of the Irrigation Branch.

The records show that as early as 1907 an "investigation and study of the water supply of Regina" was instituted by the City. R. S. Lea and O. W. Smith, Consulting Engineers, Montreal, were employed for the purpose.

A report covering these investigations was submitted to the Mayor and aldermen, dated March 18, 1908. As these investigations were entirely confined to local sources of water supply, reference to the inquiry is made here only for the purpose of showing the concern which the city authorities felt, even at that early period, as to the potential of

these sources. This concern was again evinced some years later when R. O. Wynne-Roberts, Consulting Engineer, Toronto, was employed to make a similar investigation for the City. The findings and "General Conclusions" arrived at as a result of these investigations are contained in a report dated January 18, 1912.

After giving a general description of the various local sources of underground water supply, the consulting engineer proposed that all these sources should be combined "into one trunk main." When the system was fully developed it would "probably yield a total supply of about 7,000,000 gallons per day," which, the report estimated, would "be inadequate when the population exceeds 100,000."

The consulting engineer therefore concluded that "the alternative proposition is to obtain the additional supply from the South Saskatchewan River which is about 86 miles west and 48 miles north of the City; and must so far as my information extends consist of a pumping scheme. This question, however, was not included in my reference," he went on, "and consequently I have no opinion to express concerning this possible source of supply. Furthermore," he summed up, "I respectfully suggest that it will be to the interest and welfare of the neighbouring towns to consider a comprehensive combined water scheme"—a suggestion which was not accepted until there was a further worsening of conditions in the area, which necessitated such action in later years.

"In May and June, 1911," a Government report explains, "Mr. W. J. Francis, Consulting Engineer, of Montreal, made a reconnaissance of the whole district surrounding Moose Jaw with a view to locating some body of water sufficiently large to assure that city permanent supply and, in his report, after examining all the possible sources and summing up the advantages and disadvantages of each, he arrived at the conclusion that the South Saskatchewan River offered the only satisfactory solution to the problem and that it must ultimately be the source from which this district should draw its water supply for domestic purposes."

The same report credits W. J. Francis with the belief "that the best method of obtaining such supply would be by means of a concrete dam in Township 21, Range 7, West of the Third Meridian, to give pondage and to furnish hydraulic power for pumping to a filter, thence to a reservoir on the height of land and from there through a gravity pipe line along the valley of Thunder Creek, recommending that a general topographical survey be made along this valley."

The site of this proposed "concrete dam" was one of the three potential sites which had been favored by the engineers of the Irrigation Branch, at the Shellstone-Thunder Creek location, as previously outlined.

The surveys instituted by the cities were circumscribed by the fact that it was unnecessary to go beyond the water requirements of the city itself in each case.

A more comprehensive investigation was conducted by T. Aird Murray, C.E., Toronto, then Advising Sanitary Engineer to the Bureau of Public Health. The outcome of the investigations is contained in a Preliminary Report dated February 8, 1911, presented to Dr. M. M. Seymour, Commissioner of Public Health, Saskatchewan. The Murray report refers first to a verbal statement which its author had made at a conference with the Hon. Walter Scott, Premier, the Hon. J. A. Calder and the Hon. W. R. Motherwell, on the 9th of January, 1911. This statement outlined "certain conclusions arrived at as to the future prospects of domestic water supply for that portion of the Province of Saskatchewan which includes Regina to the east, Moose Jaw to the west and Weyburn to the south, as well as including the Qu'Appelle Valley." The report emphasizes that the "smaller towns on the Pasqua branch of the Canadian Pacific Railway between Moose Jaw and Weyburn are all of them extremely limited in water supply. The conclusion to which I have been forced," Murray continued, "is that the whole of the district named must remain limited in growth unless a visible water supply can be obtained which will warrant growth of population." Murray repeated another statement made at the conference, to the effect "that the only apparent available and practically unlimited supply was from the South Saskatchewan River." The suggestion was also made "that such a scheme for obtaining water might be more efficiently administered if undertaken by a Commission representing all the municipalities within the district named. Such a Commission might be on the same lines as the Ontario Hydro-Electric Commission, viz., the Provincial Government to control along with the municipalities."

Discussing the proposed diversion of water at the Elbow over the Aiktow Creek-Qu'Appelle Summit, Murray's report is specific and to the point as follows: "Any scheme for bringing water supply from the South Saskatchewan River to the Moose Jaw and Regina district, must depend either upon pumping the water over the height of land or tunnelling through the height of land. From the information I have, I am inclined to think that a tunnel scheme will prove the most efficient in every way, combined with the construction of a dam across the Saskatchewan River. Any exact determination cannot, however, be made without precise data and surveys made specially for the purpose in view."

Another important matter, dealt with in the Murray report, was the quantity of water to be taken from the river. Casting about for some basis as to that quantity, the report states, "assuming a basis of 50 gallons per head per day, and population of 100,000 respectively for Moose Jaw and Regina, with an additional population of 100,000 for smaller towns, we would then require 15,000,000 gallons per day." Anticipating a still greater growth in the population it was thought that, to be on the safe side, the quantity of water to be diverted should be something in the order of "100,000,000 gallons per day," equivalent to

180 cubic feet per second. To this end it was recommended that consideration should be given to "obtaining at once, from the Dominion Government, an Order-in-Council granting the right to the above-named district of at least 100,000,000 gallons per day from the South Saskatchewan River for purposes of domestic water supply."

In response to which, and following representation by the Province to the Dominion, a reservation for that amount of water was in due course assured by the Federal Department. This, then, was the origin for the quantity of water taken into consideration by the engineers of the Irrigation Branch in calculating maximum costs for the various schemes as outlined in their reports.

Of interest, too, is the fact that what might be called an interim reservation was fated to remain in abeyance for many years, or until a situation developed which made the issuance of a license under the original application obligatory.

The report also directed attention to the matter of "calling a meeting of representatives of the various municipalities interested to consider the whole situation, and the advisability or otherwise of forming a joint municipal Water Board or Water Commission; and further the best methods and means to be adopted to put a practical scheme of water supply in force."

It will be readily seen from what has been said that the engineers, who made the different investigations, were not as one in the choice of a diversion point in the river as between the Elbow and the Shellstone-Thunder Creek locations. A final determination of that important matter was still far in the future. More of this later.

As already indicated, the local authorities, supported by organized groups and others similarly interested, made representation to the Provincial Government in an effort to get some government action designed to solve the water shortage problem in the area, by such means as had been shown to be feasible from an engineering standpoint.

In response to this growing public interest in a matter of such vital importance to such a large and populous section of the country, the Saskatchewan Legislature, in the spring of 1912, "voted the sum of five thousand dollars to provide for an inquiry into the feasibility of diverting water from the south branch of the Saskatchewan River."

This action by the Legislature was followed up by the Government, and Order-in-Council No. 432/12, dated April 25, 1912, was passed. It specified that the five thousand dollars should "be placed under the control of the Chairman of the Board of Highway Commissioners, to be administered by him; and that the said Chairman be appointed to carry on the inquiry."

The following year, 1913, the Saskatchewan Water Commission was constituted, with the Honorable Senator James Hamilton Ross and Mr. Archibald John McPherson as members. As a result, still another investigation into the water shortage problem was launched.



Obviously, the sum of five thousand dollars was a comparatively small amount with which to conduct such an inquiry, with its complex engineering and economic implications. Since the Commissioners served without a salary, and since the Commission had a great deal of data available that had been compiled from previous investigations and studies, it was not necessary to engage in field surveys to any great extent; this kept expense to a minimum.

The findings and "Conclusions," based for the greater part on the material available at the time, is contained in a public document headed "Report of an Enquiry into the Feasibility of Diverting Water from the Saskatchewan River for Domestic and Industrial Purposes throughout Southern Saskatchewan by the Saskatchewan Water Commission."

The report, dated January 25, 1916, was submitted to the Honorable Walter Scott, Premier and President of the Council. There is no need to elaborate on the various matters dealt with in it, the substance of it having been fairly well covered in the discussion of previous reports on the same matter, particularly as the same is, in reality, a modification of former schemes already dealt with. The present reference can, therefore, very appropriately be confined to modifications of earlier proposals.

But first, to get to the proper setting and scope of the inquiry, it is necessary to give a brief outline of the area which the Commission delineated as being within the terms of its reference. "In order to insure that all the elements in the problem will be included," the Commission explains, "and that all the area which by any chance can possibly have an interest in or be affected by the operation of a system that includes the supply of water to Moose Jaw and Regina, the area to be considered has been taken as bounded by lines running on the north along the Qu'Appelle River from Elbow to Lumsden, through Balgonie, Francis, Weyburn; on the east and from Truax skirting the Dirt Hills to Mortlach and the hills south of Thunder Creek to Log Valley on the Saskatchewan." Commenting on the local supplies available, the report states that "the area described for the most part consists of a vast basin over the whole of which a deposit of clay has been laid down to a great depth and with very limited quantities of ground water, no matter to what depth wells are sunk."

In a further explanation of the situation, the report continues, "the watersheds of the Wascana, Cottonwood and Moose Jaw Creeks and their tributaries include the larger part of the area." These are streams in which, it is explained, the run-off can be impounded and had been impounded in many places, by the construction of dams, with the result that the water shortage in these localities had been, to some extent at least, improved. The report points out, however, "that in recurring dry seasons very little water is discharged from these streams, even during the time of the usual spring freshet, which would indicate that no satis-



factory supply can be depended on from these sources where there is a demand for quantities for industrial purposes."

A total of thirty-three towns and villages were listed within the prescribed area, indicating, in each case, the source of supply and the shortage or otherwise for immediate and future requirements. In this connection, too, the sources of water supply for Moose Jaw and Regina are also discussed, and their requirements present and future outlined. The conclusion reached was that the water requirements of the two cities could not be satisfactorily met much longer from local sources, if the rate of growth, in the immediate past, could be taken as a reliable guide for the future. That being the case, the Commission accepted the thesis, propounded by other authorities, that the South Saskatchewan River was the only satisfactory source from which to secure the quantity and quality of water needed to ensure the future growth and industrial development of Regina and Moose Jaw, together with the continuous progress of other urban centers and agricultural communities in contiguous areas.

Under the heading, "Methods of Administration and Financing," the report cites the experience of cities both in the United States and Canada, the organization of Water Districts and the methods of administering and financing the same. Here the report very properly draws attention to a very important difference between the comparisons given and the system under consideration, which it describes as follows: "The schemes above outlined are all situated so that there is a large demand concentrated within a comparatively small area, and all needing water; and the formation of a Metropolitan Water District is therefore easily brought about. In the case under consideration the controlling features are two cities, 42 miles apart, the three railroads in varying degrees and small towns and outlying municipalities. . . . It would therefore appear that the scheme should be financed on the security of these interests in such a way that other interests as their needs arise could be added to the system. The administration would seem to require a Commission, the members of which would represent some or all of these interests. It would appear to be wise to attempt to have the Canadian Pacific Railway and the city of Moose Jaw first arrive at an agreement regarding the matter, with provision for the interests of the other parties remaining open for future negotiation. Rural districts within reasonable reach of the system as it develops might succeed in getting a satisfactory supply if formed into rural water districts with a majority or some proportion of the resident tax payers being able to commit the district to initial expenditure. Such districts might be enabled to obtain water when it would be impossible by individual effort."

The main conclusion reached, as set out in the report, was that the scheme most applicable to the situation which existed in the area under investigation would be one with the lowest initial capital cost and

one which could, moreover, be readily enlarged to meet the growing consumptive needs of the area.

To this end, a modification of the Thunder Creek scheme was proposed. Briefly stated, the scheme would consist of a pumping plant at the river, a pressure pipe to the height of land, as before, from which point the water would be conveyed, "in an open channel by gravity to the head of Thunder Creek and thence down Thunder Creek valley by open channel and in the Creek to Pelican Lake; construct a reservoir of suitable size at the upper end of Pelican Lake and from this pump water, after filtering it, through some 50,000 feet of pipe line to join with the line leading from the head works reservoir of the Sandy Creek Moose Jaw water supply to Moose Jaw. Construct an open channel from Pelican Lake reservoir to join with Thunder Creek to Moose Jaw. About one mile near the outlet from Pelican Lake of this latter line will have to be a closed gravity channel."

Describing the first stage of the scheme the report states: "The initial installation should be sufficient to supply Moose Jaw with from 2,000,000 to 2,500,000 gallons per day." The capital cost of this installation was estimated at \$850,000. The report continues, "when Moose Jaw comes to have about 70,000 population and Regina from 100,000 to 125,000 the system may be enlarged to supply Moose Jaw with 4,000,000 gallons per day and Regina a similar amount by adding to the power plant at the river . . . adding filtering and pumping capacity at the reservoir and installing a 3-foot pipe line to a point north of Moose Jaw." The capital cost of the proposed additions was estimated at \$3,360,000, which amount, plus the initial cost, made an estimated total of \$4,210,000 for a scheme designed to serve the requirements of the two cities.

Here the report adds that "future developments would approximate the installation described as scheme number 2 in the report of the Irrigation Department 1914, page number 132." Estimates are also given to show the rates per 1,000 gallons for water delivered at various points under varying conditions of distribution. These give "some indication of the reduction that may take place in the cost of water supplied to say part of the district as the total consumption increases. Any additional supplies to other points will serve to reduce the cost to each of the places interested in the system and as the system develops and new points in the district are added it will gradually be possible to extend the system to cover any points requiring water in the whole of the district."

As a further accommodation to the financial means "of those immediately interested," it was suggested in the "Conclusions" that consideration might be given to a further modification of the initial installation, whereby the "Pelican Lake dam and Caron pipe line" would be eliminated, and the water run in "an open channel at a higher elevation to an outlet at Sandy Creek," there to augment one of the

main sources of city supply. The capital cost of such installation was estimated at "approximately \$500,000. The eliminated features or some similar provision would then be added when an extension is necessary to the system."

Perhaps such a modification as the one suggested could be best described as a minimum of minimums, only intended to meet the needs of Moose Jaw, which was much worse off than Regina in the matter of a water supply. It is of interest, too, that this was essentially the scheme adopted, in later years, by the Federal Government as a means of furnishing Moose Jaw with a supplementary water supply, particulars of which can be more appropriately given in a later chapter.

It was in the nature of things that such an immense undertaking, with its inherent potentialities, should present a challenge to engineers and others endowed with an imaginative turn of mind. The consequence was that what might be called private or independent investigations on a limited and incomplete scale were undertaken by some individuals on their own behalf or at the behest of others, who had become interested, for one reason or another, in the project. As there are, apparently, no authentic records available to show the value of these independent investigations in the overall development, the purpose of this record will be served by mention of the fact that such investigations were made, and did in fact stimulate public interest in the scheme.

The central fact, of course, which kept the residents of the area alert was the water deficiency, always present, but which became more acute when periodic and regional droughts struck, particularly when the period between such droughts was too short for recovery.

## DROUGHT CYCLES EMPHASIZE WATER SHORTAGE

The most reliable precipitation records available are those of the Meteorological Branch, Department of Transport, extending over the period of settlement from 1885 to 1925. These records show that there was a period of five years, from 1886 to 1890, when the average rainfall within the "Palliser Triangle" was below normal. Specifically, Medicine Hat had only 8 inches in 1886. This dry period was followed, in the early nineties, by years of above-normal precipitation. Notably, there was a total of 19 inches over most of the area in 1891; drought again returned in 1894 and continued for three years in succession. This dry spell was broken by a sharp increase in rainfall, until in 1901 a total of 28 inches for twelve months was recorded at Medicine Hat—the greatest precipitation on record in the area for any one year up to that time. This heavy rainfall was followed by a sharp decrease until, in 1904, the precipitation did not exceed an average of 13 inches. The years 1908 and 1910 were extremely dry; 1910 averaged less than 8 inches. There was some recovery during the next three years, 1911-13 inclusive; but the following year, 1914, was another very dry year, with an average



yield of only 9 inches. This again was followed by two years, 1915 and 1916, of heavy precipitation.

One of the worst regional droughts, after the turn of the century, struck south-western Saskatchewan and southern Alberta in 1917; and, except for scattered areas, continued unbroken for five distressful years, 1917 to 1921 inclusive. However, the distribution of the precipitation was such that fair crops were produced in some localities during the last two years of the period. Anyway, one result was that water supplies in the greater part of the area reached a very low ebb. Sizable lakes and streams went bone dry, shallow wells gradually dried up, and in some districts water had to be hauled in railway tank cars to supply domestic and stockwatering needs. There was partial recovery during the years 1922-23, but the deficiency remained until 1925, when there was a return to normal.

Half-way through the severe drought spell of 1917-21, these extreme conditions brought about efforts on the part of the residents in the Moose Jaw and Regina area to secure a more adequate and dependable water supply—a supply which all believed could be obtained from the South Saskatchewan River.

Consequently, to bring about co-ordinated action on the matter, a meeting was held in Moose Jaw at which a resolution was passed requesting the Provincial Government to call “a representative conference to thoroughly canvass the question.” Such a conference was called shortly after the Moose Jaw meeting, to assemble in the Parliament Buildings, Regina, November 12, 1919. A report of the proceedings states that among those present were the Hon. W. M. Martin, Premier; the Hon. C. A. Dunning, and the Hon. W. E. Knowles, for the Government; A. J. McPherson and G. A. Maybee, “Chairman of the general committee of the Southern Saskatchewan Greater Water Project,” together with “representatives from the following places: Moose Jaw (City and Board of Trade), Regina (City and Board of Trade), Pense, Sherwood, Brownlee, Caron, Elbow, Eskbank, Lake Valley, Tuxford, Lawson, Central Butte, Enfield, Marquis, Eyebrow, Keeler, Riverhurst, North Regina.”

Mr. Maybee, in the opening address, stressed the urgent need for a greater water supply, not only for the two cities, but also for the rural districts. He voiced the opinion that “mixed farming and increasing of stock in this part of the Province were both absolutely impossible unless an abundant supply of water was secured. It was perfectly feasible to tap the Saskatchewan River where there are millions of gallons of water being poured into the ocean . . . and thus provide comfort for the farmers.” Mr. Maybee’s statement was supported by other speakers, one of whom asserted that “it was necessary in some districts to haul water from one to ten miles to run threshing engines.” Another speaker, in a burst of zeal to emphasize his point, said he had taken “a wash” before he left home, but felt the need for another clean-up before leaving for

home. As there was very little water in the hotel where he was staying, "it will have to be by way of the dry-cleaning system." The need for prompt action on the part of the Government was also stressed by many of the speakers, if the progress and future prosperity of the area was to be assured.

In order to direct discussion to a specific proposal, Mr. Maybee called upon Mr. G. D. Mackie, City Commissioner of Moose Jaw, to outline a tentative scheme or "proposition" which he was ready to submit, not necessarily for the Government to adopt, "but as a means whereby we could talk to some point." Mr. Mackie prefaced his proposals with a reference to the necessity for assistance from the Provincial Government, both in organizing and financing the scheme. "If we are to secure water for domestic, industrial, manufacturing, railway and farming purposes," he said, "this district which is represented here today has gone on the right track in getting together and coming before the Government to get them to launch a definite scheme for this whole district." He defined the district he had in mind. "It is an area of over 3,000 square miles or 10% of the cultivated lands in this province. The population is between ninety and one hundred thousand; the assessment is over seventy-three million dollars; one of the most densely rural populated districts in Saskatchewan."

The main features of Commissioner Mackie's proposals followed the scheme previously recommended by the Saskatchewan Water Commission, but he expanded the idea a bit: "I have figured it out that we could lay spurs of cast iron from each town and village between the Grand Trunk lines and the Canadian Pacific from Riverhurst to Moose Jaw and supply every village between Moose Jaw and Regina at an additional cost of less than one million." This would bring the total estimated cost of the proposed scheme to nearly seven million dollars.

With specific reference to "the financial end of the scheme," he observed: "I do not think that the Government or any one else ever contemplated that this scheme would be a paying concern from the moment the pumps were started at the Saskatchewan River. The Provincial Government must expect to meet a deficit to begin with." Later, in answer to a question on this point by the Hon. Mr. Dunning as to whether he thought "the credit of the Province would be required to support the scheme," Mr. Mackie answered with an emphatic "Yes!"

Previously in the discussion it had been indicated by one or more of the delegates that the scheme should rest on a self-supporting basis, that "the districts would expect to pay for what they got"—a view which, it can be said, was generally accepted by the representatives present at the conference. Here, then, for the first time, a group of interested and leading citizens signified their willingness to assume full financial responsibility for a huge undertaking designed to remove the great handicap which nature had imposed on the area, provided a formula could be agreed upon which would enable them to do so. Surely



no better proof could be advanced of the crying need of the project than that.

Mr. Mackie closed his presentation with a proposal to the effect that the Government should "appoint a Board or a Commission to go thoroughly into the whole question." Such a Board or Commission "could map out the district to be served and ascertain how many and how far spur lines should be laid to serve the farming districts and how they should be laid to the urban centers. They could determine as to how the water is to be brought in and also allocate the cost between the different sections of the province. . . . These are things that can only be settled by a Board of men representing the various interests and going into and laying, with the assistance of the Government, a concrete proposition before the district."

Summing up the discussion on the proposals put before the conference, Premier Martin, speaking for the Government, indicated full awareness of the water shortage problem and how that problem militated against "the mixed farming proposition which is proving profitable elsewhere." He referred in particular to efforts which the Provincial Government had made in the past to assist in finding a solution to the problem. To give a specific instance of just one such effort, the Provincial Government, back in 1907 and 1908, had sunk a well at Wilcox to a depth of some "2,000 feet without results."

While there could be no doubt as to the need, there was the question of how the need could be best met, the Premier said. On the financial aspects, the proposition put forward was "a policy of pledging the credit of the people of the province to the extent of at least six million dollars and we all know this scheme may run into ten or twelve millions." Further, he understood "from Mr. Mackie's figures that for a number of years to come the revenue from the large expenditure and our guarantees would not be sufficient to meet the obligation. Some one would be called upon to make it up." The Premier asserted, too, that before embarking upon such an undertaking, there would have to be assurance "that the people of the district affected are behind the scheme and will support it financially and in all other ways."

For these, and other reasons which he outlined, the Premier announced: "As far as I am concerned I am not prepared to assess any deficit on a water scheme affecting a portion of our people on the whole of the province." The Government, apparently, was particular in those days about such principles in matters of public policy.

On the proposal of setting up a Board or Commission, to determine location of pipe lines, laying out of a Water District and the rest, Premier Martin assured the gathering that the Government would "co-operate in every way possible." This promise was implemented at the following session of the Legislature, 1919-20, when "an Act respecting a supply of water from the South Saskatchewan River" was passed. Incidentally, the Act has never been repealed; it still remains on the

statute books of the Province. The purpose of the Act is specified in the preamble as follows: "To provide means whereby an adequate supply of water may be furnished from the South Saskatchewan River to that portion of the Province lying between the said river and the cities of Regina and Moose Jaw, including the said cities, and within an area to be more definitely fixed and described at a later period under the provisions of this Act."

In clause one, the Act provided for the appointment of a Commission, to be known as the "Saskatchewan Water Supply Commission, composed of not more than three members, whose duty it shall be to cause all inquiries, surveys, and tests to be made and all other measures to be taken which in their opinion may appear necessary and advisable in order to ascertain the feasibility of providing an adequate supply of water from the South Saskatchewan River to the area outlined in the preamble to this Act and which shall later be more definitely fixed and described by the Commission subject to the approval of the Lieutenant Governor in Council."

Clause four empowered the Commission to report on the "practicability of a system of water supply being undertaken as above set out . . . the probable cost of the construction of the same and the means which in its opinion should be adopted to meet the said cost, and to provide for the maintenance, operation and management of the system and the charges for service and other expenses necessarily incidental thereto, provided that any report to be submitted under this section shall provide that all moneys required for the erection and maintenance of the system, whether for principal or interest, shall be a specific charge against and shall be levied within the area to be served by the said system upon a fair and equitable basis."

Clause five of the Act made provision for taking a vote "of the municipal electors in the area to be served by the system," to determine whether or not the system, as laid out by the Commission, would be proceeded with.

Clause seven states: "There shall be associated with the Commission for advisory purposes a Board to which one member may be appointed by each of the railway companies operating in Saskatchewan and by each of the cities of Regina, Saskatoon and Moose Jaw." All of these were assumed to have an intimate knowledge of the water supplies and the immediate and future needs of the city or the railway, respectively, represented by them.

Under the authority prescribed in the Act a Commission was duly set up and the following members were appointed: A. J. McPherson, Regina, Chairman and Chief Engineer, W. F. MacBean, Moose Jaw, and Thos. Tear, Marquis.

The Commission held sittings at which the requirements present and future in each locality in the proposed water district were fully canvassed. A report including numerous maps and technical details,

showing the thoroughness with which the Commission investigated the matter, was submitted to the Government; this report was laid before the Assembly by the Hon. W. M. Martin on Friday, December 10, 1920. A "synopsis" of the report was printed "by order of the President in Council" in 1920. The synopsis from which the following quotations are taken traces the early history of the proposed scheme, going back to the time of Sandford Fleming, Engineer-in-Chief of the Canadian Pacific Railway, in the seventies of the last century, who was given credit for pioneering the idea. "Mr. Sandford Fleming, when investigating the route for the Canadian Pacific Railway referred to the South Saskatchewan River as the source of supply of water for the plains around what is now the Regina-Moose Jaw district," the report said. "This appears to be the first mention of the project."

The report also makes reference to other engineers who had favored the river scheme. "In 1894," the report states, "Mr. J. S. Dennis, at that time Superintendent of Irrigation, suggested the South Saskatchewan River as the only satisfactory and final source of supply for the plains around Moose Jaw and Regina extending as far south-east as Weyburn."

Again, "in 1910, Mr. W. J. Francis, a Consulting Engineer of Montreal, while reporting on the Moose Jaw water supply, suggested the river as the final source of supply for the city."

"In 1911," the report continued, "the late Mr. T. Aird Murray, when Consulting Engineer to the Provincial Bureau of Health, was so impressed with the lack of a proper supply of water for the district that it led to an application being made to the Irrigation Branch of the Department of the Interior for permission to divert 200 cubic feet per second from the river near the Elbow."

Credit is also given in the report to the engineers of the Irrigation Branch for the many surveys and investigations which that branch had conducted "during 1912, 1913 and 1914 to show the possibilities of the use of this quantity of water throughout the district, the estimates for various schemes running from about \$9,000,000 to \$20,000,000 depending on the quality of water diverted and the size of the area over which it was to be distributed."

In the chain of events, as recited in the report, reference is also made to the commissioning of Senator J. H. Ross and A. J. McPherson by the Provincial Government "in 1914" and the solutions for the difficulty offered as a result of their findings, but "for various reasons," the report states, these "were not adopted." To complete the historical review, reference is also made to the special study which G. D. Mackie, City Commissioner for Moose Jaw, had made of the proposed river supply scheme, to the conference, and finally to the Act empowering the appointment of the Saskatchewan Water Supply Commission. While the statements, as quoted, are largely a repetition of events already recorded, the historical summary as given in the report provides the proper setting for the conclusions that were reached and, therefore,

merit restatement for that reason, if for no other. But there is, in addition, the further reason that the recitals provide further proof of the contention that if any project was ever justified by intensive investigation and study, then the South Saskatchewan River scheme could be said to be such a project.

First and foremost, in outlining the Commission's conclusions and recommendations, the report states that "the project is found to be feasible, although it cannot be said to afford cheap water. The Commission is so impressed with the needs of many of the villages, towns and large areas of the farming districts, and of the immediate necessity of more ample supplies for Regina and Moose Jaw that it advises taking the necessary steps at once to erect a Water District and give effect to the scheme."

The capital cost of the project was estimated at \$5,500,000 and "as population increases and further expansion is necessary, from \$7,000,000 to \$9,000,000 within ten years. The cost of the water will vary from 20 cents to \$1 per 1,000 gallons depending on the amount consumed and the difficulties of distribution. Such rates will make the system self-supporting and each branch system will be self-supporting."

For economic and engineering reasons, given in the report, the Commission decided to locate the intake works opposite the head of Thunder Creek, "near Riverhurst." A main pipe line 34 inches in diameter would run from the river to Gilroy and Lawson; then, for topographical reasons, the line would run south-easterly to Eyebrow and thence along the Canadian Pacific Railway through the towns of Brownlee, Keeler, Marquis, Tuxford and Belbeck. The diameter of the pipe is reduced to 30 inches at Brownlee from which point an 18-inch line would branch from the main line running south through Lake Valley and Rowletta to Caron at which point the pipe would join Moose Jaw's "Sandy Creek" supply line, already installed. The size of the main pipe line would be reduced to 28 inches at Belbeck from which point it would run direct to Regina. After the 18-inch line from Brownlee by Caron became inadequate for Moose Jaw's supply a 24-inch line would be installed from Belbeck to Moose Jaw.

On the Belbeck-Regina section, branch lines would serve towns on the main line of the Canadian Pacific Railway and towns on the Canadian National Railway between Moose Jaw and Regina. A branch would also run south to Drinkwater on the Soo line and another branch would run to Rouleau. A 12-inch line would branch from the main line at Regina and run through towns on the Northgate-Regina branch of the Canadian National as far south as Lewvan. A branch from this line would run south and west to serve the towns of Wilcox, Corinne, Milestone, Lang and Yellow Grass. (See Map No. 2.) The length of the main pipe line from the river to Regina would be 112 miles.

Reserve supplies for the system would be ensured by the construction of reservoirs at selected locations such as Gilroy and by increasing



reservoir capacity at King's reservoir, Regina and additional reservoirs at or near Eyebrow and Belbeck. When the construction of the system was complete "the total reservoir capacity should finally be about one week's supply or about 100,000,000 gallons with the most of it located near Eyebrow and King's reservoir and the Belbeck reservoir should be about a three days' supply for Moose Jaw."

The report states further that "the total capacity of the system will finally be 16,800,000 gallons per day by such additions." The area of the country to be included in the Water District would comprise a total of approximately 1,620 square miles.

Dealing with the matter of finance, the report states that the "cost of construction is to be met by the proceeds of debentures secured by the total assessable property in the district." As before indicated, the system as a whole would be on a self-supporting basis. For the proper and efficient administration of the Water District the following was proposed: "The undertaking is to be administered by an Administrative Board composed of elected representatives of divisions of the district, and appointed representatives of the two railways.

"A Commission consisting of the Chairman and Vice-Chairman, of the Administrative Board and the General Manager, will be responsible to the Board for the management of the business."

In compliance with the Act, a vote was taken of the municipal electors in the cities of Regina and Moose Jaw and the towns and villages and rural districts along the route of the proposed pipe lines on July 27, 1921. The cities voted overwhelmingly in favor, but the vote of the other or smaller centers was against the proposed scheme *as submitted*. The emphasis is the present writer's own, for the doubt remained that had the question been phrased in a different manner and more time given to explanation and public discussion, before the vote was taken, the results in the smaller communities might have been very different. Be that as it may, the outcome of the vote put an end, for the time being at least, to further efforts on the part of the Provincial Government to provide a more abundant supply for the area by tapping the South Saskatchewan River.



## CHAPTER FOUR: GRAPPLING WITH SEVERE DROUGHT

### THE "BETTER FARMING CONFERENCE"

In giving a somewhat lengthy recital of the principal provisions of the Saskatchewan Act of 1919-20, as the writer did in the last chapter, it was felt desirable in the record of events to show how the Government fulfilled its undertakings, as given to the conference at Regina on November 12, 1919. Together with this it was desired to outline the successive steps which lent substance as well as form to the legal sanctions, given for the first time, to a project which had been a matter of investigation and a subject of public discussion since the time of Palliser. Then, too, the writer having been a member of the Saskatchewan Legislature when the Act was passed, and having a close acquaintance with many of the leaders and officials engaged, one way and another, in furthering the scheme, he can therefore speak from personal knowledge of these later events, as he does in the following pages.

In order to give a proper picture of the full effects of the protracted drought of the 1917-21 period, it is necessary to explain here that, owing to the great increase in the farm population and the consequent increase in the acreage under cultivation, there was more widespread distress and hardship, as a result of crop failure, than had ever been experienced during previous droughts over the period of settlement. Indeed, it may be said that one of the notable results was what might be called an "agricultural stock taking."

For the first time, doubts were beginning to be harbored as to the suitability of the region for the production of cereal crops—it might not be the proverbial "banana belt" after all.

Obviously, in such a situation, governments both provincial and federal had a responsibility. Certainly the situation could not be ignored and allowed to deteriorate to a point where the area would lose the greater part of its population. The principle of agricultural aid had to be extended. This aid took the form of supplying seed grain and feed for livestock, where needed—measures which had been instituted to meet similar situations occasioned by previous droughts which had plagued the region. Even direct relief, food and clothing, had to be supplied in cases of real distress.

These, of course, were only emergency measures. Something of a more permanent nature was also required if agriculture was to become stabilized in the area. Up until that time regional droughts had been generally regarded among other vagaries of climate as a phenomenon of nature which no one could do much, if anything, about, except in so far as "dry farming" methods could be practised, to overcome the low and variable rainfall handicap common to the high plains. "Bare summerfallow" was, at the time, the accepted practice for the production of

grain in the prairie region. A grain and summerfallow rotation is, in essence, a method whereby the moisture content in the soil is conserved by constant cultivation during the growing season, for the following year's crop. In some localities two annual crops are taken after summer-fallow, but under the more extreme conditions experienced in the "Palliser Triangle" a one-crop rotation is practised—half the cultivated acreage is summerfallowed every year. The summerfallow system fails, however, when there is more than one dry year in succession, as was the case in the 1917-21 period.

In short, it is not possible to conserve moisture when there is no moisture to conserve. The writer can recall that in the fall of 1918 he plowed sod with a walking plow for a cow barn in Christmas week. The ground had been too dry to freeze. Under such conditions the prospects for a crop the following year were anything but bright. Worse still, the drought continued and the next year was the driest year of the period. It was in these circumstances that "numerous requests were made to the government for a special study of the situation, in the hopes that some means might be found to make crop production more sure and agriculture more profitable."\*

To this end the Hon. C. M. Hamilton, Provincial Minister of Agriculture, called a conference of professional agriculturists and practical farmers resident in south-western Saskatchewan. This conference, known as the "Better Farming Conference," met in Swift Current on July 6, 7 and 8, 1920, to discuss the situation. Mr. Hamilton, in the opening address, outlined the purpose of the meeting—a purpose which, in brief, was to obtain information from leaders in experimental agriculture in Saskatchewan and other western provinces. Invitations had also been extended to well-known agriculturists in the Dakotas, Montana and Minnesota. All of these were "giving special study to farming conditions there which are somewhat similar to ours."

The speaker explained further that invitations to attend the conference and to take part in the discussion had also been sent "to a number of men who have made more or less a success of carrying on their farming operations even during these past three years."

It was hoped that in bringing together in this way scientific knowledge and practical grass-roots experience, a more sound and profitable basis could be laid for prairie agriculture. As had been hoped, too, nature co-operated. The morning of the conference dawned warm and bright. Farmers and others from far and near were out in full strength. So great was the attendance that the conference had to meet in the old skating rink, as there was no other available building in Swift Current large enough to accommodate the crowd. A program of appropriate

---

\*Statement made to the Better Farming Conference by the Provincial Minister of Agriculture.

subjects had been drawn up in advance, all of which had reference to the agricultural problems present in the area.

One of the subjects which aroused particular interest was a paper on climate and weather by Sir Frederic Stupart, Director of the Meteorological Service for Canada. The writer, who was present on the occasion, can well remember an odd happening on the first day of the conference, which created some excitement for a short time, but which was not without its amusing turn. When in the mid-afternoon Sir Frederic rose to deliver his address, he was greeted by hearty applause. Among much else, the speaker made reference to the tremendous forces of nature which combined to bring about sudden changes in the weather: heavy precipitation, violent storms and the like—forces which the puny efforts of man were entirely powerless to prevail against. In stressing "certain elementary facts," Sir Frederic stated that "the higher the temperature the more moisture is the air capable of holding, and if the air is saturated any fall in temperature will cause rain."

Further, the speaker asserted that certain features of the geography had much to do with the climate of the prairie provinces. He cited, in this connection, the Pacific Ocean on the west with its moisture-laden air and the great mountain ranges which imposed a natural barrier to the free passage of this moist air to the country lying east of these mountains, with the consequence that "a vast amount of moisture . . . was deposited on the western slopes of the mountains." The speaker went on: "Unfortunately for Saskatchewan and Alberta they lie, as it were, under the shadow of the highest portion of the great mountain ranges, and in seasons when the westerly drift brings the air directly over these high mountains it becomes almost dried out and there is scarcity of rainfall, because no matter how the air is cooled there can be no rain if there is no moisture." Then, in a split second, there was a blinding flash followed by an ear-splitting crash that shook the old rink to its very roots. Rain, with a spattering of hail, came down in torrents! The storm struck the metal roof with such force that even the voice of a Caruso could not have prevailed, so terrific was the din. Sir Frederic bravely struggled on—but it was a lost cause! The rest of his learned address had to be taken as read. Then, to make matters worse, people rose from their seats and pressed toward the open door, craning their necks to get a glimpse of the downpour.

The writer, who was seated near one of the passageways, noticed a small black-and-white dog, of uncertain ancestry, darting excitedly backwards and forwards in the rear, vigorously wagging the stump that did service for a tail, as he tried in vain to get through the jam blocking the open door. "He's not taking anybody's word for it—wants to see for himself," someone cracked flippantly. "Tim is only three years old—he hasn't seen any rain yet!" his owner quipped, with an infectious grin.

At the conclusion of the conference, a resolution was passed which requested that the Honorable Minister appoint a committee "to make

such detailed study of the situation as may be necessary to enable them to recommend to the Government and the public such action as they deem essential to bring about the desired agricultural improvements."

The appointment of the "Better Farming Commission" followed this request, and the following were duly named commissioners: "William J. Rutherford, Esquire, Dean of the College of Agriculture, Saskatoon; John Bracken, Esquire, President of the College of Agriculture, Winnipeg; George Spence, Esquire, Member of the Legislative Assembly, farmer, Monchy; Neil McTaggart, Esquire, farmer, Gull Lake; and H. O. Powell, Esquire, General Manager of the Weyburn Security Bank, Weyburn." Dr. F. H. Auld, Deputy Minister of Agriculture, officiated as Secretary to the Commission.

The Commission held its first meeting in the Parliament Building, Regina, for organization purposes on August 24, 1920, at which meeting "it was decided that the amount of work to be done necessitated the assistance of persons outside the Commission"; and three sub-committees were appointed as follows:

*Committee on Drifting Soils*

Prof. R. Hansen, S. H. Vigor and Prof. M. Champlin.

*Committee on Grazing Lands*

George Spence and Prof. A. M. Shaw. (Mr. J. W. Greenway, Commissioner of Dominion Lands, and Mr. Jack Byers, President of the Saskatchewan Stock Grower's Association, were added to this sub-committee.)

*Committee on Investigation and Extension*

Prof. Bracken, H. O. Powell and Hon. Mr. Hamilton.

After the special studies had been completed, the Commission held public hearings at twelve strategic points in south-western Saskatchewan. The hearings enabled the Commission to obtain first-hand knowledge of the situation extant in each locality and properly to appraise the distinctive features of each—features which might favor greater diversification than the common practice of exclusive grain growing afforded. The chief of these would consist of dependable water supplies, access to native pasture lands, and the like.

A report of the Commission's findings and recommendations was submitted to the Government on January 31, 1921. After giving a recital of the "History of the Investigations," the report dealt with the "Physical Features of the Area Studied," together with such matters as "soil and native vegetation," "water supply," and "climate." On the all-embracing matter of climate, precise information was given in tabulated form, showing monthly precipitation for a given number of years in each "Crop District" in Saskatchewan, together with charts covering precipitation records over a period of approximately 35 years at points in the three prairie provinces.

All these matters, as outlined, were set out very fully in the report, together with the appropriate recommendations in each case. Briefly summarized, the principal recommendations stressed greater diversifica-



tion, the need for a broader base to prairie agriculture, the need for greater knowledge of crops best suited to the local conditions, and tillage and cropping practices designed to conserve the precious organic matter in the soil, which, together with better cultivation practices, would help to prevent excessive soil drifting.

Special reference was made to the matter of "Grazing Lands." The desirability of making such lands available to adjoining farmers as "community pastures," where this was practicable, was emphasized. In this connection "the problem of inferior soils and their occupants" was dealt with, and the need for some action by the Government was stressed. As a basis for such action a "soil survey" and a system of land classification, based on such survey, were recommended.

Under such a policy, sub-marginal or non-arable lands would be classified as such and made available to the nearby farmers for community pastures wherever feasible. In this connection, too, the report made reference to the "desirability of finding some means of permitting settlers to move from sandy, stony, alkaline or 'burnout lands,' and start elsewhere on a free homestead," where they could make a fresh start under more favorable conditions.

As a means of bringing about the proposed changes in a sound and expeditious manner, it was recommended that greater experimental activities should be "undertaken by the University, the Provincial Government or the Federal Government for the improvement of agriculture in the south-west."\* Further, that because the soils lacked uniformity "sub-stations" should be established on distinctive soil types in an effort to determine a system of agriculture based upon local conditions rather than upon a one-crop blanket system for the region as a whole.

It was realized that one of the most important matters, if success was to be achieved within a reasonable time, was some means of disseminating the information gained to all who could profit from such knowledge. To this end it was recommended that "Agricultural Representatives" should be appointed, and allotted districts. Such representatives would be specially "trained in the science and skilled in the practice of Agriculture." In order to make the services of such specialists conveniently available, it was proposed that "four rural municipalities forming a square" should, as far as possible, constitute a district, so that farmers resident therein could keep abreast of advancement. The report dealt with developments in the management of soils, suitable crops for a given area and proper cropping practices, grain and livestock improvement, care and treatment of disease in livestock, control of noxious weeds and insect pests, and many other matters. In short, a service was proposed that would range over the whole field of prairie agriculture.

---

\*Work by the Federal Department of Agriculture to establish an Experimental Farm at Swift Current, Saskatchewan, was started in the late summer of 1920. The first Annual Report was issued in the fall of 1922.



In this connection, too, it was recommended "that pending the appointment of a staff of Agricultural Representatives, which to be successful must be developed carefully and on sound lines, a vigorous campaign be organized to acquaint farmers of western and south-western Saskatchewan with the findings of the Commission and its recommendations respecting the production of crops and livestock in areas of limited rainfall."

The following, in part, is quoted from the section dealing with "Irrigation Development": "Irrigation of land in south-western Saskatchewan has been developed principally in the area in and tributary to the Cypress Hills. The present irrigable area is 50,137 acres. Additional irrigation can be developed by building reservoirs and storing water through which about 50,000 acres more may be irrigated."

Just here it should be pointed out that later developments proved the existence of a much greater irrigable potential than the area specified in the report, a fact which will be dealt with when events more directly concerned with irrigation are being recorded. Meantime, it can be stated that the recommendations contained in the "Report of the Royal Commission of Inquiry into Farming Conditions," as outlined, together with other recommendations, too detailed for mention here, became an important part of the agricultural program not only of the Provincial Government but also of the Federal Government in later years.

The agricultural aspects have been dwelt upon at considerable length because of their paramount importance in the economy of the region. Indeed, it is right to say that the commercial and industrial progress of such centers as Regina and Moose Jaw was due wholly to the development of prairie agriculture. It is, therefore, fitting that anything adversely affecting agriculture should be diligently recorded, particularly, as in the present case, when the needs of agriculture, more than anything, became the dominant factor in the survival of a vision, or dream if you like, so strikingly portrayed by William Pearce, J. S. Dennis and other farsighted pioneers in the cause of water conservation and use, on the high and dry, but exceptionally fertile prairie region.

## FURTHER STUDIES OF URBAN WATER SUPPLY

In order to maintain the proper chronological order of events, it is necessary to revert, once more, to the particular situation in which the cities of Regina and Moose Jaw found themselves after the adverse vote of the smaller centers in the proposed water district, as related in the last chapter.

Obviously, any hope which these cities may have cherished of a scheme embracing an area in which they would be included, preferably under government sponsorship, had been dashed by the adverse vote, with the consequence that the cities in question were thrown back upon their own limited financial resources.

Meantime the increase in the population, particularly in the Capital City, was proceeding regardless of potential water shortages. It continued to rise at an ever increasing rate, imposing a still greater drain on the local sources from which the city drew all its water supplies. The situation created deep concern to the residents, and particularly to the city authorities. The immediate question, assuming a rate of growth in the future proportionate to that of the past, was this: would the potential supply which could be developed from local sources be great enough to meet the growing needs of the city for the foreseeable future, or should the local supply be augmented from a more dependable source, and the means whereby the same could be achieved fully explored?

In an effort to meet the situation, the city launched, during the late twenties, a detailed and comprehensive investigation not only of local sources of supply but of distant prospective sources as well.

The report which resulted from these investigations began with the following statement: "In December, 1928, the City Council adopted a report by the Commissioners, dealing with the city water supply, in which it was recommended that Consulting Engineers be engaged to investigate and report fully upon both local and distant sources of supply. To give effect to this action the city secured the services of Mr. Nicholas S. Hill, Jr., Consulting Engineer of New York, and Mr. R. O. Wynne-Roberts, Consulting Engineer of Toronto."

"As the study of local underground sources seemed to contain geological problems," the report continued, "the Geological Survey of the Dominion Government was appealed to for assistance, which was readily promised. During the summer of 1929, the Geological Survey provided a field party under Mr. W. A. Johnston, which was joined by Professor H. E. Simpson, an outstanding water geologist of the United States."

As already stated, R. O. Wynne-Roberts had conducted a very full investigation of the local sources of water supply for the city of Regina back in 1911, and had, therefore, in addition to other qualifications, the benefit of knowledge gained from these previous investigations.

No question whatever can be raised, either as to the adequacy of the means sought to resolve the problem or the competency of the high-ranking authorities employed to carry out the assignment. All three authorities submitted separate reports dealing with particular aspects of the investigations. The conclusions reached and the ensuing recommendations had more weight from having been reached by close co-operation and frequent consultations during the progress of the investigations—consultations with, among others, the appropriate officials of the city administration, notably D. A. R. McCannel, City Commissioner, and J. W. D. Farrell, Superintendent of Waterworks. All of this helped to instil public confidence in the proposals, and all with a view to the formulation of a scheme that would be practicable and adequate

to meet any conceivable growth which the city might experience in the future.

The reports were printed by order of the City Council and bound together in the convenient form of a paper-covered book with a descriptive title: "Reports on Regina Water Supply by N. S. Hill, Jr., New York, R. O. Wynne-Roberts, Toronto, H. E. Simpson, University of North Dakota [dated 1930]." Certain appendices, diagrams and drawings, not included in the printed report, were made available for inspection at the City Hall.

While it is not necessary here to give a lengthy description of the subject matter contained in the different reports, it can be said that the investigations were, without a doubt, the most thorough and complete of any ever instituted by the city up to that time. One example was the precise examination and study given to the water geology, of both distant and local areas, by the field party under W. A. Johnston and by Professor Simpson. The geology of distant areas was studied for the bearing which it had on ground water resources. The more local geology was studied for what it disclosed, not only to indicate the availability of these resources to the city but also to define local basins and watersheds where such resources offered the best prospects for development.

All three reports also dealt with available sources of surface water supplies, applicable when the time came to supplement local underground supplies. The Wynne-Roberts report made reference to the available surface supplies as follows: "The following surface water supplies were examined and carefully considered, namely, Long Lake, Qu'Appelle Lake, Moose Mountain Lake, which are set aside as unsuitable sources for a city water supply." This left the South Saskatchewan River as the only other feasible source of visible supply if it became necessary to augment local supplies. This preference over other sources was stressed in the same report in these words: "When the demand for water tends to equal the aggregate supply from these [local] sources, then the city must go to the South Saskatchewan River." With this in mind, the relative merits of alternative schemes for bringing water from the river to Regina and Moose Jaw were carefully investigated, the details being specified at some length in the Wynne-Roberts report. The conclusions reached as a result of the studies were also reflected in the N. S. Hill report, all of which might be said to be, virtually, refinements of former and more comprehensive schemes of more general application. In particular, to quote again from the report: "This scheme in its main features is somewhat similar to that proposed by the 1920 Commission. It differs, however, in respect to boosting pumps, type of construction of reservoirs, etcetera."

The necessity for certain modifications of former schemes arose from the fact that the inquiry was being conducted primarily at the behest of one city only: Regina. Costs were therefore a dominant factor in the planning and design of any scheme that would be practical and

adequate in such circumstances. Hence economies, consistent with adequacy and the efficient operation of the system, had to be effected both in the initial capital outlay and also in the annual expenses.

The Wynne-Roberts report deals with the situation as follows: "This report is being prepared on the instruction of and at the expense of Regina Council, and it was therefore necessary to discuss all matters already referred to, with particular regard to Regina. But in every instance when the proposal to take water from the South Saskatchewan River has been discussed, Moose Jaw was regarded as a potential factor. It will, doubtless, have been observed that references were made in this report to previous schemes, every one of which had Moose Jaw as a co-partner with Regina in the enterprise, as their interests with respect to the future are practically identical." The report could have added, with equal truth, that Moose Jaw stood to gain very materially by joining with Regina in the enterprise, for the reason that Moose Jaw's local sources of water supply were more limited than the resources available to Regina. Consequently, the water situation was much more critical in the case of Moose Jaw.

It was realized by the consultants that the cost of bringing river water to Regina would be high, even with the inclusion of Moose Jaw in the scheme. It was also realized that any scheme confined to the two cities only would fall far short of that which was originally envisaged for the water requirements of the area as a whole, urban and rural. That these larger aspects were not disregarded was evidenced from the fact that in the Wynne-Roberts report reference was made to "towns and villages along the pipe line" and to the "railway authorities" and the "Provincial Government," all of which "would enjoy the benefit of abundant good and soft water," and all of which would and should help to bear an equitable share of the costs of the scheme.

The same report also affirmed the need for an abundant supply of good water to maintain and develop the agriculture of the area. In support of this contention, an excerpt was given from the report of The Royal Commission of Inquiry into Farming Conditions, January 31, 1921, where, on page 15, it was stated that "the value of an adequate water supply is hard to overestimate in an agricultural district. A water supply makes stock-raising and dairying possible and where these are possible, farming may be so diversified as to make one very largely independent, except in years of complete failure, and these can be got through by carrying over reserves of fodder from years of plenty to the years of drought."

To meet such agricultural needs in the area, the report suggests that "it would be possible to deliver water from Regina and Moose Jaw to the districts lying south of them, provided the Government would co-operate in building the necessary trunk pipe-lines and other works, and also help the farmers to organize water schemes in defined areas."

Thus, for the first time, a clear directive was laid down by an



eminent authority, entirely devoid of selfish motive and beyond the orbit of local pressure, for the institution of public policy on available water supplies which the compulsion of coming calamity was soon to render imperative.

Obviously, if the requirements of diverse interests were to be satisfactorily met, a scheme with some flexibility would have to be devised. Of necessity such a scheme, to be acceptable to Regina, would have to have a low initial capital cost. The scheme would, moreover, have to lend itself to convenient and economic enlargement necessary to meet future demands, urban and rural, and the extra cost of it would have to be absorbed by such expansion.

As already indicated, the details of various proposed schemes were carefully studied by the consultants. Subject to more precise determination to be reached when the time came to construct the project, estimates of the comparable costs of the different schemes were detailed in the Wynne-Roberts report. They were based on trunk water mains "designed to deliver twelve million gallons per day to the vicinity of Tuxford (up to 16 million gallons daily), from which point a pipe connection could easily be made to Moose Jaw." The estimated capital costs of the various schemes ranged from six million dollars odd to sixteen million dollars odd, depending upon the "class of pipe" constituting the trunk lines, and upon other variables, such as location of river intake, pipe-line routes, reservoirs, pumping stations and related works. Correspondingly, "the annual capital charges and operating expenses" ranged from about six hundred thousand dollars to about one million dollars.

Thus, after taking into account all relevant economies designed to reduce the initial outlay, the costs were still considered very high. It was, therefore, recommended that first consideration should be given by the city to the further development of its local sources of underground water, which, according to the H. E. Simpson report, might be "expected to yield approximately 8 million gallons per day, with 9 or 10 million gallons available for short periods of time in emergency."

So important to the Capital City was the matter of a water supply that would be "soft, ample and permanent" that, in spite of the high costs of river water, it was recommended, in almost identical words both in the N. S. Hill report and the R. O. Wynne-Roberts report, that when the time was "opportune" preliminary steps should be taken to that end. The statement on the point from the Wynne-Roberts report is as follows: "It would be an excellent move on the part of the City Council to anticipate the day when more water will be required than can be supplied from the present and new underground sources, and it is therefore further recommended that investigations and surveys as to the best location and design of a river intake and the pipe line from it to the city should be continued, rights-of-way arranged; land acquired, soil analysis made, any necessary additional statutory authority obtained." In due time, the matter should be discussed with the Provincial Government

and with Moose Jaw, the report concluded, and all preliminary measures prepared, in advance of the time when the local resources would be fully utilized.

The efforts which Regina put forth over the years to find a solution for one of the city's greatest problems, if not *the* greatest, has been stressed for two main reasons. One of these is apparent, in that the Capital City could not maintain the "phenomenal development" which had characterized its growth in the past without abundant supplies of good water for domestic and industrial purposes, so that any effort by the city directed to overcome such a major handicap as the lack of such supplies imposed should properly be noted in any record of events consistent with the matters under review. The second and equally important reason is that the urgent needs of the two cities, Regina and Moose Jaw, for adequate and permanent supplies of good water, was one of the determining factors, coupled with engineering feasibility, in the selection of a location for the construction of a high dam in the South Saskatchewan River when the occurrence of untoward events, together with accumulative requirements, domestic and industrial, made the selection of a site for such a project a definite objective.

The severe and prolonged drought which struck the western prairie provinces in 1929—the like of which had never before been experienced in all the history of western settlement—had results which were to have a strong influence on the thinking of the times, and, as it turned out, these were destined to bring about new dispensations in the administration of the land and water resources of the region.

## CHAPTER FIVE: THE BLACK THIRTIES

### THE TOLL OF DROUGHT AND DEPRESSION

It would be almost impossible to exaggerate the terrible conditions brought about by the unprecedented drought of the "black thirties." This drought cycle began in 1929 after a record-breaking crop produced over the greater part of the plains area in the previous year. It continued with varying intensity over a vast area of the prairie provinces for eight distressful, torturing years, 1929-37.

It was then, if not before, that the Palliser report was brought down from the shelf, dusted off, and read with avidity, as the drought tightened its grip and began playing havoc with the agricultural and business life of the prairie region, to a degree never before experienced in the county's history. The Prime Minister, the Right Honorable R. B. Bennett (1930-35), made reference to the situation created by the drought as a "national emergency"; and measures were forthwith initiated by the Federal Government to mitigate the distress and hardship, as far as that was possible in the circumstances.

The writer of this history of events ventures to affirm that only those who lived through and underwent the privations, and felt the full impact of the blow which the unleashed forces of nature imposed, could be expected to have a proper conception of the grim, forbidding conditions which prevailed over such a vast area of the prairie provinces at that time. The grim reality of the situation was evidenced in grain fields laid waste, pastures smothered beneath a layer of dry dust as "black blizzards" lashed across the land, lifting clouds of topsoil into the air, darkening the noon-day sun and turning the whole landscape into a veritable sea of motion; as racing, bouncing tumbleweed, driven by the piercing gales piled up in fences, trapping the drifting soil, blocking roadways for miles on end, and—the grim irony of it—filling farm shelter-belts with great drifts of "blow dirt," blow dirt, so flour-fine as to sift through every crack and cranny of the dwellings, settling on floors and furnishings, contaminating food, and distracting the occupants almost beyond human endurance.

This writer has personal knowledge of more than one family who were actually driven from their farm homes as conditions became increasingly unbearable. It is not too much to say that scenes of ruin and desolation followed in the wake of these terrible eroding dust storms, invading alike the precincts of the living and the somber resting places of the dead. This latter condition was particularly evident in light sandy sections. As a result of high wind and light soil, combined with unwise tillage practices, graveyards could be seen in such sections so badly filled with drift soil that only the tops of the tallest tombstones were showing above the drift, truly scenes of such utter desolation as to beggar description. The restoration of burial grounds was, therefore, one

of the many grievous tasks that had to be undertaken when and where necessity arose. Fortunately for our ease of mind and heart, tragedy will often yield to humor with becoming felicity. Apropos of this, an incident comes to mind that will serve to convey some of the realities of a situation that had to be met, and was met, in the same spirit and with the same grim determination with which other baleful problems common to the area at that time were met and surmounted.

On one occasion, as the writer was driving through a badly-drifted area, he noticed considerable activity going on in a nearby graveyard, and stopped to observe operations at close range. The graveyard in question was in no sense an exceptional case. Rather, it was typical of other graveyards similarly situated in exposed locations, where soil drifting from one cause and another had become acute. Previous to the restoration operations, then in progress, this graveyard had been completely covered, fence deep, with drift soil. Only the top of the odd tombstone, here and there, had been visible above the surface of the drift.

The writer learned that in this case the work of restoration was all voluntary—not unique in the circumstances—which made the assembly of the large man-force and equipment present all the more impressive. In addition to a large assortment of horse-drawn equipment, scrapers and the like, there was a great mass of power-driven equipment, tractor shovels and bulldozers, all with skilled operators. These were reinforced by a smaller army of foot-loose men, armed with scoop shovels and good intentions. In order to facilitate the work in the cramped conditions and provide the greatest space in which to operate the big equipment, the woven wire fence enclosing the plot of ground had been first excavated and removed, thus enabling operations to proceed on all four fronts. Even so, the operators were having difficulty: getting into each other's way, at times, thereby complicating operations and creating some confusion. Every now and then a bulldozer would hook on to a headstone, buried in the drift, and heave it up into the sunlight, only to get it mixed up with other stones similarly uprooted. Hence uncertainty arose in some cases as to which belonged where. There was a lively argument going on, in this regard, just as the writer arrived on the scene. Two headstones lay, face up, where they had fallen. In the general disorder, there was divided counsel as to whether John Simpson or Julia Tempest belonged over a particular grave. The dispute was settled for all time, by peremptory order of the straw boss. "We can't tie up the works fooling around," he exclaimed gruffly. "Plant Simpson here," he directed, indicating with his foot a sand-filled depression at one end of a mound. "It's just as apt to be right as anything else," he asserted firmly. "If old Jack should happen to be over Julie, it won't matter a damn—they'll never know the difference anyway," he added grimly.

So it was that the restoration of burial grounds was carried on in the manner of the times, whether or not money was available for such



tasks. Perhaps the humble homage due the dead was not always what it might have been, or what one would have wished it to be, but at least there was no shirking of duty, where the needs and the welfare of the community were at stake.

While the distress and hardships experienced by the people in the drought area, during what came to be known as the "dirty thirties," was of such severity as to tax the willpower and break the spirit of all but the most stouthearted, the fact was that the privations suffered served to break down restraints and bring the people in every walk of life together in a spirit of warm friendship, mutual helpfulness and co-operation. These qualities, in turn, enabled governments and municipal administrations to proceed with rehabilitation programs in a manner not possible had such public support been withheld or less freely given.

As the Prime Minister's statement implied at the time, the economic effects of the drought were felt far beyond the confines of the provinces directly affected. It followed, therefore, that measures national in scope had to be instituted in an effort directed to cope with the economic disasters occasioned by the drought; and no less to ameliorate, so far as possible, the human distress and hardship attributable to the same cause.

The measures adopted fall roughly into three main categories. First were the measures designed, primarily, for the relief of distress, to take in the cases where food, clothing, fuel, medical care and other vital necessities had to be supplied. This was classified as "direct relief." Next in importance was the need for agricultural rehabilitation, which included supplying seed grain, feed and fodder. Even chicken feed and garden seeds were provided. In this category, too, was included tractor fuel, implement repairs and other supplies necessary for farm operations—even to the axle grease needed to haul the supplies home. Last were what were designated as "long-time measures," or measures which were of a more permanent nature than those intended only for the relief of distress. The long-time program, shortly stated, embraced soil conservation, together with the conservation and use of the region's available water supplies, a program long before envisaged by the early pioneers in that field, as before outlined.

It is not the writer's purpose to give a detailed account of all the harassing burdens, the eroding disasters, that beset such a large portion of the prairie provinces during the thirties. That should be a story in itself—a very human and tragic one at that. There is, however, one important aspect that should be emphasized. This will bring out some of the more important matters, social and economic, which induced the Federal Government to institute measures designed to prevent, or at least to lessen, the ravaging effects in the event of another such drought striking the region.

History would have been badly served in the darkest and most trying days of prairie agriculture, and the lesson of its privations lost, but for the fact that much relevant material was gathered together at the

time, and compiled into such reports as that written by Dr. E. W. Stapleford, at the direction of the Federal Minister of Agriculture. His completed report was submitted to the Hon. James G. Gardiner in 1938, after which it was printed and published by authority of the Minister, under the title, "Report on Rural Relief due to Drought Conditions and Crop Failures in Western Canada, 1930-1937."

## THE STAPLEFORD REPORT

The purpose of the Stapleford report, as set out in its foreword, was as follows: "This report is an attempt to tell as briefly as possible the story of the crop failures from which the West has suffered for the past eight years. As the full impact of the drought was felt chiefly in the Province of Saskatchewan the major portion of the report is devoted to that province. An effort has been made to set forth the story of the hardships which the prairie farmer has had to face during this period and the effects which those hardships have had upon him. The generous response of the Federal Government to meet an emergency of Dominion-wide importance is dealt with and also the fine gesture of the people of Canada, from the Atlantic to the Pacific, who sent into the drought-stricken areas *over two thousand carloads of food and clothing as voluntary relief.*"\* The foreword concludes: "In addition to this, the report endeavours to set forth the long-time plans which are being worked out in order to make it possible for the farmer to continue to produce wealth from the prairie soil in comparatively dry years, and also to make it possible for him to support himself even in a period of protracted drought."

The situation which prevailed in the drought area can be better understood when it is remembered that at the time a very acute economic depression had also set in and was spreading its baneful effects over the country as a whole—indeed, over most of the civilized world. This disastrous combination reduced earning power, and dried up sources of municipal revenues to such an extent that the municipalities, urban and rural, had to appeal to the provincial governments for the financial assistance needed to discharge their obligations where direct relief was concerned, and in many cases even for the funds to meet ordinary running expenses.

This, in turn, imposed a greater burden on the provincial governments, which were also experiencing a great decline in their revenues, and from the same causes. The provincial governments had, perforce, to rely in turn on the Federal Government for financial support. This support consisted of outright grants, in some cases; bank guarantees in other cases; and direct loans. According to the Stapleford report, Sas-

---

\*Present writer's italics.

katchewan suffered to a greater degree from the effects of the drought than either Manitoba or Alberta, with the result that Saskatchewan became more dependent on the Federal Government for all forms of assistance. This in turn brought about a greater consciousness on the part of the residents, in the drought area of Saskatchewan, of the need of employing every possible means that could be considered practicable in the circumstances, of lessening such hazards. This feature will be dealt with more specifically later.

In the sequence of events, the first matter which should be discussed here is the relief problems which faced the governments, both provincial and federal. The fact that the drought was more severe and of longer duration in the provinces of Alberta and Saskatchewan than in Manitoba, and the further fact that there was considerable variation in that severity as between different areas in the same province, made the matter of formulating relief measures and administering these measures all the more involved and perplexing. Certainly, the problem of supplying food-stuffs, clothing and the agricultural supplies needed in the emergency could not be dealt with in a haphazard, first-come first-served fashion. In short, the whole relief situation could only be satisfactorily dealt with at the local or municipal level, working in close co-operation with the provincial authorities, and the latter with the federal, although by far the greater part was supplied in one form and another by the Federal Government.

To ensure the proper functioning of the policies instituted, and for the smooth working of the hundred-and-one details in connection therewith, "regulations and agreements between the municipalities and the Province, and between the Province and the Dominion," were executed as a first step to that desirable end. On the efficiency of the general setup, Dr. Stapleford wrote: "The writer of this report has come to the conclusion that the present system of relief administration in the rural areas provides the most equitable and economic procedure which has yet been devised. It extends to the rural areas the policy in use all over Canada for the past eight years in urban centres, in that it places the responsibility on the municipal councils."

It is not necessary here to give a lengthy detailed review of the many and diverse matters which claimed the attention of the respective governments in the relief area, ranging as they did over every segment of the region's economy, and embracing the health and welfare of every man, woman and child resident in the area. What should be outlined are the principal matters which influenced—"compelled" might be a better word—the Federal Government to take the necessary steps directed to put agriculture, in the low rainfall area of the prairie provinces, on a more stable and permanent basis.

As the most authoritative source of information for this purpose is the Stapleford report, it will be used as a text for the following discussion.

In 1937, one of the driest years in the drought period when conditions were at their extreme worst, the Federal Government authorized the expenditure of \$1,000,000, for the purpose of purchasing fruit, vegetables, cheese and "deep sea" fish. "The purchases were made chiefly in the Maritime Provinces, in Quebec, Ontario, Manitoba and British Columbia. By agreement between the Federal Government and the Government of the Province of Saskatchewan, 177 rural municipalities and local improvement districts in the province were designated as the areas which had suffered most from the crop failures of the past eight years, and hence were entitled to share in this special distribution of food supplies. Similarly by agreement between the Federal Government and the Government of the Province of Alberta, 53 rural municipalities and local improvement districts in Alberta were designated to share in this special distribution." This assistance was in addition to the regular "relief orders to the value of \$20.25 per month for a family of five persons." The fuel allotment was made "according to actual need. The maximum relief quota for clothing for a family of five persons," was "\$53 for a year."

Commenting on this schedule, the report makes the following observation: "It can scarcely be claimed that the above quotas are too generous. While the total costs of relief reach staggering figures the principle is everywhere accepted today that provision must be made for those in need." Apart from food and clothing, medical and dental care was provided. This took the form of medical supplies, drugs and hospitalization. To further ensure the care of the sick, "grants-in-aid to doctors resident in the affected areas" were provided, to enable these doctors to carry on when it was no longer possible to collect their fees. Indeed, it was not uncommon for doctors, practising in rural districts, to accept meat, fowl, butter and other farm produce as part payment for services rendered.

Before leaving the subject of direct relief and the vast expenditures of public funds needed in such emergencies, a further reference to private benevolence—to the splendid and praiseworthy response—might be in order: "When the Canadian public began to realize the extent of the drought in 1931 and of the distress which was following in its wake, a great wave of sympathy broke over the entire country; and churches, lodges, welfare organizations and individuals began to vie with each other in their desire to help. Some 249 carloads of vegetables, fruit and clothing were hurried to Saskatchewan to relieve those in want." Indeed, it was more than a contribution in material goods, great though that was. It also exemplified good citizenship in a manner for which the nation, as a whole, could be proud—typifying, as it did, a united people imbued with the same humanitarian impulse to share their bounty with others less fortunate. The actual assembling and handling of such a large quantity of supplies was in itself no light task. Illustrative of such matters, the writer recalls an incident not without a touch of humor.



On one occasion, shortly after a voluntary shipment of fruit, vegetables and other supplies from a point in Ontario had been received and distributed to the residents of the district, this writer was having a friendly chat with former neighbors over a cup of coffee in the hotel restaurant. One of the local merchants had two photographs, a "before and after" of the event which he was showing for the enlightenment of the group seated at our table. In the photograph, taken at the point of shipment in Ontario, could be seen a large group of farmers with an assortment of wagons, democrats and buggies, all loaded with supplies. The scene had the appearance of a busy market day, as men and some women too were shown dressed in working clothes, laboring to sort and load a railway boxcar with the supplies. These had been sedulously gathered by all and sundry in the neighbourhood and brought to the railway point in transport vehicles as old fashioned as yesterday, by men and women with hearts as young as tomorrow. All had responded in the same generous spirit; all desired to help their fellows "out West," who, through no fault of their own, were in want and distress.

The companion photograph showing the same car being unloaded at its destination in the village of Orkney, and its contents distributed to the local recipients, was in marked contrast. Instead of horse-drawn conveyances, all that could be seen was a line-up of cars and big farm trucks, with their drivers and others, all waiting their turn to share in the shipment. As the first cold snap of the season had set in, the men could be seen in warm overcoats, likewise shown were women wearing long fur coats—all *prima-facia* evidence of better days.

One of the group seated at our table, by the name of Norman Dennis, well known in the local community for his ready wit and assertive manner, had been intently scrutinizing the photograph taken in Ontario. Then, holding it up for all to see, he asserted emphatically, "Here's something we should never forget, fellows—I mean never!" After passing the photograph to the writer, he reached for the one showing the unloading operations in his home town. "Here's where we play the other side of the record," he exclaimed. After a momentary glance he added wryly: "If we all have to go to the poorhouse we're sure as hell goin' in style. Everybody will be in a Rolls-Royce and a mink coat!"\* This writer wishes to affirm in this way at this time, and from his own knowledge, that Norman Dennis expressed the thankfulness of a sorely distressed people for what was being done for them, not only by governments but by private benevolence as well.

Bad as conditions were, all was not gloom and despondency. Characteristic of the mood, at times, was a tinge of frivolity, most in

---

\*The seeming prosperity of the drought-stricken Saskatchewan farmers was, of course, quite deceptive. The well-worn garments, as before stated, were only a testimony to better days. So were some of the cars and trucks, which told of a mechanized agriculture in dry areas where even in hard times it might be easier and cheaper to run a used truck or car than to find feed and water for a team of horses.

evidence on social occasions. Typical of these were the "hard times" dances. At such functions everybody wore old torn and patched clothes, the patches in contrasting colors, sewn on with white parcelling cord. The elbows of the men's coats and the seat of the trousers provided strategic settings for such patches. The proceedings would be further enlivened by short skits and the singing of popular songs, interspersed with dance numbers. One such song never failed in its appeal and could always be counted upon to strain the vocal chords of all and sundry to the breaking point. A verse of this was as follows:

We've reached the land of frozen wheat  
Where nothing grows for man to eat;  
Where winds can blow both cold and heat  
Across the prairie hard to beat.  
Oh prairie land, sweet prairie land,  
As on your burning soil I stand,  
I look across the parching plains  
And wonder why it never rains.

In a somewhat different category from the assistance extended on an individual basis, or direct relief, were other forms of assistance which became necessary—assistance designed to enable ordinary social services to function. Among other things, assistance had to be given to schools and other public institutions. Relief works were undertaken as a means of creating employment, and for their salutary effects in other ways. Excellent as these various measures were, there still remained the accumulated burden of farm debt which "became well nigh, if not utterly, hopeless." The adjustment of farm debt, on a "voluntary" basis, "within the drought and marginal areas," therefore, was a matter that engaged the attention of the provincial governments concerned; and various agencies were set up over the years to deal with the problem.

The debt adjustment, in the various categories, as given in the Stapleford report for the Province of Saskatchewan alone "amounted to approximately \$111,778,000." There was still another aspect, too deeply human for classification in any official report: the blasted hopes, the bleak outlook for the future with its spirit-eroding tendencies, which material statistics could never reveal.

Two simple incidents in the writer's own experience may be helpful to a better understanding of the intensely human side of the unhappy story. In the late summer of 1937, when conditions were at their worst, the writer had occasion to call upon a family resident in Local Improvement District No. 17, South Western Saskatchewan. The name of the family is here withheld to save any embarrassment which might be caused should the family still be resident in the district. This family had continued to occupy the "sod-shack" of their homesteading days: a shack which, like many another of its kind, had taken a bad beating over the years but was still habitable. The writer arrived on horseback, and his arrival had not been heard. A rap on the half-open door brought

instant response—the door was slammed shut in the writer's face! After the lapse of a minute or two, the door was cautiously opened again but only wide enough for a woman's face to appear in the aperture. The door was being used as a screen to conceal the person behind it. It was only after the comely lady of the house recognized her visitor as, to use her own words, "just one of ourselves," that she relaxed her precaution and opened the door, with a cordial invitation to "come in." The reason for her previous strange behavior was then revealed. The woman was sensitive about her appearance, in worn-out shoes that didn't even match, and a house dress made from flour sacks, after the lettering *Ogilvie's Best* had been carefully bleached out. The good woman was simply ashamed to be seen by strangers in such unbecoming attire. The incident was not an isolated case, but quite the contrary; the custom of using flour-sack material for articles of clothing for both old and young, male and female, when the family wardrobe became depleted due to successive crop failures, was common practice in the drought area at the time.

It would be impossible to estimate the saving in dollars and cents which these farm women effected by their ingenuity and willingness to "make do" with what they had. Such forthright thrift was not confined to clothing. A further example was the saving achieved in fuel costs. It was a common sight to see farm women, sometimes accompanied by younger members of their family, out in the pasture fields with a team and wagon gathering "buffalo chips" (cow dung) into gunny sacks. The hot dry weather had made the chips dry and crisp, had burnt up the grain crops, and left the granaries empty, so the farm women filled them with chips instead! Indeed, some of their men folk earnestly declared that food cooked over a "chip fire" had a superior flavor! Be that as it may, there is no gainsaying the fact that those brave thrifty prairie farm women have never had the need of credit rightfully their due for the sacrifices they so willingly made in helping to maintain home and family in the real-life tragedy of these discouraging and distressful years.

New disasters, and there were many, neither broke their spirit nor dimmed their vision of a better and a more prosperous future. They stood steadfast—steadfast as a rock—never giving way to despair when crops failed and all seemed lost. It was then as never before that the prairie dwellers, men and women alike, closed ranks as an undefinable faculty born of the spirit asserted itself: that iron in their life-stream which made them pioneers in the first place, and sent them forth to seek adventure and fortune in a new land; an iron which, when cast in the mould of a "new way of life," and hammered out on the anvil of pioneer experience and tempered in the fires of enduring faith, came to be known as the "Western spirit," a spirit imbued with the will to carry on and face the future, come what may, with a smile.

The other incident had to do with a still more intimate human relationship which likewise happened about the same time and, incident-

ally, in the same locality. The writer on the occasion in question was accompanying the local relief officer, Austin Bailey, on one of his supervisory trips through his district. As we were driving along the highway, a farm house came in sight, only a stone's throw from the road. Mr. Bailey, known for being a fast driver, and also a particularly good one, began slowing down. "Mrs. Smith (not her real name) will be waiting for me at the roadside," he said, with a meaningful grin. "She knows when I usually pass by her place, and watches for me, so she can flag me down. She's been doing that every trip I've made lately." Then he confided: "She's expecting. I have to fix up her papers for medical and hospital care." Sure enough, as we approached, a woman stood on the side of the highway waving us down. Coming to a stop at the side of the road where she stood, Mr. Bailey stepped out and greeted the woman with a friendly gesture. The shabby short house-dress that the woman was wearing did little to disprove the statement as to her condition. Taking a seat on the running board—in those days cars were so equipped—and supporting his briefcase on his knees, for a desk, Mr. Bailey began asking the intimate personal questions, answers to which were required in such cases. To the question as to when she was going into the hospital, she replied, in a disturbed voice, that she was going that "very night"; it was then mid-afternoon. After completing a list of supplies needed for household use, and items for the woman's immediate and personal requirements before and after the birth of her baby, Mr. Bailey pushed the completed papers into his bag, and, rising from his seat, pressed what appeared to be a ten dollar bill into the woman's hand. "That's everything for now," he exclaimed. Then, clasping her tanned and toil-roughened hand in both of his, he added reassuringly: "Have no fear, Mrs. Smith, everything will be all right. I'll see to it that you have everything you need." Tears came into the woman's eyes and ran down her weathered cheeks, as she tried in a voice choked with emotion, to thank her benefactor.

It was, indeed, a pathetic and depressing incident. This writer still has a mental picture of that lone, shabbily-dressed woman as she stood there on the dusty roadside wistfully regarding us as we drove away. It was all in a day's work, as far as the relief officer was concerned; but in reality much more than that, typifying, as it did, the efficient service and tireless zeal of a public officer, charged with onerous duties and responsibilities on the one hand, and on the other a state of unthinkable poverty and dependence on governments for all and every daily need. To this state a resourceful and industrious people had been reduced, ranging through every phase of human existence, from the womb to the tomb.

## AGRICULTURAL AID

Reverting now to the problems in the second category: agricultural aid, feed, fodder, seed grain and the like—this phase of the situation



became more acute as the drought continued and local or nearby supplies became exhausted. The Stapleford report dealt with the matter as follows: "Then came the catastrophe of 1937 with scarcely a blade of grass over enormous areas. Because of the desperate position of the farmers for lack of feed and fodder, the Dominion Government undertook to buy their surplus cattle and make provision for grazing grounds and for feed and fodder." The report further stated that an estimated total of "some 474,000 head of cattle and calves were taken out of the drought area in 1937."

In an effort to meet the problem of feeding the livestock that remained on the farms, and which were considered "indispensable" to farm operations, buyers were sent out to points as far distant as Alberta, Manitoba, North Dakota and Minnesota to secure enough feed and fodder to satisfy the reduced requirements. The situation became so serious in 1937 that in August of that year the Hon. J. G. Gardiner, then Federal Minister of Agriculture, decided to see conditions for himself and proposed that a trip should be arranged which would best enable him to do so. Mr. Gardiner was accompanied by the Federal Minister of Labour, the Hon. Norman McL. Rogers. The writer was asked to be the pathfinder and as such also went along with the party.

Starting at Regina, Saskatchewan, the party covered some 2,500 miles. Conditions over the whole area were found to be bad—unbelievably bad! Such grain crops as could be seen were fully ripe, but we saw only one threshing operation on the entire trip. The stand was too short and thin to be harvested in the ordinary way, but the need for salvaging what there was for feed was so important that great ingenuity was exercised in harvesting operations. In some cases the grain was cut with the grain binder and bunched loose on the field. Mowers were also used for the same purpose, in the same way. But the most astonishing harvesting machine of all was the duckfoot cultivator! This implement was brought into service where other means failed, or where the stand of grain was too short and straggling for the cutting blade. The cultivator uprooted everything growing on the surface—weeds and all. The loose trash was then raked in windrows, after which the dust was carefully shaken out, by hand, with barley forks, before being stacked for feed, thereby saving everything—stalk, root and branch! Even Russian thistle was put up for feed and proved a god-send to livestock men in some areas. The growing thistle also helped to furnish pasture in the late fall months, when livestock men were in great need of pasture.

How great this need became can be best illustrated by recounting some personal experiences which this writer had during his trip with the Ministers. On the first day out, as we drove along the highway, through a badly drifted section of the country well known to the writer, and in order to establish the realities of the situation, the writer drew attention to a badly-drifted field along the roadside and asked Mr. Gardiner if he could say, from his knowledge of farming, what the

particular field might be. "It looks like a summerfallow," he said. "No," I replied, "that field happens to be Mr. Robinson's cow pasture!"

Later that same afternoon, by previous arrangement, we called at the farm home of Mr. and Mrs. Charles Cooper of the Admiral district, Saskatchewan. Mr. Cooper was a model farmer who kept abreast of innovations in prairie agriculture. A visit to the Cooper farm was, therefore, always a rewarding experience, not only for a chat on current farming trends, but equally because of the gracious hospitality of Mrs. Cooper, a Scots lady from Edinburgh, endowed with a steadfast loyalty to everything Scottish, particularly Scots people. Introductions over, Mrs. Cooper invited us to stop for a cup of tea, an invitation which we gladly accepted, as our throats were feeling dry and raw from the heat and dust of travel. While Mrs. Cooper was brewing the tea and setting out a tasty lunch of oatcakes and other home-cooked dainties, an art in which she excelled, Mr. Cooper took us round the yard to view the farm home and buildings in their sylvan setting amid shelter belts and long tall caragana hedges: all living testimony of a prairie farmer's imagination and hard labor. I noticed some cattle browsing on the hedges. "Do you permit your cattle to destroy your beautiful hedges, Charles?" I asked critically. "Good heavens, George!" he exclaimed, "those are our milk cows, and it's the only pasture I have left! I don't know what in hell I'll do—they're on the last row," he added dejectedly.

It was in this situation that the Irrigation Districts in Southern Alberta became virtually an oasis in a desert. This is not to say that these irrigation districts became the main source of fodder supplies for the dried-out area. Such was not the case. The acreage under irrigation was altogether too small for that. What can be said is that the irrigation districts did supply roughage of the highest quality, alfalfa hay and the like, to neighbouring dried-out localities, thereby effecting a substantial saving in freight and trucking costs. But more important was the stabilizing effect which these dependable sources of feed and fodder supplies had upon surrounding farming and stock-raising communities. It is a generally accepted axiom that one acre "under the ditch" will stabilize twenty acres of adjacent dry lands, on a livestock basis.

While this demonstration of the value of irrigated lands in southern Alberta could not be said to be the deciding factor which led up to the action taken by the Government in the matter of instituting the long-time measures, before mentioned, the benefits of irrigation were well understood, and to that extent, at least, it did influence the thinking of the authorities in the best position to do something about the situation. What can and should be said is that the cumulative and shattering economic effects of the prolonged and severe drought over such a vast agricultural area brought about a state of desperation and concentrated public attention on the problem as never before. The result was that the Federal Government and Parliament were ready to employ any means

that offered some prospect of preventing a recurrence of the disaster, or at least of lessening its worst effects, in the event of such recurrence.

Some progress, indeed, had already been made in introducing long-term measures, even before the critical drought year of 1937, to which reference has just been made. In the spring of 1935, the Federal Parliament had enacted the Prairie Farm Rehabilitation Act (PFRA). Under its authority, new steps were being taken to cope with the long-term problem. The drought of 1937 emphasized the importance of PFRA. The early activities of PFRA will be the theme of the next chapter.

## CHAPTER SIX: THE PRAIRIE FARM REHABILITATION ACT

### THE ACUTE WATER SHORTAGE OF THE THIRTIES

Before referring to the legislation which created a new federal government body to cope with rehabilitation on the prairies, it will be in order to show still further how desperate the drought situation had become. This will explain, if explanation is needed, what led the Government at Ottawa to take such action.

The persistent continuation of the drought, year after year, resulted in the surface water, over the greater part of the prairie region, either drying up altogether, or, in the case of the larger bodies of water, receding to the lowest level in the memory of the oldest residents.

Among such bodies of water, important in the domestic and economic life of the country, one that can be mentioned was Crane Lake, in south-western Saskatchewan, a body of water six miles long and three miles wide; where the headquarters of the 76 Ranch—one of the largest in Western Canada—was located. Crane Lake went bone dry. Johnstone Lake, nineteen miles long and eleven miles wide, receded to the proportions of little more than an oversized prairie slough. Cypress Lake, a body of water six miles long and two miles wide, dried up until all that remained of a former clear beautiful lake was a muddy water hole in the center of the lake bed, frequented by wading birds and other waterfowl. Dead fish, mostly trout, with which the lake had been stocked previous to the drought, lay everywhere on the dry cracked shore, in every stage of decay, stinking to high heaven in the noon-day sun. Sizable streams, such as Swift Current Creek, Qu'Appelle River and the Souris River, ceased to flow throughout most of their length, and became stagnant ponds, injurious to livestock and entirely unfit for domestic purposes. Shallow wells went dry and water had to be hauled for long distances both for stockwatering and for domestic purposes.

An effort was made to determine the ground-water resources over a portion of the prairie provinces where difficulty in obtaining water by means of wells had been experienced. The Department of Mines, Bureau of Economic Geology, Geological Survey, Ottawa, began in 1935 an extensive investigation of southern Saskatchewan. The results of these investigations are contained in a series of reports, one for each municipality, first published in 1936.

In the introductory section of these reports there is the following general statement: "Lack of rainfall during the years 1930 to 1934 over a large part of the Prairie Provinces brought about an acute shortage both in the larger supplies of surface water used for irrigation and the smaller supplies of ground-water required for domestic purposes and for stock. In an effort to relieve the serious situation the Geological Survey began an extensive study of the problem from the standpoint of



domestic uses and stock raising. During the field season of 1935 an area of 80,000 square miles, comprising all that part of Saskatchewan south of the north boundary of Township 32, was systematically examined, records of approximately 60,000 wells were obtained, and 720 samples of water were collected for analyses. The facts obtained have been classified and the information pertaining to any well is readily accessible."

In a further statement it is explained that "the reports are written principally for farm residents, municipal bodies, and well drillers who are either planning to sink new wells or to deepen existing wells."

After the completion of the 1935 program, reported upon in 1936, typical areas in south-western Manitoba and east-central Alberta were investigated and reported upon in later years. Even at this writing this important work is still being carried on by the Geological Survey, but on a reduced scale. Supplementary investigations and studies have also in recent years been conducted by the Saskatchewan Research Council Geology Division. A report giving particulars of these investigations has been published under the title, "Saskatchewan Research Council Geology Division Report No. 1, Geology and Ground-Water Resources of the Qu'Appelle Area Saskatchewan, by E. A. Christiansen, 1960."\*

In view of the interest which agriculture and industry alike have in the information obtained by the investigation, it might not be out of place to make a passing reference to the form as well as to the substance of the reports in question. Under the caption "Physiography," precipitation, temperature, evaporation, soils and other features are dealt with in plain precise terms, coupled with illustrative charts for added simplification. Under "Geomorphology," glacial, preglacial and postglacial landforms are discussed, in a manner calculated to make the subject more readily understood by those who may not be conversant with its technical aspects. Profiles and photographs are also shown as a further help in this regard. Under "Stratigraphy," the upper Cretaceous and Pleistocene series are described and illustrated. In dealing with the "Glacial History" of the area covered by the investigations, one report states: "Five significant phases dominate the glacial history of the Qu'Appelle area. Each of these phases is shown in a map." These include a map "in which, the ice front at a particular time is drawn."

Under "Economic Geology," there is a general statement on the information available on "ground-water" probabilities in a given area. Gravel occurrence is discussed in considerable detail. A "ground-water probability map," compiled in colors from available information, accompanies the report. All of which sets out in graphic form what is essentially a history of the geology of the area reported upon, and its potential in relation to ground-water resources.

---

\*Since this was written, later reports have been published.

Be it remembered that as far back as the early seventies of the last century, Sandford Fleming, when engaged in locating the main line of the Canadian Pacific Railway across the country, foresaw with a prescience born of genius the necessity for specific information on the ground-water resources of the dry plains; and he recommended to the Government of that day test-well boring as a means to that end. It is worthy of note that in this, as in so many other instances in this history, the vision of the pioneer was amply justified. What the pioneer strove to establish became in the fullness of time a matter of settled public policy.

However, it was not until 1935 that a real start was made by the Federal Government on preliminary investigations into the ground-water resources of the prairie area. For measures to be undertaken in the matter of surface water supplies it is necessary to return to the Prairie Farm Rehabilitation Act.

## AN EXPANDING PROGRAM

The circumstances which led up to the enactment of a rehabilitation measure by Ottawa have been related at some length in preceding pages. The combination of a ruinous fall in farm prices and prolonged drought had reduced the grain farmers and ranchers of the prairie region, especially of the short-grass plains, to the point where relief outlay, year after year, was massively mounting; and in spite of this the fortunes of all concerned, including provincial and municipal governments, continued to decline. It became clear that in addition to immediate alleviation, the long-term prospects of the entire region had to be fundamentally studied, and suitable steps taken.

The Bennett Government set up a committee in the late months of 1934 to study the situation and make recommendations. One important consequence was the introduction of the Prairie Farm Rehabilitation Act, given Royal Assent on April 17, 1935.

This early approach to the problem was somewhat limited both in scope and time. In some quarters, prairie drought and distress were still regarded as a short-term situation. The initial total appropriation was for just under five million dollars, and the Act was to cover a period of from four to five years.

By 1937, the need for a permanent organization had become clearly apparent. In the previous year, a separate administration had been set up at Regina to direct water development. The extension of PFRA legislation in 1937 added the tasks of land utilization and re-settlement. The summer of 1937 saw the most severe drought in the history of the West. In 1939, financial appropriations were again increased, and the five-year limitation in the Act was removed. These stages in the history of PFRA are examined at greater length in the following pages.

The Prairie Farm Rehabilitation Act, in its original form, was short, with its main provisions set out in general rather than specific

terms. In this it may well be that the builders builded better than they knew, in that it allowed time and actual experience to dictate such amendments as would be necessary to meet particular situations which might be encountered—and were encountered—later. Then, too, it is perhaps correct to say that at that time no one knew exactly what should be done in the circumstances. In any case, subsequent amendments reflected the soundness of the leeway principle.

The preamble of the Act read as follows: "An Act to provide for the rehabilitation of drought and soil drifting areas in the Provinces of Manitoba, Saskatchewan and Alberta." The Act was "assented to 17th April, 1935."

Clause one cited the Act as "The Prairie Farm Rehabilitation Act."

Clause two specified that "Minister" meant "Minister of Agriculture."

Clause three is here quoted in part as follows: "The Governor in Council may establish a committee to be known as the Prairie Farm Rehabilitation Advisory Committee, hereinafter called the 'Committee,' the members of which shall hold office during pleasure."

Clause three also stipulated that the Committee should consist of the following:

- (a) one representative of the Manitoba Grain Growing Farmers from the drought and soil drifting areas;
- (b) one representative of the Saskatchewan Grain Growing Farmers from the drought and soil drifting areas;
- (c) one representative of the Alberta Grain Growing Farmers from the drought and soil drifting areas;
- (d) one representative of Saskatchewan Livestock Farmers from the drought areas;
- (e) one representative of Alberta Range Farmers from the drought areas.

Also included in the membership of the Committee was one representative of the Mortgage Companies of Canada, and one representative of the Canadian Bankers Association. Provided for in the same clause was "one representative each from the Canadian Pacific Railway Company and the Canadian National Railways." Also, it designated as members on the Committee "two representatives from the Dominion Department of Agriculture; and one representative of the Government in each of the Provinces of Manitoba, Saskatchewan and Alberta." In all, these made up a committee which was virtually a cross-section of the agricultural industry in the drought area, allied with the provincial and federal administrations, and also linked with the financial and transportation interests of the nation.

Clause four, the main operative provision of the Act, was worded as follows: "The Committee shall consider and advise the Minister as to the best methods to be adopted to secure the rehabilitation of the drought and soil drifting areas in the Provinces of Manitoba, Saskatchewan and Alberta and to develop and promote within those areas systems

of farm practice, tree culture and water supply that will afford greater economic security and to make such representations thereon to the Minister as the Committee may deem expedient."

Clause eight provided that "the sum of seven hundred and fifty thousand dollars shall be appropriated and paid out of the Consolidated Revenue Fund of Canada during the fiscal year 1935-36 and for each fiscal year for a further period of four years a sum not exceeding one million dollars per annum as may be necessary to continue and extend the work undertaken under this Act."

The concluding clause stipulated that: "The Minister shall annually lay before Parliament a report of all proceedings under this Act for the preceding fiscal year."

Clause four, by reason of the responsibility which it placed upon the Committee, implied the need for expert knowledge on such diverse matters as soil drifting, tree culture, water development and related requirements. This in turn necessitated the setting up of special committees and sub-committees, consisting of appropriate and well-qualified officers in the federal and provincial services, together with specially-trained personnel on the staff at the western universities, all working together with the Advisory Committee. This Committee, as specified, was the body responsible for the measures which it might see fit to recommend to the Federal Government.

Fortunately there was a wealth of information to be drawn upon: information on engineering investigations and economic studies, together with research and experimentation by the Experimental Farms situated in the drought area, all obtained prior to the advent of the PFRA. The duty of the Committee was to co-ordinate and channel all relevant activities in such a way as to "afford greater economic security," and also with the additional funds, made available under the Act, to expand all such activities to that desirable end. Additional "District Experiment Sub-Stations," in strategic locations, were established—to mention one such expanded activity. As this history is mainly concerned with the conservation and utilization of the region's water resources, reference will be confined for the most part to activities connected with that particular development.

In order to follow the sequence of events in this regard it will be appropriate to quote from the "Minutes of the Water Development Committee held in the Hotel Saskatchewan, Regina, May 1st and 2nd, 1935," as recorded by the Secretary, W. L. Jacobson. That report states among other things that the Honorable Robert Weir, Minister of Agriculture, explained to the meeting "The plan under which the Water Development Committee is to function." The gist of this was as follows: "The duty of the Water Development Committee would be to outline a program for water development covering the drought areas of Manitoba, Saskatchewan and Alberta"; and to submit the same "to the Advisory Committee appointed under the Act to consider and advise



the Government as to the best methods to be adopted to secure the rehabilitation of the drought areas in the prairie provinces." The Minister further stated "that it was the wish of the Department that L. B. Thomson be appointed Chairman of the Water Development Committee and that W. L. Jacobson be appointed Secretary." Towards the close of the meeting, the report states, the Hon. Robert Weir again addressed the Committee in these terms: "He was gratified to learn of the progress made during the two-day session and assured the Committee that their recommendations would receive close consideration. He felt the first meeting had been the means of laying the foundation for the future success of the work to be undertaken."

The type of projects recommended by the Committee were classified in three main divisions as follows:

- (1) Small, or individual, projects such as dugouts and small dams, for domestic use and stockwatering.
- (2) Community projects, mostly for stockwatering but which could also include irrigation.
- (3) Irrigation dams up to 50 acre-feet of storage.

It was stipulated that such "storage schemes" should be carefully investigated as to "agricultural possibilities . . . engineering feasibility and water supply before giving any approval for any financial assistance."

As before stated, in this third category much information was readily available from reports of previous investigations by the Reclamation Service of former days. This was particularly true where large projects were concerned. At subsequent meetings of the Committee during 1935, many such prospective projects were listed for special investigation and report.

Once again history was repeating itself, in the matter of small projects. Whatever else, it could not be said that such a government-sponsored scheme of water supply for the dry plains was an entirely new policy. It will be recalled that as far back as the eighties and nineties of the last century such projects had been constructed in specified areas by the Federal Government of that day. What was new was that, for the first time, a systematic and effective effort was being put forth to deal not only with the water shortage problem, as such, but also with the best means of putting available water supplies in the area as a whole to the best economic use. New, too, was the principle of self-help. The farmer, himself, had to take the initial steps to improve his existing water facilities. First and foremost, the farmer had to locate a site for a project—be it dugout or dam. Next he had to make an application to secure financial assistance. Then, in order to ensure against unfavorable conditions, a qualified officer of the Administration had to inspect and test the proposed site. If approval was given the applicant was required to construct the project in accordance with "engineering specifications."

After the project was completed a final inspection had to be made to ensure, still further, against wasting money on unstable—in the case of a dam—or otherwise faulty construction. On approved projects, three cents per cubic yard of earth moved was paid to the applicant, up to a maximum of \$50.00 for dugouts, \$150.00 for stockwatering dams and \$350.00 for dams used for irrigation purposes, where the storage did not exceed 50 acre-feet. Thus it will be seen that the financial assistance extended in each case covered only a part of the total costs, because the policy was only intended as an incentive for the greater development of such projects.

Proof that these small water-developments filled a great need is found in the fact that, whereas the first annual report (1935-36) gives a total of 645 completed as of that year, the annual report of 1964-65 gives a cumulative total of 94,482, of which 1,025 are described as “small community projects.”

It can be said, too, that interest in the program is as great as ever. A definition of the value in human terms of the small individual projects was given to this writer in the most convincing manner by a farmer's wife on one occasion, as in company with her husband and others we sauntered admiringly through their farm garden and orchard. The garden was irrigated from a reservoir created by a small earth dam across a shallow coulee, about one hundred yards from where the garden was located. The farmer explained how he used an old Ford car engine for the power necessary to pump the water up to the garden—a lift of some eight feet—how he had brought into service an old rotary pump, and added that the whole pumping unit entailed the outlay of only a few dollars. He said further that their garden had “never amounted to much” until they practised irrigation. The orchard was also “a failure until it was irrigated,” he said. “Now look at it!” he exclaimed.

True enough, the crab apple trees were heavily loaded with beautiful big ripe apples that weighed the lower branches to the ground. The plum trees also offered a tempting display of beautiful red fruit that hung in clusters on the branches. In addition to tree fruits, there were berry bushes and a plot of strawberry vines. “We have strawberries to no end,” the farmer said. “Yes,” his wife interjected, with an engaging smile, “I serve them in soup plates.” In addition, there were long rows of vegetables, sweet corn, tomatoes—everything. Most noticeable of all were the beautiful flowers—flowers in almost every variety and color, planted in a scattered landscape pattern that would have done credit to a professional gardener. “My wife does the gardening,” the farmer asserted, with proud emphasis. Commenting on the gorgeous display, the writer told them that he had never seen such a beautiful farm garden and that the work entailed in achieving such magnificent results must have been particularly hard. “It was more of a pleasure than a toil,” she asserted. “Irrigation makes all the difference; with plenty of soft reservoir water it's a joy to see things grow—besides,” she continued enthusiastic-

ally, "to be able to pick delicious fruit, such as you see, off your own trees; to have your own crisp vegetables fresh out of the moist earth for your table; to have cut flowers in every room in the house, and bouquets for your friends and to give to people who are sick; that really does something for you! The PFRA have made it possible for us women folk to live on our prairie farmsteads, even in the driest years, without losing our souls," she added with emotional fervor.

## REHABILITATION PROGRAM ENLARGED

After the general election, October 14, 1935, there was a change of government and the Right Honorable W. L. Mackenzie King became Prime Minister. In November of the same year, the Honorable James G. Gardiner was appointed Federal Minister of Agriculture. In 1937, the Prairie Farm Rehabilitation Act was amended. The amendments greatly extended the scope of the Act and brought about many new activities under its authority. For the sake of clarity it might be helpful, at this juncture, to outline briefly the substance of the amendments and the bearing which the same had upon future developments.

Section three of the Act was repealed, and the new clause which was substituted provided, in part, as follows: "The Governor in Council may establish one or more Advisory Committees to be known as Prairie Farm Rehabilitation Committees, the members of which shall hold office during pleasure."

Section four was repealed and a new clause substituted which provided for "land utilization and land settlement," in addition to the earlier responsibilities.

A new clause eight removed the financial limitations imposed in the former section and substituted the following: "For the purposes of this Act the Governor in Council may from time to time authorize the expenditure in each of the fiscal years 1937-38 to 1939-40 inclusive, of sums not exceeding the amount appropriated by Parliament in each year for such purpose."

The amendments, as before stated, brought about many new activities. Among these was the movement of settlers from sub-marginal, or non-arable, lands to lands of a better class in new locations. In some cases the settlers were relocated in districts where irrigation was practised—where such lands were available for settlement. The sub-marginal lands from which the settlers had been removed were then withdrawn from cultivation, regrassed, and put to their best economic use, namely, grazing. Where sufficient lands could be obtained in this way to constitute an economic unit, the area was fenced and developed as a "community pasture."

While it is a fact that the "grass-fed" steer has won general favor in the market place, it is also a fact that the potential value of the great grassland areas of the prairie region, that produce the most palatable

and nutritious native grasses to be found anywhere in the world, has never been fully recognized. This is largely due to the circumstance that the value of these immense grass-land resources could not be fully realized, owing to the further fact that there are great areas without surface-water supplies. A fact, well understood by stockmen, is that in order to make satisfactory gains, beef cattle should not walk more than two miles to water.

A livestock economy is based upon grass—on the pounds of beef that can be produced on a given acreage of pasture. Realizing this condition as basic to the full development of available pasture lands, the community pastures were supplied with adequate stockwatering facilities, such as dugouts, small dams and wells. Here again the best proof of the value which these projects bestow upon a farming community is found in the large number of pastures constructed since the inception of the program. The PFRA Annual Report for 1937-38—the first year of pasture construction—gives a total of 16 pastures constructed, comprising a total of 175,900 acres, while the 1964-65 report gives a total of 83 pastures constructed, comprising a total of 2,318,477 acres. Stated in more graphic terms, the pasture fence as presently constructed, if put end to end, would stretch across Canada from the Atlantic to the Pacific and half way back again on a return loop.

The pasture development program has been dealt with to show the importance which the proper management of that great national asset, the grass-land areas of Western Canada, have in the livestock economy of the region, coupled with the need for water development projects in these areas, if maximum benefits are to be acquired and the strength of the national economy increased thereby.

Important as these small water development projects were, and are; and benefiting, as they do, so many people, there remained a further requirement if the general economy and the agricultural economy in particular was to be made more stable and secure in the low rainfall area. There remained the necessity for providing dependable sources of winter feed supplies for livestock. Not only that, but, as before stated, for providing sources of such supply as could be relied upon to meet more adequately a general feed and fodder deficiency during periods of severe and prolonged drought—the effects of which were at that time being felt. Such a desirable objective could only be accomplished by means of irrigation, and large-scale irrigation at that.

But before getting into that subject there remains to be explained the new procedure brought about by the amendments to the Act. Orders-in-Council dated May 20 and May 29, 1937, “established Advisory Committees known as the Water Development Committee, the Prairie Farm Rehabilitation Committee and the Land Utilization Committee.” Then, too, the area in which the rehabilitation measures would be applied had to be properly defined. In this, down through countless ages natural forces had operated, with rigorous severity, to



mark in unmistakable outline the regions of low and variable rainfall. The great open plains, the "short-grass" heartland, merged into the long-grass areas, the parkland areas and eventually into the wooded areas of greater precipitation and lower evaporation. All of which, in itself, defined the drought area, and made the work of the Land Utilization Committee in that regard a reasonably simple matter.

At an executive meeting of the Committee held on May 31st, 1937, the decision was reached that "the boundary of the drought area should follow the municipal boundaries along the park belt line extending across the Provinces of Manitoba, Saskatchewan and Alberta"—thereafter known as the "PFRA Area." But, as with other variables common to the Prairie Farm Rehabilitation Act, this line of demarcation was subject to such minor modifications as experience might determine.

In the spring of 1938, the writer was appointed Director of the Prairie Farm Rehabilitation Administration; and for over nine years, or up until October, 1947, he was responsible for recommendations involving government approval for the construction of land utilization and water development projects and, consequently, had personal knowledge of such projects.

## CHAPTER SEVEN: LARGE DEVELOPMENT PROGRAMS

### PIONEER VENTURES IN IRRIGATION

A fact well understood since the first days of prairie settlement was that the greatest limiting factor in agricultural production, grain and livestock, was a moisture deficiency caused by low precipitation and high evaporation. This climatic condition was also the direct cause of a shortage of surface water supplies. While it was not possible to do anything about the climatic condition, a great deal could be accomplished in the matter of conserving such surface supplies as were available for the use and benefit of both agriculture and industry.

The small individual projects, outlined in the previous chapter, filled a great need, but there still remained the necessity for conserving the runoff in rivers and sizable streams. Obviously, if a policy of water conservation and development was to be made fully effective, the water currently wasted would have to be retained and put to beneficial use. Plans were, therefore, formulated for the construction of dams in such streams, where it was feasible. These projects were designated as "Large Community Water Development Projects." Since the capital costs of the projects were beyond the means of the communities concerned, and since the developments conferred general benefits on the country as a whole, where irrigation was the objective, the capital costs of the main works were borne by the public treasury from funds appropriated for that purpose. It will be recalled that this principle had been invoked by R. O. Wynne-Roberts in the case of the proposed South Saskatchewan River scheme.

Here it might be of some interest to refer to a rather odd circumstance recorded in the early history of irrigation in Canada. The Sessional Papers for 1896 contain a report by the Department of the Interior outlining some early history as follows: "In British Columbia . . . the early settlement and cultivation of the valleys in the interior proved the necessity for the application of water, through irrigation, to make agriculture successful, and for many years the principle has been in active operation there, notably in the Kamloops and Okanagan districts. The experience which had come to the early residents of that province through the construction of ditches and flumes for the conveyance of water to aid mining operations proved of value when systems carrying water for irrigation were undertaken; and in some instances the works originally constructed for the first mentioned purpose are now utilized for the latter."

Thus it came to pass that the means used for washing out fine gold from the river gravel deposits, when applied to water the dry but fertile valley lands for the production of crops, resulted in the creation of wealth infinitely greater than had ever been realized from the gold mining operations.

As with so much of the history here recorded, there is a useful lesson to be learned from such a circumstance, namely, the importance which should be attached to the development of permanent resources, such as the agricultural resources, as compared with resources (such as oil, gas, minerals and the like) which, while much more spectacular, are nevertheless all in the exhaustible category.

The Sessional Papers of 1895 contain a report by William Pearce which, among other things, makes special reference to the history of irrigation in the North-West Territories. "The first irrigation ditch was probably constructed by Mr. John Glen, who in the year 1875 settled on what upon survey proved to be Section three, Township twenty-three, Range one, West of the Fifth Meridian," Mr. Pearce wrote. "The ditch was constructed in, I think, 1878 or '79 and was in active operation in 1880. The water was taken out of Fish Creek and an area of probably 15 or 20 acres irrigated." After giving two or three instances of efforts that proved unsuccessful, the report continues: "In 1889 water was taken out of Big Bear Creek, which rises on the north slope of the Cypress Hills and empties into Crane Lake, by a ditch, to create some hay lands. It is stated to have been a success." The report adds: "The next ditch constructed in the Territories was in, I think, the year 1891 by Mr. John Quirk. The water was taken out of the north fork of Sheep Creek on about Section 5, Township 20 (21), Range 4, West of the 5th Meridian. In 1892 he had probably 100 acres under irrigation; but he has since extended it considerably. This ditch has been a decided success and a great object lesson in irrigation for the settlers of that portion of the Territories." A fruitful lesson it turned out to be in the development of irrigation east of the mountains, proof of which is found in the fact that the St. Mary and Milk Rivers Water Development Committee Report of 1942 gives a total acreage under irrigation in Southern Alberta, as of that date, at 508,800 acres.

Reverting to the Prairie Farm Rehabilitation program involving large projects, it is not necessary for the purpose of this history to give a detailed description of each project constructed in the above category. The purpose will be as well served if reference is confined to projects representative of definite objectives in each case.

The Annual Report of the PFRA for 1938, dealing with the situation in the Province of Manitoba, observes that "largely because of the relatively high rainfall, there has been no irrigation development of any consequence in Manitoba." The large projects in that province were, therefore, confined to domestic, municipal and stockwater supply. They began with the construction of a series of low overflow concrete dams in the Souris River, providing channel storage only, but owing to the flat gradient of the stream a chain of storages throughout a considerable length of the river was thus created, affording stockwatering facilities in one of the best livestock sections in south-western Manitoba. Since the start of the program in 1937, many projects serving the purpose

before stated have been constructed in areas where both underground and surface water was in short supply. These projects range in size from a storage capacity of a few hundred acre-feet up to 24,000 acre-feet in the case of the Rivers Dam, across the Minnedosa River (data given in a Preliminary PFRA Report of January, 1957). This dam, now completed, is a compacted earthfill structure. The report continues: "A portion of this storage can be well utilized within this district for domestic, stockwatering and municipal purposes, while downstream of this area the reservoir capacity would be beneficial for aid in flood control in wet years and water conservation during dry years." Other large projects are planned for the future and still others are under intense investigation and study at this writing.

In the Province of Saskatchewan conditions were such that irrigation was a main consideration in the planning and design of large projects. Among the first of such projects to be undertaken was the construction of a dam across the Frenchman River, near the Village of Val Marie, particulars of which are given in the PFRA Annual Report of 1939, from which the following is quoted: "This project provides for the irrigation of 6,000 acres of river-bottom flats . . . by means of a 3,600-foot dam across the Frenchman River, constructed in 1936, which stores some 6,000 acre-feet of water." Later a dam was constructed just above the reservoir of the first dam. Here a pump lift was installed to irrigate bottom lands at a higher elevation than could be commanded by gravity. By this means 4,146 additional acres of irrigable land were brought into the Val Marie system. In 1936 a dam was also constructed "some 50 miles west of Val Marie," on the same river, near the Town of Eastend, which project, according to the PFRA Annual Report for 1939, provided "for the irrigation of 3,200 acres of river flats." The Cypress Lake reservoir with a capacity of 80,000 acre-feet, at the head of the Frenchman River, was constructed later on as a source from which water could be released to supplement storage in the Val Marie and Eastend reservoirs and for other irrigation projects on the Frenchman River and Battle Creek, and to maintain "a stream flow for stockwatering purposes along these streams."

As a means of affording maximum returns from the lands under irrigation, all land surplus to that which the farmer himself could farm properly under irrigation—generally not more than a quarter section—were purchased at the beginning by the Federal Government for fair market value. Then, as a means of removing what had proved to be such a great handicap in so many cases in the history of irrigation farming, the lands were properly leveled to receive the application of water. As a further means of ensuring success from the start, the distribution ditches were also run. After these operations, the lands in the project were sub-divided into 40- and 80-acre units and made available to appropriate applicants, for example for resettlement, to farmers situated on sub-marginal lands; to farmers resident on dry lands adjacent to the



irrigable area, as an aid to those who were desirous of going into livestock, in order to stabilize their grain-growing operations; and to farmers already in livestock who were in need of a permanent source of feed and fodder supplies. One or more units might also be allotted to farmers resident within the irrigable area, who had sons coming of age, and who desired to remain on the land. In short, there were no hard and fast rules. In such matters there had to be some flexibility in order to meet certain situations, known to exist, which it was most desirable should be met.

The lands, as developed, were priced at from \$7.50 to \$15.00 per acre, depending upon the quality of the soil and other considerations; the payments were spread over a fifteen-year period. Here a complete break with tradition governing land purchase contracts was introduced. The contract contained the following provision: "Now, therefore, to prevent speculation and to prevent profiteers appropriating the increased value of the land, and that the Vendor may ensure that the land shall not become idle or waste but rather may be kept in a state of reasonable husbandmanlike cultivation, the Vendor and the Purchaser as a part of this agreement covenant and agree, that should the Purchaser at any time within 99 years from the date of this agreement wish to sell said land the Vendor shall at all times have the first right, prior to all others, of purchasing the said land from the Purchaser, and the Purchaser shall not assign this Contract or sell the said land before he has first offered to assign or sell to the Vendor." Thus it will be seen that the Government was not "bound or required to accept" the final payment. Ample proof that the clauses in the agreement for sale prevented speculation in these lands, made valuable by reason of public expenditures, is vouched for by the fact that the same provision has since been incorporated in all PFRA agreements for the sale of land involving the same principle.

In addition to the rehabilitation within the irrigation areas, there were general benefits to adjacent areas, since a reliable source for feed and fodder thus became available to farmers on surrounding dry lands, thereby stabilizing the livestock industry in that region.

The Maple Creek irrigation project was undertaken in 1938 by the construction of the Downie Lake reservoir, followed by Junction and Tennelle reservoirs and the construction of a considerable number of miles of main and distributing canals. The purpose of the development was to conserve and put to beneficial use the waters of Maple Creek, with Gap Creek and other tributaries. These drain part of the northern slope of the Cypress Hills and empty into Big Stick Lake about 30 miles north-east of the Town of Maple Creek, where the runoff becomes lost in a great evaporation basin. A special report on PFRA activities, dated March 31, 1943, gives the area as comprising "some 6,000 acres of irrigable land."

There was no essential difference in the land policy from that of the Frenchman River developments. Lands in the project area were

acquired by the Government, prepared for irrigation and sub-divided in the same way, in 40- and 80-acre units. Due to the need for "reserve supplies of hay and feed in order to stabilize the large ranching industry in the Maple Creek District," the irrigable units were made available to farmers and ranchers resident in the vicinity of the irrigable area. It can be said that the Maple Creek development has fulfilled the objectives sought, as far as the same can be achieved within the limits of available water supplies—always a limiting factor in such developments.

Large irrigation projects were not uniform either as to size or form of development. Size was determined by the available water supplies, while form was largely prescribed by the circumstances in each case. The Swift Current development differed from that of the Frenchman River and Maple Creek developments in that lands in the irrigable area were not purchased by the Federal Government. Land purchase in the case of the Swift Current project was confined to rights-of-way for reservoirs, canals and other works.

The special PFRA report, before cited, gives some particulars of this project. "The main or primary storage has been created on Swift Current Creek near Duncairn by the construction of an earthfill dam with a maximum height of 66 feet," it says. "The storage capacity at full supply level is about 85,000 acre-feet." The construction of a dam across Rush Creek created secondary storage of "about 10,000 acre-feet," which, according to the general plan of the development, would provide water for a "potential irrigable area" totalling 13,175 acres, east of Swift Current and in the Rush Lake and Herbert districts. The Swift Current "main supply canal" extending from a weir in Swift Current Creek for a distance of 21 miles to Highfield reservoir, made water available to a large number of farmers whose lands could be irrigated, in whole or in part, from the canal system. The Herbert main canal extending from Highfield reservoir for a distance of 22 miles provided water for the Rush Lake and Herbert districts. All of these lands, with the exception of the lands in Rush Lake basin, have been or are being developed for irrigation by the farmers themselves, at no cost to the Federal Government.

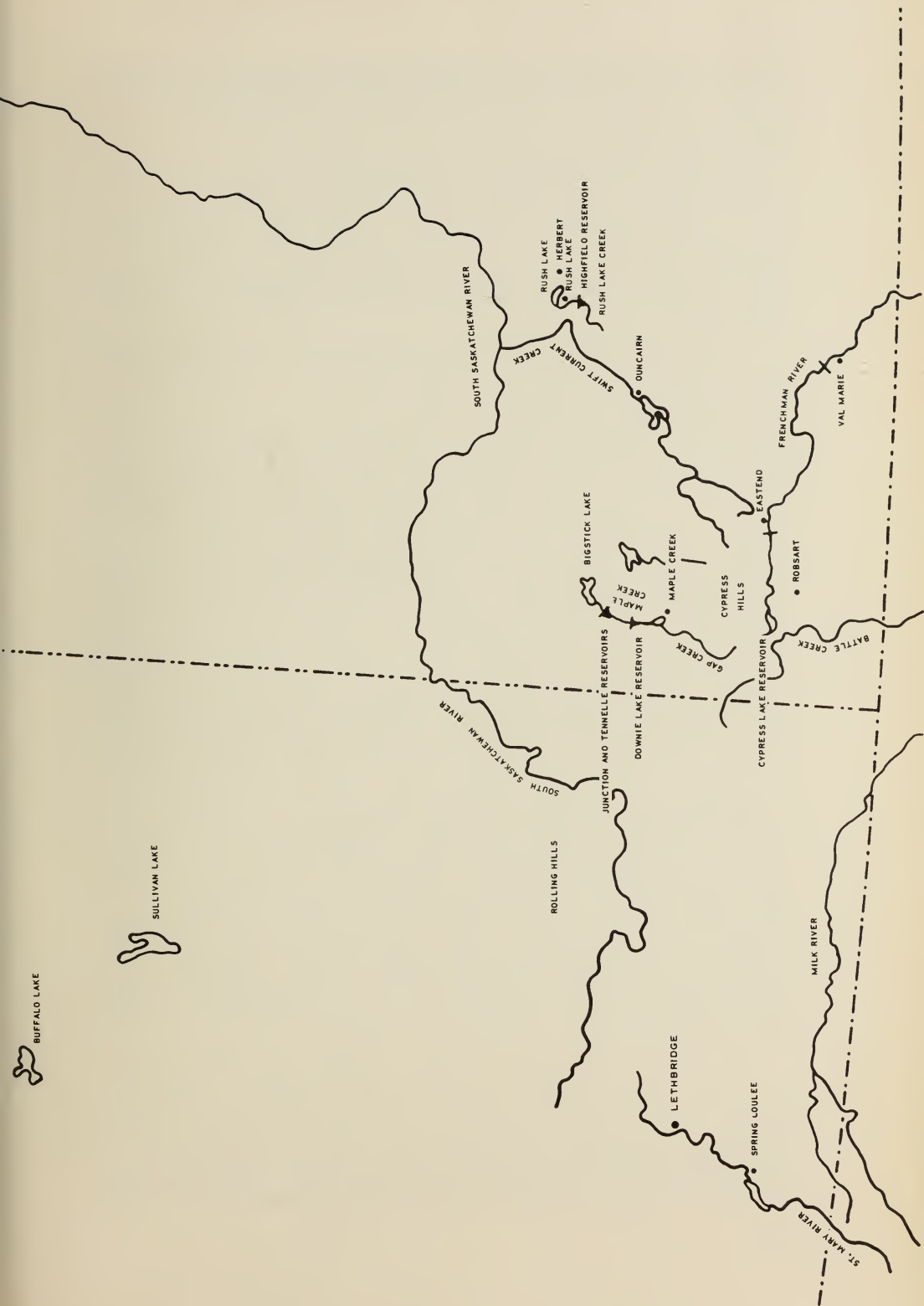
Rush Lake proper involved a drainage undertaking, the costs of which were borne by the Federal Government. The drained area, portions of which were owned by the Province and to a lesser degree by the Federal Government, comprising a total of approximately 6,000 acres, was sub-divided into 40-acre units and made available by both governments on a lease basis to farmers in the surrounding areas, to serve as a "feed bank" for these communities. In order to meet certain requests that were made by some farmers situated nearby, a strip of choice building property was selected on the perimeter of the irrigable area, near the Town of Rush Lake. This strip of land was sub-divided

---

The map on the opposite page locates many of the places and areas which feature in the history of irrigation in Alberta and Saskatchewan.

BUFFALO LAKE

SULLIVAN LAKE



into small lots averaging 10 or 12 acres and made available to adjoining farmers who desired to move from their dry-land farmsteads to the irrigable plots, where they could be sure of growing garden products, even in the driest years.

The purpose of these small sub-divisions can be best stated in the words of a farmer who had moved from his dry-land farm to one of the lots. "I have a good grain farm," he said to the writer, "but I moved to this lot, under the ditch, in order to be sure of feed for my milk cows, and to have a garden and orchard. This lot, small and all as it is, provides us with a good living. That's about all anyone gets," he asserted emphatically.

These small irrigable units are mentioned here to show the variety in the means sought to overcome the handicaps which mother nature, in one of her inhospitable moods, imposed.

In the Province of Alberta, particularly southern Alberta, the people on the whole were more "water conscious," than was the case in either of the other two provinces, the reason being that irrigation had been practiced for a longer time and on a much larger scale, and its benefits realized, not only by the agricultural interests, but by business generally. The irrigation systems in southern Alberta had been developed by private interests independently, each of them more directly mindful of their own particular interest than in an overall plan of basin development designed to utilize the available water resources to the best economic advantage and to the greatest extent possible in the circumstances.

These somewhat random developments in Alberta left many isolated localities without means of obtaining sufficient supplies of water necessary for the full economic development of good irrigable lands in these localities. This condition brought about a keen demand for the construction, by the PFRA, of new projects and for the "extension and repair of existing projects," some of which involved considerable expenditures of PFRA funds. The Eastern Irrigation District can be cited as an instance of such extension. The PFRA Annual Report for 1937-38 states that \$22,400 was expended, "making some 14,000 acres of additional land irrigable. An additional \$50,000 is being expended on the Rolling Hills section of the Eastern Irrigation District where some 30,000 acres of virgin land will be made irrigable." The report also states that "during 1936 and 1937, \$80,000 was expended for the repair of the Canada Land and Irrigation Company project where some 250 farmers are irrigating over 34,000 acres of land."

In return for the financial assistance extended to the Eastern Irrigation District, lands in the new Rolling Hills development were made available to the Federal Government for the resettlement of farmers who were being moved from sub-marginal lands in Saskatchewan. In spite of the fact that these farmers were entirely inexperienced in irrigation practices, and that many of them were well advanced in years when



they made the change to irrigation farming, it can be recorded that the colonization venture was an unqualified success.

It might be appropriate here to mention a specific case where advanced age did not blunt the will to make a new start, in new surroundings, and to acquire new skills in farming methods. A settler by the name of A. W. Larson was being re-established on the Rolling Hills irrigation project by the PFRA in 1939. W. L. Jacobson, Assistant Water Superintendent, had occasion to visit the new settlement in the summer of the same year, and immediately upon his return to the Regina Office reported to this writer the substance of a chat which he had with the new settler. The highlight of it was that he, Larson, was "homesteading" for the third time, having been completely "dried out" on his last farm near Robsart, Saskatchewan. Larson was then, at the time of Mr. Jacobson's visit, over 70 years of age, but in spite of that hard fact the redoubtable hero of former ventures "conveyed a spirit of optimism. He was looking forward to setting up a home where he had plenty of water to grow things." Surely, a perfect example of the western spirit with the tenacity and the determination to hang on and beat down obstacles to the achievement of ultimate success in a chosen calling.

The 1937-38 and subsequent reports give particulars of expenditures on other irrigation systems and on the construction of new projects which were not large enough to have a bearing on the unfolding of events which led up to the construction of major projects later. It is not necessary to give particulars of them here. What is necessary, at this juncture, is to draw a distinction between what had been characterized as large community water development projects—already dealt with—and proposed major developments, entailing expenditures far in excess of anything previously undertaken by the Prairie Farm Rehabilitation Administration.

To get a proper understanding of how these very large, or major, projects came to be included in the PFRA program in the first place, it is necessary to explain that such inclusion did not come about either by chance or by reason of a preconceived plan of overall development. Rather, the major developments grew out of accumulated knowledge acquired from data compiled as a result of the extensive irrigation surveys carried out by the engineers under the Department of the Interior, from the passing of the North-West Irrigation Act in 1894 up until the transfer of the resources in 1930. This, coupled with what might be called the compulsion of necessity, constituted the main background of later and larger developments.

## MACKENZIE KING LOOKS TO THE FUTURE

Proof that the Federal Government was hospitable to large-scale irrigation projects was furnished to this writer at the highest level and by no less a personage than the Prime Minister, the Right Honorable

W. L. Mackenzie King himself. In the fall of 1937, this writer, in company with other cabinet colleagues on the Relief Committee of the Provincial Government of Saskatchewan, had occasion to discuss the relief situation with members of the Federal Government and Treasury officials in Ottawa. At the close of the conference, as we rose to take our leave, the Prime Minister came over to where the writer was standing within the hearing of others present. As far as memory serves, and from notes made at the time, the substance of his words were as follows:

"I wonder how long this terrible situation will continue," the Prime Minister said, more as a thought uppermost in his mind than a question. "No one knows," I said. "No, of course not," he replied in a somewhat perplexed tone, "but is there anything practical that can be done, in a large way, that would prevent, in a measure at least, the distress and hardship which these occasional severe droughts bring about over such a large area of the prairie provinces? I understand," he continued, "that there are possibilities of storing immense quantities of water by means of large dams in the rivers, and that this stored water could be used for the production of grain and other crops, thus offsetting the worst effects of these droughts. Are such projects feasible?," he asked anxiously. "Yes," I replied, "there are such possibilities, but such projects would, indeed, be very large. The construction of them would take time and the costs would be high, very high," I asserted. "Undoubtedly," he replied. "But the costs of relief are also high, and offer no permanent solution whatever of the problem," he affirmed forcefully. Then he added, with realistic finality, "I think it is high time we were making a start on some carefully-thought-through and comprehensive program, looking to the future, and designed to prevent, or at least to greatly lessen the need for these large expenditures on relief which the governments have been confronted with year after year."

A further proof of the favorable reception which recommendations for the construction of major irrigation projects might be expected to receive from the Federal Government at the time was given to the writer by the Right Honorable James G. Gardiner, Minister in charge of the Prairie Farm Rehabilitation Administration. On one occasion, shortly after this writer became Director, the Minister made the suggestion that I should discuss the matter of large water storages with C. A. Magrath.\* Mr. Gardiner said, further, that he had been impressed

---

\*C. A. Magrath was rated as an authority on water conservation and use, having been one of the pioneers in the development of irrigation in southern Alberta. He had also been instrumental in getting industries, complementary to such development, established in the area. Mr. Magrath was Lethbridge's first Mayor and represented the Medicine Hat riding (which then included the community of Lethbridge) in the Federal Parliament from 1908 to 1911. But undoubtedly his greatest service to the cause of irrigation in southern Alberta was given while he was Chairman of the International Joint Commission, a high office which he filled with distinction not only for himself but for Canada. Certainly, no history of water development in southern Alberta would be complete which failed to mention Charles A. Magrath.

by the strong views which Mr. Magrath held on head-water storages—views which Mr. Magrath had expressed to Mr. Gardiner shortly after he, Mr. Gardiner, became Minister of Agriculture.

In accordance with the Minister's instructions and at the first opportunity that presented itself, the writer canvassed Mr. Magrath for his views on the water storage question, and found after some questioning that the Minister's interpretation as given to me was correct in all particulars. Magrath's views, briefly stated, were that the Federal Government should construct large water-storage projects, the entire costs of which should be borne by the public treasury. The justification for such a policy, he explained, arose from the fact that such storages would be created on inter-provincial streams and, therefore, were not within the jurisdiction of any one province. Then, too, the waters of such rivers represented a great natural resource, the conservation of which was properly a national responsibility. All such storages, in Magrath's view, should be made available to municipal, provincial and private interests alike, subject to whatever development might be approved by the Federal Government. Again, the idea was not new. Virtually, the same policy had been advocated back in the nineties of the last century, as before stated, by that far-sighted and staunch advocate, William Pearce.

What needs further emphasis here are the particular incidents which influenced the course of events at the time. In this the writer is constrained to assert, from personal knowledge, that the statement by the Prime Minister, the Right Honorable W. L. Mackenzie King, as before quoted, together with the views as given to the writer on the same matter by the Right Honorable James G. Gardiner, Federal Minister of Agriculture, marked a decided turning point in the thinking of those of us entrusted with the responsibility of submitting recommendations to the Federal Government. In this we felt that we had sufficient support to proceed with the necessary investigations to determine the feasibility of large potential storage and irrigation projects, which, from preliminary surveys, previously conducted, were known to exist, but of which further investigations would have to be conducted before any recommendation could be made.

The first of the very large projects to be investigated by the Prairie Farm Rehabilitation Administration came about from a combination of circumstances, the chief of which had certain international aspects. This proposed project was known, at the time, as the "Lethbridge Southeast Project," and was later renamed the "St. Mary and Milk Rivers Development."

The project, because of its international implications, had a priority over other large projects also under investigation and study at the same time. The international implications were tied in with the fact that the St. Mary and Milk Rivers are international streams, the waters of which rise in the State of Montana, in the United States, and flow across the International Boundary into the Province of Alberta, Canada. The



urgency to get started on the construction of a Canadian dam across the St. Mary River, without undue delay, arose from the fact that a "Final Order of the International Joint Commission, dated October 4, 1921, provided definite rules for apportioning the waters and the application of priorities." In this connection, the report of a committee later appointed to investigate the matter states in its "Findings," on the point quoted above:

"At the end of 1940 the United States had constructed storage and irrigation works capable, except in periods of unusual precipitation, of regulating and making available for use its entire share of the waters of the St. Mary and Milk Rivers." The topography was such that Canada, *without storage facilities*, could divert and use only a small percentage of the flow of these international streams. The construction of a dam on the St. Mary River would be necessary before Canada could use its share of the flow.

The main reason for haste in getting on with the construction of such a storage dam was that the Canadian section of the International Joint Commission (its chairman at the time was Mr. Magrath) had obtained a favorable apportionment of the flow in the St. Mary River, and that United States' interests were fully aware of this fact and had made a determined effort, in the highest circles, to have the matter re-opened, so that an apportionment more favorable to the United States could be brought about.

The crux of the matter was that Canada, by failing to construct the works necessary to utilize her full share of St. Mary River waters, stood to lose not only the advantage secured by the apportionment, but all the waters of the St. Mary River for which Canada had not established a "use." In other words, Canada could not maintain with propriety a "dog-in-the-manger" attitude indefinitely.

For the reasons stated, and other reasons which could be given, the proposed project had the backing of informed public bodies, together with the general support of the local residents. In order to arrive at a proper determination of the various matters involved—the economic feasibility and, particularly, the international implications—the "St. Mary and Milk Rivers Water Development Committee" was established by Order-in-Council dated February 17, 1941.

The Committee was instructed to make a thorough study of proposals to build storage and irrigation works in Canada on the St. Mary and Milk Rivers. It was to go into all aspects of the matter—water supply, water requirements, the best way of utilizing the available water, the cost, the necessary arrangements with owners of existing irrigation projects, the benefits to be contemplated, the way the costs should be divided, and how the projects should be administered, operated and controlled after completion.

The Committee was further instructed to invite the "co-operation of the Department of External Affairs in dealing with international



aspects of the proposals." The following were named members of the Committee:

"Victor Meek, Chairman, Controller, Dominion Water and Power Bureau, Ottawa. Designated by the Minister of Mines and Resources;

George Spence, Director of Prairie Farm Rehabilitation, Regina. Designated by the Minister of Agriculture;

William E. Hunter, Accounts Branch, Department of Finance, Ottawa. Designated by the Minister of Finance."

The Order-in-Council also provided that "the Government of Alberta be invited to appoint or designate one or more persons to work with the Committee, but of which they will not be members." In response to which the Government of Alberta duly appointed:

The following representatives to be known as the Alberta Water Development Committee:

Honourable D. B. MacMillan (Chairman), Minister in Charge of Water Resources and Irrigation, Edmonton;

Honourable N. E. Tanner, Minister of Lands and Mines, Edmonton;

P. M. Sauder (Secretary), Director of Water Resources, Edmonton.

W. L. Jacobson, Assistant Superintendent of Water Development, Prairie Farm Rehabilitation Administration, performed the duties of Secretary of the Committee and compiled its report.

This writer was a member of the federal Committee and therefore had personal knowledge of proceedings. He can attest as to the care and thoroughness with which the inquiry was conducted. In this connection, in order to get a better understanding of the scientific side, the Committee had consultations with recognized authorities on irrigation practices; and to obtain information on the practical side, at a grassroots level, the Committee visited irrigation districts and held conferences with those who were actively engaged in the operation of applying water to the lands for the production of crops, and others directly interested, in one way and another, in irrigation farming. This diligence on the part of the Committee met with ready response from farmers and businessmen alike, with the result that the inquiry was able to get at the very heart of the various matters the Committee had been commissioned to investigate and report upon.

One of the noteworthy agricultural achievements which greatly impressed the members of the Committee was the tens of thousands of head of livestock—cattle and lambs—which were being fed and fattened annually on the farms and "feed lots" in the irrigation districts; thereby rounding out and stabilizing the livestock economy of a large section of the country surrounding the areas under irrigation.

Notable, too, was the industrial development which had taken place in areas where large-scale irrigation systems were in operation. Such was the case in the "Eastern Irrigation District," where irrigation had been in operation for 28 years, or since 1914, and particularly in the Lethbridge area where the first water ran down the ditch shortly after

the turn of the century and progressively expanded, over the years, to include several irrigation districts, some of which had a large acreage under irrigation at the time of the inquiry.

Experience has shown that wherever irrigation is practised on a large scale, conditions are favorable for the establishment of secondary industries, such as sugar-beet refineries, canning factories and processing plants of one kind and another. This in turn provides a home market for specialty and other crops grown under irrigation. Sugar-beet refineries are among the best examples of this trend, furnishing as they do a home market for a profitable crop, and by-products such as pulp and molasses, which are in great demand by livestock feeders. In discussing with me qualities of beet-pulp, one of the feeders explained its merits. "Pulp is no great shakes as a feed, it's really a tonic, a cocktail, that gives 'em an appetite for a greater grain ration—that's what puts on the weight," he asserted positively, pointing to a broad-backed steer, standing, with half-shut eyes, contentedly chewing his cud.

The canning factories and processing plants in the area not only provided a cash market for speciality crops, grown under irrigation, but also created employment and greater opportunities in the trades and professions, thereby creating a higher all-round standard of living in the whole community.

This writer ventures to assert that any committee, or body of inquiry, which failed to appraise these secondary developments resulting in such direct benefits would be doing less than its duty to the authority to which it was primarily responsible and to the country as a whole.

## A BASIC PRINCIPLE IS ESTABLISHED

At the conclusion of the inquiry a report was submitted to the Federal Government in February, 1942. The report had the unanimous approval of the members of the Alberta Committee, which Committee assisted in its preparation. It is not necessary to review all its findings and recommendations. Discussion will, therefore, be confined to recommendations, the principal of which were later adopted by the Federal Government, not only in the case of the St. Mary and Milk Rivers development, but which became settled public policy later, in similar large-scale developments.

First and foremost, the report laid down what might be regarded as a general principle applicable to large irrigation projects: "It has become a generally accepted principle that the total costs of an irrigation project of this magnitude should not be charged to the lands immediately benefited. To ensure completion and successful operation of the project, there must be governmental assistance. The development of the St. Mary and Milk Rivers Project would not only be of benefit locally and provincially but would, we believe, be to the general advantage of Canada."

As the administration of the water resources was a provincial responsibility, it was recommended that an agreement between the Dominion and the Province, should be entered into, which agreement "should provide for a co-operative development of the proposed project. . . . The Committee further suggests that a reasonable basis for division of costs may be as follows:

- (a) That the Dominion undertake and assume as a 100 per cent responsibility the construction of the main reservoirs and connecting canals to provide storage facilities for Canada's share of the waters of the St. Mary and Milk Rivers as apportioned under the Order of the International Joint Commission of October 4, 1921.
- (b) That the Dominion's part in the construction of the project be carried out as a Federal post-war development and that the cost thereof be regarded as non-recoverable.
- (c) That the Province of Alberta construct and carry out as a 100 per cent provincial responsibility the remainder of the proposed construction program as outlined in Part II of this Report, or such modification of this program as may be found necessary and is agreed to by the Provincial and Dominion Governments.
- (d) That the Province of Alberta be wholly responsible for maintenance, operation, and replacements, after construction, of main reservoirs and connecting canals.
- (e) That the Province of Alberta have full jurisdiction with respect to arrangements it may make with its municipalities, irrigation districts or others, as regards repayment of capital or for service charges necessary to the maintenance, operation, and replacement works.
- (f) That the suggested agreement should provide, among other things, for the settlement and colonization of the irrigated lands.

In brief, it was recommended that the project should be a joint development, in which the cost of the main capital works would be borne by the Federal Government on a non-recoverable basis, while the cost of the secondary, or distribution, system would be borne by the Province. The latter costs could be recovered by the Province, in whole or in part, as the case might be, from the water users of the system. The total cost of the development, as given in the report, was estimated at \$15,178,435, which included land preparation, colonization and related matters—a figure which worked out at approximately \$44.00 per acre.

Armed with the report of the Committee, various organizations, such as the Lethbridge Chamber of Commerce, the South Alberta Water Conservation Council and other bodies dedicated to the expansion of irrigation in the Lethbridge area, had a powerful weapon to use, and did use on the Provincial and Federal Governments in an effort to bring about the formal agreement embracing the principles set out in the report, preparatory to the actual construction of the project.

There is a fact not generally known in connection with the drive to get immediate action by the Federal Government, but of which this writer has personal knowledge and which he feels should be recorded,

more for its significance in an individual sense, supplementing as it did, in no mean way, the organized efforts of the community at large. In this the writer has in mind the contribution which the late Senator, the Honorable W. A. Buchanan, Editor and Publisher of *The Lethbridge Herald*, made to the cause. Senator Buchanan fully understood the international aspects and took the case direct to the Prime Minister, the Right Honorable Mackenzie King. At that time Mr. King was the Minister of the Department of External Affairs and was, therefore, in a position to make a proper appraisal of the international implications. Senator Buchanan was at pains to stress these in his talks with the Prime Minister on the project. The outcome was that the Federal Government, after giving consideration to all the factors, duly authorized the construction of the project, so that upon completion of the "plans and specifications" contracts were let, and the construction of a rolled earthfill across the St. Mary River, near Spring Coulee, Alberta, was started in 1946. This dam, 202 feet high with a crest length of 2,536 feet, would create a reservoir with a total capacity of 320,000 acre-feet, or sufficient storage for the utilization of Canada's full share of St. Mary River water, as apportioned by order of the International Joint Commission. A formal agreement between the Federal and Provincial Governments was also consummated, providing for the construction of the additional works required for the full development of the St. Mary and Milk Rivers project, as set out in the recommendations of the Committee.

In conclusion, then, the St. Mary and Milk Rivers development can be best summarized by a quotation from the 1959-60 Annual Report of the PFRA: "When completed, the St. Mary Project is expected to contain nearly 500,000 acres of irrigated land, using all available water from the Belly and Waterton Rivers, along with Canada's share of the St. Mary River. The project lends itself to stage construction which is an important asset because it takes time for a dry region to adjust itself agriculturally and economically to the addition of large acreages of irrigated land. It is expected that another six or eight years will pass before the final stage of construction is completed. Up to the present time works have been completed to serve 304,000 acres of land, of which 120,000 acres were previously irrigated with a limited water supply."

Thus it came about, due in part to the need to preserve Canada's rights in the matter of international waters, and to provide additional water supplies for existing irrigation districts, and no less to bring extensive acreages of new lands under the ditch, that a new principle came into being whereby the respective fields of action by the Federal and Provincial Governments were clearly defined in a program of joint development.



## CHAPTER EIGHT: THE WILLIAM PEARCE PROPOSAL

### A TRUE GENIUS OF CONSERVATION

In order to set down the full story of events comprising this history, and to supply adequate background for the narrative which follows, it is necessary to go back a few years; and to accord due credit to that branch of the public service which brought to light for the first time some of the immense potential water resources latent in the eastern watershed of the Rocky Mountains. These waters were available for the rehabilitation of a large portion of the prairie region—particularly the portion with a history of low agricultural production and recurrent crop failure, due entirely to drought.

The thread of the story can be picked up at the point when the Irrigation Branch of the Department of the Interior was re-named the "Reclamation Service." This was on December 31, 1918.

"The change became necessary because of the increasing importance of the administrative work relating to drainage by virtue of agreements between the Dominion Governments of the Provinces of Alberta and Saskatchewan," the report of the federal branch dated 1918-19 makes clear. After citing the titles of the relevant legislation, the report adds: "This legislation marks the successful conclusion of negotiations carried on for several years between the Dominion Government and the Governments of the Provinces of Alberta and Saskatchewan for the reclamation of submerged or swamp lands by drainage, and paves the way for a progressive policy, *whereby large areas of now worthless land may be reclaimed and made productive.*"\*

Amongst the large projects previously proposed was what was known as the "William Pearce Stockwatering Project." Ideas are the roots of progress in every field of human endeavor. William Pearce acquired some of his most notable ideas from explorations which he made of watersheds on the eastern slopes of the Rocky Mountains. In his chosen field the late William Pearce had no equal. Born with a "good eye for country," he had the rare gift of being able to sense, in a unique way, the potential existent in a situation where natural conditions gave little or no indication of such potential. His proposal to divert water from the North Saskatchewan River for use on the high, dry prairies was a good example of his undoubted gifts in this particular regard.

It has been said that one of the marks of true genius is the quality of oddity, being eccentric, queer, or not as ordinary humans. William Pearce met all these requirements. One of his most outstanding characteristics was his zest for the great outdoors, where he could explore, at will, the potentialities of the water resources of a region. He much

---

\*Present writer's italics.

preferred to pursue his self-imposed mission in the solitary calm of wild uninhabited territory untrammelled by the hurry and bustle of distracting crowds in densely populated communities. In getting about on such missions, whether by train or horse conveyance, he always "travelled lightly." When stopovers had to be made, Pearce displayed a supreme disregard for the customary amenities of modern travel. The importunities of hotel porters and waiters he could not abide. He would "accept no special services and would give no tips." Characteristically, too, he could not "suffer fools lightly." For all of which he was regarded, by those without a proper appreciation of his other sterling qualities of mind and heart, as a "cranky" individual. Most of all he insisted upon precision—precision in word and deed.

Dr. W. H. Fairfield is this writer's authority for an anecdote illustrative of Pearce's penchant for precision. Dr. Fairfield had been connected with irrigation since its early beginnings in the Lethbridge area, and as Superintendent of the Lethbridge Experimental Farm had made many and valuable contributions to the science and practice of irrigation as carried on in that locality. The anecdote referred to an address which Dr. Fairfield had delivered to a Calgary audience on the subject of irrigation. William Pearce was present. In the course of Fairfield's remarks on the future possibilities of extending the area then under the ditch in Alberta, he made reference to the proposed North Saskatchewan River project, which he said comprised altogether 1,400,000 acres. At the close of the meeting Pearce buttonholed Dr. Fairfield and in a somewhat disturbed tone said, "I noticed that you gave 1,400,000 acres as the total area included in the project. I make it 1,457,000 acres," he asserted seriously. As if a few thousand acres—for it was only an estimate—made much difference one way or the other in a project of such immense proportions. The incident serves to show, however, that Pearce insisted upon precise statements, particularly when the statements had reference to a project which he solely had originated and the main particulars of which he had himself determined.

The unique ability which William Pearce had of being able to see the latent possibilities for water development in a particular area was sharply and concisely stated to the writer by an engineer who had known Pearce intimately, having been associated with him in some of his early explorations. "Pearce," he said, "had a good eye for country and the rare gift of foresight besides. He could size up the water resources of an area and formulate comprehensive long-range plans which would not only meet existing needs, from the water supplies available, but which would also take care of such additional needs as might arise in the foreseeable future. Reconnaissance engineers are born; they can't be made," he asserted. "God only made a few." Then he added tersely: "He surely made Billy Pearce!"

Apart from the general reconnaissance made by Pearce himself in the early years, nothing whatever was known of the possibilities of

developing the water resources of the area in the way he had outlined. Briefly stated, the proposed William Pearce Stockwatering Project was a gigantic scheme, whereby water would be diverted from the North Saskatchewan River, near Rocky Mountain House, into the Clearwater River, and from the Clearwater into the Red Deer River. From the Red Deer River the waters would be again diverted at a prescribed elevation, and thence conveyed by means of canals and natural water channels through a dry portion of east-central Alberta into west-central Saskatchewan as far east as the City of Saskatoon, thus serving something in the order of 1,400,000 acres for such purposes as stockwatering, irrigation and domestic supply.

Having fully satisfied himself as to the benefits which would accrue to the area, the Province, and the country generally, by the construction of the project, Pearce exercised his considerable persuasive powers on his long-time friend, the Honorable Sir James Lougheed, who later became Minister of the Interior, in an effort to induce the Federal Government to undertake detailed surveys and investigations, with the definite intent of locating diversion points on the rivers, prospective reservoir sites, canal routes, etc. In the end, his perseverance won out. Field parties were organized, equipped and sent into the area by the Department of the Interior to make such surveys and investigations as were necessary to determine the feasibility of the proposed project.

For reasons which will become more apparent later on, neither time nor events since have significantly changed the relative importance of the North Saskatchewan River scheme, nor the place which the scheme had, and still has, at this writing, in a comprehensive overall program looking to the full or ultimate development of the water resources of the whole region. It can be truthfully said that the immense possibilities of the proposed project, as envisaged by William Pearce, inspired those of us entrusted with the responsibility of initiating and recommending rehabilitation projects; and also influenced our thinking, at the time, in a way which brought about a decided change in that thinking. For these reasons, among others, it will be appropriate to give such particulars of the surveys and investigations, conducted by the Reclamation Service, as are necessary to convey a proper understanding of the physical and economic factors involved, and the diligence which was exercised, at that time, by the officers of that service to bring the project within the range of economic feasibility. More particularly, they will illustrate the direction which the latent possibilities, still extant, may give to future development, when the needs of the region become such as to warrant the large expenditure involved in such development.

The Annual Report of the Reclamation Service for 1919-20 contains the first particulars of the "Pearce" surveys, started at that time. "This project," it says, "has been repeatedly brought to the attention of the Department by Mr. William Pearce, of Calgary, who takes a very broad and advanced view of the proposed development. His conception

is of a great area, which, while not commonly so considered, is really in a dry belt where natural hay crops cannot be successfully raised, and where the natural surface water supply is insufficient to support that amount of livestock which properly should be kept on the farm lands. The lack of ability to keep the necessary amount of livestock is very properly conceived to create a serious difficulty in establishing agriculture on a permanent basis. Mr. Pearce's idea is to carry an artificial supply of water through the great area, which will be outlined hereunder, and distribute it primarily for the purpose of establishing the stock industry. This means not only the supply of water for drinking purposes but also a sufficient supply of irrigation water to create both summer pasture and enough hay to carry through the winter."

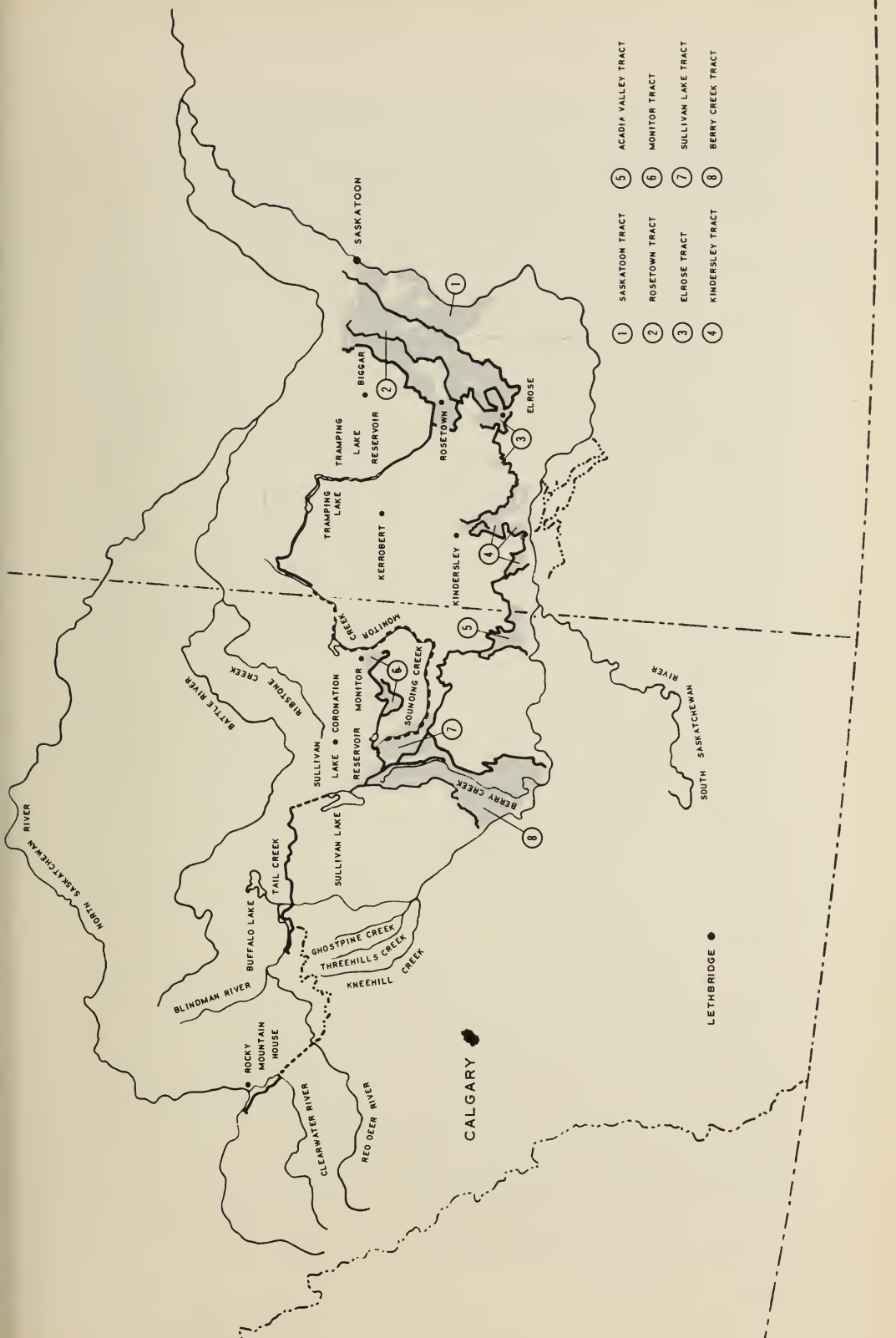
Then follows a description of the preliminary surveys which the engineers of the Reclamation Service had conducted of the proposed North Saskatchewan River project at that time. "During 1919 a general but hurried reconnaissance of the whole project was made by the Commissioner, and local instrumental reconnaissances were made by Mr. B. Russell and Mr. A. E. Welby. A very large amount of instrumental survey will be required before this great project can be definitely developed and reported on. At the present time it is only possible to outline the general boundaries of the area involved and to indicate our present opinions which will be subject to correction when more information is available."

Subject to this specified reservation, the report continues: "The proposal is to gain the main supply of water by tapping the North Saskatchewan and the Clearwater Rivers near Rocky Mountain House. Probably the Red Deer, the Blindman and the Battle Rivers could also be diverted and their waters utilized. . . . The water from the original sources of supply would be diverted into Buffalo Lake, which would be created the main reservoir with a possible maximum capacity of over 800,000 acre-feet. The water would be drawn off from Buffalo Lake at an elevation somewhat above 2,500 feet. Mr. Pearce's idea has been that all land below this elevation, to the east of the reservoir, and between the North Saskatchewan and the Red Deer and South Saskatchewan Rivers should be supplied with water from this scheme. As a result of the reconnaissance referred to above the present feeling is rather that the area for development should be restricted to the area lying to the south of the railway line running from Coronation to Kerrobert, from Kerrobert to Doddsland, from Doddsland to Biggar, and from Biggar to Saskatoon. Even with this restriction, an immense district is affected, comprising a rectangle with dimensions of roughly 130 by 180 miles. The nearest edge of this area is about 200 miles from the most distant original source of supply, the North Saskatchewan River in Township 39, Range 9, West of the 5th Meridian, and from this point it is about

---

Details of the William Pearce stockwatering and irrigation scheme are illustrated by the map on the opposite page.





- |   |                  |   |                     |
|---|------------------|---|---------------------|
| ① | SASKATOON TRACT  | ⑤ | ACADIA VALLEY TRACT |
| ② | ROSETOWN TRACT   | ⑥ | MONITOR TRACT       |
| ③ | ELROSE TRACT     | ⑦ | SULLIVAN LAKE TRACT |
| ④ | KINDERSLEY TRACT | ⑧ | BERRY CREEK TRACT   |

350 miles as the crow flies to the lower end of the proposed area near Saskatoon."

Dealing with the general lay of the land and its suitability for irrigation, the report goes on to state that it would be "impossible to make any complete statements based on the comparatively small amount of reconnaissance work done. The general impression of the district is that main canal location may prove difficult because most of the drainage lines run at right angles to the general direction of the main supply canals. There are certain areas, particularly in the Berry Creek district, and again between Rosetown and Saskatoon that appear to lie very nicely for irrigation. Again there appear to be other large areas which while smooth and otherwise suitable have no natural drainage. In general the areas which appear to be smooth enough and generally suitable for irrigation are separated by long stretches of country too rough for irrigation." Thus, having taken into account the topographical and other difficulties which were foreseen in bringing water from the sources before outlined to the irrigable lands in the "great area," the report sets out a plan of development which it was thought, at the time, would be the most advantageous and practical in the particular circumstances. The principle of this plan, it should be said, has not been seriously questioned wherever the economy is primarily based on livestock, and where available water supplies and other conditions are favorable to the form of development suggested in the report.

"Tentative schedules, which have been prepared," the report concludes, "indicate that the gross acreage in the districts which appear to be suitable for irrigation is 2,900,000 acres. Assuming that forty per cent of this could actually be irrigated the net irrigable area would be 1,160,000 acres. There is no doubt that one hundred per cent irrigation is required for the Berry Creek district, and probably also for the area northeast of Youngstown. Speaking generally of the whole area, the opinion is held that something along the line of the so-called forty-acre tract proposition (or twenty-five per cent irrigation) for the purpose of growing hay, providing water for summer pasture and water for drinking purposes, would be desirable."

The Annual Report of the Reclamation Service for 1921-22 deals with the further progress of the surveys and investigations of the "North Saskatchewan Project," provision for which was made "in the estimates for the year 1921." Four large field parties were employed in the work, "under the general supervision of Mr. B. Russell, A.M.E.I.C., as Chief Field Inspector." These parties made surveys of the main canals from the North Saskatchewan, Clearwater and Red Deer Rivers to the proposed Buffalo Lake reservoir. "These surveys showed that it is quite feasible to make these diversions and that there are several possible routes from the Red Deer River." Reference is made to storage reservoirs as follows: "Two alternative schemes have been studied to some extent, one anticipating the use of Buffalo Lake as a storage reservoir and the other

Sullivan Lake. Sullivan Lake is a more economical reservoir site than Buffalo Lake as a larger area of land can be commanded from it; and the proposed Sullivan Lake route to the irrigable land is more direct than the Buffalo Lake route. There are a number of other advantages which the Sullivan Lake route has over the Buffalo Lake route, and it is proposed to thoroughly investigate it during the next field season."

The Annual Report for 1922-23 states that "preliminary surveys were continued, the following parties being employed: one 13-man location party; one 12-man location party; two 13-man levelling parties; and one 4-man reconnaissance party." The levelling parties were employed to complete further topographical surveys of the irrigable tracts "by running levels throughout townships in 2-mile squares. In addition to running these levels the parties also made a large number of soil tests and gained information regarding rainfall, crop yield, and other data pertaining to the irrigable areas." Thus it will be seen that the information sought was not confined to engineering only; some agricultural investigations were also conducted in an effort to show, in a general way at least, soil suitability and such need as might exist for irrigation in the various tracts. "Preliminary surveys were also made of the main distributary from Sullivan Lake, the supply canal to the proposed Tramping Lake reservoir and the main distributary from the reservoir." All of these facilities provided for the delivery of water to an immense system, including Sullivan Lake, Monitor, Berry Creek and Acadia Valley tracts in Alberta, and the Kindersley, Elrose, Rosetown and Saskatoon tracts in Saskatchewan. Important, too, were the surveys conducted during the same working season, of prospective reservoir sites on the head waters of the North Saskatchewan, Clearwater and Red Deer Rivers; some of which had been previously located by A. B. Cook. Mr. Cook is singled out for mention, in this instance, because he was recognized as one of the best reconnaissance engineers with the Reclamation Service at that time. Altogether, some ten head water reservoirs were proven, with a storage capacity ranging from 21,000 acre-feet in the case of Site No. 1 on the Red Deer River, to 309,000 acre-feet capacity in the case of the "Gap" reservoir on the North Saskatchewan River; making a total of approximately 1,000,000 acre-feet of head water storage. This storage, combined with the Sullivan Lake and the Tramping Lake reservoirs, made a total of some 3,000,000 acre-feet. If Buffalo Lake—also a potential site—with a capacity of 500,000 acre-feet was also included, the total storage would be approximately 3,500,000 acre-feet.

The irrigable areas "in the various tracts as a result of the season's surveys," were as follows: Sullivan Lake tract, Berry Creek tract, Monitor tracts, Acadia Valley tract, Kindersley tracts, Elrose tracts, Rosetown tract, Saskatoon tract. Together these made a grand total of 1,410,980 acres.

In addition to the tracts as above outlined, the report states that

"some investigations have been made to include lands to the south of the South Saskatchewan River adjoining the Empress branch of the Canadian Pacific Railway, and also lands to the west of the Red Deer River along Kneehill, Threehills and Ghostpine Creeks." These investigations, however, were only in the nature of a general reconnaissance and therefore not sufficiently complete for final determinations. The results of the investigations and studies, as given in the report, are too detailed to be outlined here. But as the outcome hinged upon the estimated cost of the project it might be well to quote from the paragraph dealing with the "Preparation of Cost Estimates," beginning as follows: "No attempt has been made to obtain any close cost estimates, but those following are an approximation of the total cost of the project. The whole lateral distributary and main canal system have been projected upon topographic maps, scale 1 inch to 5,000 feet, and approximate estimates made from these. The whole of the irrigable area has been divided into a number of tracts, and these tracts subdivided into zones of from 10,000 to 40,000 acres each. By comparison with the estimated cost of a number of other projects of approximately the same areas as these zones, unit costs per acre have been derived, and the lateral system estimated on this basis. The larger distributary canals have all been designed and approximate estimates including excavation, right of way, fencing, telephone system, bridges and other structures prepared. Main canals have all been designed and projected, and complete estimates prepared. Designs have been prepared for the larger structures, and cost estimates based on these. Approximate cost estimates for smaller structures have been made from comparison with similar structures estimated for other projects."

The report stressed the fact that the conclusions reached were based on preliminary investigations only. The idea in preparing the approximate estimates submitted was to determine whether or not the project was a feasible one, and it is believed that the estimates submitted were sufficiently close for that purpose.

The conclusions reached from the surveys and investigations were as follows: "From the following estimates it will be seen that it is not feasible at present to irrigate the whole 1,410,980 acres, the estimated cost being \$74.84 per irrigable acre. The estimated cost to irrigate 427,360 is \$55.00 per acre, which is also high." Despite what was considered at that time prohibitive costs, the William Pearce scheme was not doomed altogether to the limbo of lost causes. The report closed on a more optimistic note. "By revising the main canal from the Red Deer River to take out at the mouth of the Raven River and including those irrigable lands along Kneehill, Threehills, and Ghostpine Creeks, it is probable that a feasible scheme could be developed," it said. In explanation of this proposal the report stated that an estimated total of 142,640 acres in the "commanded area," in addition to the Sullivan Lake tracts, "would probably bring the total up to something like



570,000 acres." The estimated cost of this project would be \$27,667,146, equivalent to \$48.50 per acre.

The results of the extensive surveys and investigations conducted by the Reclamation Service, as before outlined, can be best summarized by a quotation from a memorandum which the writer received from Mr. Ben Russell, in response to a request for special information rarely, if ever, found in dry government reports, however well written. Mr. Russell, as before noted, had been directly and prominently connected with the work in his capacity as Chief Field Inspector and, therefore, had first-hand knowledge of the situation in all its ramifications. Dealing specifically with the high estimate of \$74.84 per irrigable acre, the memorandum states: "This to us in those days, was absurd. We therefore folded up our maps, reports, papers and note books, etc., and forgot about it. I would like to emphasize, however, that it was the cost which killed the project and that there were many favourable features and possibilities which we did not have time or money to develop, such as Sullivan Lake, Buffalo Lake and Tramping Lake where large storage capacities could be cheaply built, and Sounding Creek which afforded a ready-made supply canal from Sullivan Lake almost to the Alberta-Saskatchewan border. While it was a long, long way from the North Saskatchewan River above Rocky Mountain House, where water would first be diverted, to Saskatoon, this water would be carried for many miles through natural channels controlled by earth dams and spillways rather than artificial canals and expensive and dangerous drop structures."

The main particulars of the proposed project have been dealt with at considerable length to show, first the immense scope of the scheme, and second the valuable information which was made available as a result of the investigations.

## THE PEARCE SCHEME IN LATER YEARS

The William Pearce Stockwatering Project thus went into eclipse, but the vision survived. As ever, the greatest contributing factor to that survival was the low rainfall and recurring droughts which struck the region. Particularly, the devastating drought of the thirties aroused interest in the scheme as never before. As in the case of the St. Mary-Milk Rivers development, farmers and businessmen joined forces in a determined drive to induce the Federal Government, through its agency, the Prairie Farm Rehabilitation Administration, to undertake the construction of the Pearce project. To this end, petitions were signed, but most of all, to get their case properly before the Government, the Federal Minister of Agriculture, the Right Honorable J. G. Gardiner, was invited to attend, and did attend, a public meeting in Hanna, Alberta, to hear representations direct from various groups and individuals interested in promoting the scheme. As Director of the PFRA

this writer was also invited to attend the meeting. Actually, the meeting was only a stimulus to a course of action by the PFRA which had been previously planned and decided upon, namely, a further investigation of the proposed North Saskatchewan River project, in the hope that some modification of the scheme might be developed that would bring the project within the range of economic feasibility. To this end, PFRA engineers were sent into the area previously investigated by engineers of the Reclamation Service.

The first PFRA surveys were conducted by F. Evans and E. K. Phillips. Later, S. H. Hawkins was placed in charge of the field work. Certain specified investigations, the outcome of which would have an important bearing on some variations of the general plan, were assigned to A. B. Cook. Mr. Cook, as before stated, had conducted reconnaissance surveys in the area for the Reclamation Service and, therefore, in addition to his other qualifications, he had special knowledge of the terrain when certain field controls were the dominant factor. The intention was that a thorough and complete investigation would be made of existing possibilities, to the end that a feasible project could be developed, which would meet the situation as it then existed and which would also provide for needs likely to arise in the foreseeable future. The conclusions reached from the intensive and systematic surveys and investigations are contained in a report dated April 30, 1947, by S. H. Hawkins. This report, complete with maps, profiles, tabulations and other relevant data, can be summarized in brief outline, without getting into the details of alternative proposals and counter proposals, which, however, are discussed in the report, as variations of the general scheme; each depending upon physical, economic and other considerations as to the order of preference in each case. Based on these considerations, a project which came to be known as the "Red Deer River-Buffalo Lake Project" was finally adopted as the most feasible alternative from an economic and engineering standpoint.

Briefly stated, the proposed plan of development called for "a rolled earthfill dam 175 feet high across the Red Deer at a point parallel to and 500 feet upstream of the G.T. Railway bridge 3 miles north of Ardley, on the Calgary-Tofield Branch of the C.N.R." This dam would create a river reservoir with a live storage capacity of about 300,000 acre-feet. The dam would be designed to furnish hydro-electric power for pumping and other purposes. At a later stage additional power, or a greater water supply for irrigation and other purposes, could be obtained by diverting water from the Clearwater River. The report states, in this connection: "It also appears that at least 20,000,000 K.W.H. of winter power may be produced and that this, depending on the magnitude of a diversion from the Clearwater River, and on possible storage west of Red Deer Town, might be greatly increased. It is not unreasonable to suppose that a block of winter power could be traded for summer power with which to pump irrigation water, or could be sold, and the proceeds

applied to operation and maintenance of the irrigation system." Indeed, this trading arrangement had been first proposed by E. K. Phillips whereby it was "proposed to develop winter power on the Red Deer River and to trade such winter power against summer power from the existing Bow River plants. This summer power to be used for pumping Red Deer River water to a canal which then would flow by gravity to Sullivan Lake." The plan, as revised, did not include Sullivan Lake. Instead, a diversion canal would convey water from the river reservoir, on a location a short distance south of Buffalo Lake. The report stated: "Tail Creek will be crossed with two wood stave pipes of 13' diameter, carried in the lower part of the valley on a rolled earthfill with top at elevation 2580. An opening will be provided through this fill, with gates, sill elevation being 2560. Provision will be made to deliver water from the canal into Buffalo Lake via Tail Creek so that the Lake may be maintained at any desired elevation, or possibly at some future time used as a power reservoir." After crossing Tail Creek the canal would traverse "very broken country" for a distance of approximately 100 miles east and south to a point some six miles west of Coronation on the Canadian Pacific Railway. From there it would be taken to both Hamilton Lake and Craig Lake Reservoirs, two primary irrigation reservoirs which would have "about 250,000 acre-feet capacity." These reservoirs, the report states, would be "large enough to furnish a steady flow to secondary reservoirs in Acadia Valley and on Berry Creek and to at the same time supply immediately adjacent lands directly."

Sullivan Lake reservoir would be eliminated under the plan for the reason that "Sullivan Lake is more than 100' higher than the great bulk of the irrigable areas."

Dealing specifically with the physical difficulties connected with the larger scheme, the report states as follows: "During 1946 it was established by the writer, with the aid of field parties, that the difficulties in the way of taking Red Deer water into Saskatchewan by means of a diversion are very great. A report was made on the proposed Tramping Lake route in August and later the possibility of getting a canal into Saskatchewan at any point south from Macklin to Empress was investigated. The conclusion is that this can be done only at one place with any expectation of accomplishing much. This point is the Cabri Lake summit used by Mr. Strome in 1922, which requires a very long and costly syphon and extremely flat grades which can be used only for very large canals, designed to serve immense acreages. It does not appear that any large area will be commanded west of Elrose, as the Kindersley tract is extremely flat, has no drainage, and consists mainly of heavy lacustrine type clay, unsuitable for irrigation. It is now proposed to confine the project entirely to Alberta with the principal tracts centered on Youngstown and Cessford, the estimated total being about 450,000 acres for this highly concentrated area. An additional isolated tract of about 50,000 acres lies in the Acadia Valley under Benton reservoir,



bringing the potential total for the project to 500,000 irrigated acres."

Commenting upon this additional irrigable acreage, the report states significantly, as follows: "The Acadia Valley produces consistently more crop than the Youngstown-Cessford areas, due to the heavy clay texture of the considerable portion of the valley lands, and it is perhaps questionable that a majority of the Acadia Valley farmers will favour the formation of an irrigation district. There could also be some difficulties in applying irrigation water successfully to the heavier lands in the valley bottom although slopes and drainage conditions are excellent."

In order to ensure against wasting public funds on capital works required to put water on lands in what were designated as "Large Projects," it was established PFRA procedure to make soil surveys in conjunction with the engineering investigations. These soil surveys were usually carried out by the Soils Department of the appropriate provincial university. In the case of the Red Deer project the preliminary soil surveys were made by Messrs. W. L. Jacobson and C. M. Moore, each of whom had practical and working knowledge of soil problems connected with the artificial application of water for crop production. The findings are contained in a report entitled "Estimate of Irrigable Areas under Red Deer Diversion Project, December 11, 1944—W. L. Jacobson." Later, W. E. Bowser Sr., Soils Specialist, Alberta Soils Surveys, was employed to make a detailed soil survey of the area. The findings are contained in a report complete with "soil survey maps and reports, January 1947—W. E. Bowser."

The writer, as Director of PFRA, secured the services of A. E. Palmer, Superintendent, Experimental Station, Lethbridge, to examine and report upon the general suitability of the lands which were included in the irrigable tracts. Mr. Palmer, a recognized authority on such matters, submitted his findings, which are contained in a "Report on Irrigable Areas—A. E. Palmer (January, 1947)." It is, therefore, correct to say that the various soil surveys were of sufficient scope and detail to meet all requirements at that time.

The essence of these findings is contained in the following significant report: "Only a small fraction of the total area consists of really first-class irrigable land. By far the greater portion is of a quality which is described by Mr. Palmer as 'Fairly Good to Good' and 'Fairly Good' and by Mr. Jacobson as Class 2 and Class 3. On the other hand, large areas of fairly smooth land which might at first sight be considered irrigable have been estimated as being too flat and low, presenting the probability of future alkali and drainage trouble. Most of the land now considered to be irrigable, although in many cases relatively rough and uneven, has ample but not excessive slopes and will not present major drainage problems."

The report then makes passing reference to expansion of the area which could be brought under the ditch. "Before proceeding to the cost estimates," the report states, "it should be pointed out that in



addition to the irrigation of the areas indicated on the map herewith, an area of about three townships is commanded by the main canal eastward from the Village of Red Willow in Townships 39 and 40, Ranges 17 and 18, West 4th Meridian.” In addition to the restricted tracts suitable for irrigation, the possibility of providing stockwatering facilities to a vast area is pointed out in the report. Something which had been long and consistently advocated by William Pearce, worth quoting in this regard is the following: “Also water may be supplied to several streams which normally are dry excepting in the early spring. These are Ribstone, Monitor and Sounding Creeks and the several branches of Berry Creek and finally at the extreme east limit of the project, Kennedy Coulee. Surrounding the entire project in all directions are vast areas of semi-dry grass lands which, in close proximity to an irrigated area, could safely support large numbers of cattle and sheep and thereby create a livestock industry now almost entirely non-existent.”

This writer is not aware of any economist, living or dead, who ever made a complete appraisal of the potential value which the immense areas of grazing lands, much of which are on a par with the best in the world, present to the economy as a whole; nor the worth, in terms of dollars and cents, which such native grass lands possess for the individual farmer so situated that he can take full advantage of such lands. Certainly the potential is present, wherever there are grass lands and available water supplies, but we must have the will and the wisdom to develop that potential in a manner best calculated to reap the maximum benefits of the rich heritage which mother nature has bestowed. It may well be that in the past too much attention has been given to using available water supplies on concentrated acreages for the production of field crops, and not enough attention given to the distribution of these water supplies for the rehabilitation of the native grass lands, for the purpose of achieving a more balanced agriculture, on a livestock basis.

Whichever purposes would be served, the estimated costs of the project were detailed in the Hawkins report. A summary of the main works and the estimated costs of the same are tabulated in the report as follows:

1. Clearwater Diversion .....	\$ 500,000
2. Red Deer River Dam and Reservoir .....	6,305,500
3. Main Canal to Craig Lake and Hamilton Lake .....	4,854,950
4. Reservoirs and connecting canals .....	3,151,375
	<hr/>
Grand Total	\$14,811,825
Estimated cost per acre for 500,000 acres	\$29.60
Estimated cost per acre for 400,000 acres	\$37.00

Certain assumptions are made as to various works which should, or should not, be charged to the “lateral systems,” but as these assumptions were admittedly no better than an engineer’s “guess” there is no point in giving such particulars here.

As in the case of the St. Mary-Milk Rivers development, the Red Deer River-Buffalo Lake project also lends itself to stage development. In the initial stage the diversion of water would be confined to the Red Deer River. Discussing diversion of water from the Clearwater River, the report states as follows: "It does not appear that this diversion would be required for many years. . . . The Red Deer River alone is capable of irrigating at least 200,000 net acres, and at the same time producing about 30,000,000 K.W.H. of power of which two-thirds is winter power."

Thus it will be seen the immense scheme originally envisaged by William Pearce was greatly reduced and the tracts under the ditch "highly concentrated" in an effort to meet physical conditions, and no less to comply with economic considerations. Some of the findings and conclusions are summarized in the concluding paragraphs of the report by its author as follows: "One feels that this great fertile but dry territory of about 4,000,000 acres, south from Coronation to the Red Deer River and east from Hanna to the Provincial boundary, now almost unoccupied, will some day, through irrigation, support a large and thriving economy. The water supply is ample; the climate and soil suitable. However, the entire topography is on the whole unfavorable and the initial expenditure required to bring the water to the land is very great.

"This is a very large project; big enough to affect not merely the economy of Alberta but of all Canada and deserves, I believe, the greatest attention by both the Provincial and the Dominion Governments.

"No attempt has been made in this report to estimate the cost of penstocks, turbines, generators, etc., for power development, or of the capacities and costs of pumps and motors. It is hardly possible to do this work until a more definite appraisal of both pumping and power requirements has been made, and these figures cannot be accurately stated until at least some of the irrigable areas have been tabled."

More detailed soil surveys conducted later on revealed, as before indicated, types of soil common to some of the irrigable tracts as unsuitable for irrigation, thus further restricting the irrigable area of the project.

As our PFRA office was in constant touch with field operations, we were not obliged to wait for the completion of the investigations to know that the feasibility of bringing water from the North Saskatchewan River, or alternately from the Red Deer River, for the irrigation of any large area in the Province of Saskatchewan was very questionable, to say the least. Even if, as did not seem probable owing to topographical difficulties, such difficulties could be overcome, a practical difficulty would remain, namely, the administration of a complicated system involving lands in two provinces, each with its own water laws and regulations.

Obviously, the administration of a combined project would have

to be based upon a formal agreement between the two provinces in order to ensure smooth and harmonious operation of the system. To secure such an agreement, involving, as it would, contentious questions such as an equitable apportionment of available water supplies and the like, might—doubtless would—lead to interminable discussion and prolonged negotiations entailing vexatious delays, if it did not wholly circumvent the construction of a combined project. All of which could be clearly foreseen but which could not be provided for in advance.

## CHAPTER NINE : THE SOUTH SASKATCHEWAN PROJECT IS REVIVED STUDIES OF THE RIVER FOUNDATIONS

Early in the PFRA investigations of the North Saskatchewan or "Pearce" scheme, it was realized that, notwithstanding its immense scope and great potential, it could not meet in the most satisfactory manner the agricultural, industrial and domestic needs of the Province of Saskatchewan. Furthermore, due account had to be taken of the fact that Saskatchewan had suffered much greater and more widespread hardship, during the drought cycle of the thirties, than either of its neighboring provinces.

While not considered as a matter of prime importance it was a fact, too, that the South Saskatchewan River scheme of former days had precedence over the North Saskatchewan River scheme, in that it had been under investigation by the Federal Government many years before the William Pearce scheme became prominent. Moreover, we were conscious of the further fact that the consideration most responsible for shelving the South Saskatchewan scheme back in 1921 was now no longer a determining factor, since, by the policy carried out under the Prairie Farm Rehabilitation Act, the capital costs of large projects were to be borne by the Federal Government, as in the case of the St. Mary-Milk Rivers development. For these reasons, some of us charged with the responsibility of initiating and recommending rehabilitation projects began giving consideration to a revival of the South Saskatchewan River scheme.

Unfortunately for our hopes in this regard, there was at least one formidable obstacle which would have to be overcome before such a large project could be submitted to the Federal Government for approval. It had been known since the time of Captain Palliser and Henry Yule Hind that water could be diverted from the South Saskatchewan River at the Elbow into the Qu'Appelle River. Later investigations had also determined that water could also be diverted at a point farther up the river into Thunder Creek. These diversions, it will be recalled, could be made by pumping direct from the river, or by the construction of a dam across the river at these locations, or by a combination of the two methods. What had not been determined was a precise site where a high dam could be constructed in the river without danger of its being washed out as a result of unstable foundation conditions.

A trivial incident, more often than not, has been known to change the course of history. This writer can speak of an incident, or more correctly, of a meeting which took place between himself and Mr. Ben Russell, who at that time was Senior Consulting Engineer on the staff of the Prairie Farm Rehabilitation Administration, the outcome of which meeting had an important bearing on the PFRA program from then on.



One morning in the spring of 1943, Mr. Russell stepped into my office and asked if I had time to discuss a matter to which he had been "giving a great deal of thought." "No time like the present," I replied promptly. Mr. Russell then unfolded and smoothed out a crumpled Sectional Sheet on a side table. "Will you look at this?" he asked, as he began tracing with his pencil on the map an eighteen- or twenty-mile stretch of the South Saskatchewan River, north of Swift Current and upstream from Saskatchewan Landing, to a point in Township 21, Range 18, West of 3rd Meridian, immediately south of the White Bear Lake Depression. "What difference do you see in that section of the river compared with the stretches farther up and down stream?" he asked, as he looked up and regarded me intently.

After studying the map closely for a minute or two, I replied, hesitatingly, "It looks narrower for one thing." "Exactly!" he exclaimed. "The current also flows more swiftly in that section." Then he asked, pointedly: "What would you say these two things indicate?" Turning the matter over in my mind, as I looked more closely at the map, I replied: "I would say that the river is narrower because there has been less bank erosion, which condition would indicate a more solid bank formation. The swifter current also indicates a solid river bottom condition," I ventured. "That is exactly the conclusion which I have reached," Mr. Russell declared emphatically. "If these assumptions are correct," he continued, "and if river bottom conditions are such that a dam 120 or 140 feet high can be constructed at some point in this narrow section of the river, water can be diverted from the river into the White Bear Lake Depression to create an immense reservoir, with a storage capacity of approximately 1,000,000 acre-feet, depending upon the height of the dam."

Answering a question regarding the flooded area, Mr. Russell explained that the reservoir would branch out in two arms, one of which would extend upstream almost to the Alberta-Saskatchewan boundary, while the other arm would extend in a north-easterly direction to another, or second dam near Elrose, from which irrigation water would be released to command something in the order of 700,000 acres in the Elrose, Rosetown and Saskatoon areas.

Mr. Russell pointed out, too, that everything else being equal, the cost of constructing a dam in the narrow section of the river would be much lower than it would be if constructed in a wide section of the river valley. Hydro-electric power could be generated at both dams, thereby creating a multi-purpose project.

It was, indeed, an exceedingly intriguing project posing a challenge alike to individual initiative and engineering skills.

Tapping the map with his pencil for greater emphasis, Mr. Russell declared positively: "Everything depends upon foundation conditions in that particular section of the river, and that can only be determined by exploratory test drilling." After pausing for the writer to get the full

significance of his words, Mr. Russell then asked, "Do you suppose we could get authorization for some test drilling in that section of the river?" "We can certainly try," I replied enthusiastically.

After giving the matter further thought, I went on to say that to secure the desired authority it would be necessary to prepare a memorandum setting out, at length, the great agricultural and industrial potential of the project and stressing the benefits which would accrue to west-central Saskatchewan and to the province as a whole from the development of the scheme. "In this case," I said, "time is not the most important factor. All our hopes could be shattered if the memorandum failed to make the most impressive case that can be made in the circumstances." I suggested that a large-scale map, showing in colors the main features of the scheme, should be made. I assured Mr. Russell that he could have all the time that he needed for the preparation of the submission. The writer gave him the further assurance that just as soon as the work was completed the memorandum, together with the supporting data, would be sent to Dr. G. H. Barton, Deputy Minister of Agriculture at Ottawa; and, as Director, I would write a covering letter strongly recommending the test drilling in the river. After expressing approval of the procedure outlined, Mr. Russell said that he had prepared a memorandum based on studies which he had made from aerial photographs and such other information as he had been able to obtain. Unfortunately, the information available was very limited, at best, he said. Mr. Russell further asserted that a geological report on surface conditions in that section of the river valley, if favorable, would greatly strengthen the case for exploratory test drilling in an effort to determine a suitable site for a high dam in the river. We were reasonably sure that we could obtain the desired information from Dr. John A. Allan, Consulting Geologist, University of Alberta. Dr. Allan was a recognized authority on the geology of the region. Then too, besides being an eminent geologist, Dr. Allan was also a Professional Engineer—combined qualifications which led to his appointment in a consulting capacity on the St. Mary dam.

As one engineer to another, Mr. Russell wrote a letter to Dr. Allan dated April 28, 1943, with which he enclosed his preliminary study regarding the possibility of diverting water from the South Saskatchewan River by means of a high dam at some point in the river between Saskatchewan Landing and the Cabri Antelope Creek section, as before outlined.

Dr. Allan became interested at once, and wrote back to Mr. Russell in a letter dated May 4, 1943. With it was enclosed a sketch of the river east of Empress, which he had compiled showing "the position of the 2000-foot contour." Dr. Allan stated in his letter that he had "made a geological survey of the South Saskatchewan Valley to Saskatoon in 1917," at which time he had "traversed the river by boat," and it so happened that he had "camped for a couple of days in Section 14,

Township 21, Range 18." He also stated that he had "quite a vivid recollection of the vicinity of Antelope Creek."

In his letter, Dr. Allan discussed some features of the topography, as follows: "The valley is considerably restricted from the top of Township 20 to Saskatchewan Landing, but I am not sure where the narrowest or the most suitable location is for a dam. My recollection is that more suitable rock conditions might be found below Antelope Creek rather than immediately above. The river in this part is cut through the Bearpaw shales and into the Belly River sandstones and shales. There are many exposures of rock along the sides of the valley in Township 20, Range 17." After giving further particulars of the formations in the section specified, Dr. Allan made the following significant statement: "I would not expect bedrock to be very far below stream level and, in fact, there should be no difficulty in finding some location in ranges 17 or 16 where satisfactory bedrock could be encountered at a reasonable depth. I know there is part of this river between Townships 21 and Saskatchewan Landing where the current is swifter, which might indicate a rock floor." After drawing attention to some features shown on the sketch, Dr. Allan concluded his letter with the following encouraging statement: "The project as you have outlined it seems most interesting and I do not know of any geological factors that would prevent considering it further. Of course it would be necessary to make a preliminary field investigation before any more definite statements could be made or the most suitable location selected. However, I do know as stated above, that the bedrock is exposed at many points along the sides of this valley and should occur at a reasonable depth below the water line at some point. If you should plan on considering this project further, I would be very glad to help out in any way I can."

So far, so good. We felt that at least we were on the right track. Anything which makes a deep impression on the human mind is apt to linger in one's memory, with surprising clearness, for a long time. This writer has a vivid recollection of a series of incidents, worth relating, in that they marked a succession of steps in a course of action for which there were no ground rules whatever.

As soon as Mr. Russell had completed the submission, which consisted of a memorandum with supporting data, including a map, he brought the material to this writer for final checking and approval.

A cursory examination of the papers was sufficient to assure me that, from the information available to him, Mr. Russell had taken great pains to put the case in the most favorable and impressive manner possible; to which end he had even made a draft of the covering letter which this writer had said he would send to Dr. Barton, recommending the exploratory test drilling in the river.

After a careful scrutiny of the documents comprising the submission, I said abruptly that I had decided that I would not send the submission to Dr. Barton after all. Mr. Russell regarded me with complete



surprise and disappointment. Then, in a play on words, I hastened to add, "No, I will not *send* the submission, I will *take* it to Ottawa instead, so that I can discuss the merits of the project with Dr. Barton in person."

Mr. Russell's look of disappointment vanished instantly. No words were needed to express his approval—his eyes did that much for him. In support of such action, I continued: "It is too easy to say 'No' to a request contained in a letter, however well it may be presented. This project is of such importance to the agricultural and industrial economy of this country that it would be very unwise to rely solely on the written word. The project should, therefore, be first discussed across the Deputy Minister's desk. We want to be absolutely sure that its import is fully understood by the Officer who is responsible for advising the Minister in such matters," I asserted emphatically.

Be it said at this juncture, for the accuracy of this record, that it was not altogether an accident of circumstances which made an immediate trip to Ottawa on deferred PFRA matters seem imperative. The meeting which was ostensibly called for discussing these matters took place in Dr. Barton's office. At the close of the meeting, after the staff officers present had gathered up their papers and left the room, I asked Dr. Barton when it would be convenient for him to give me about half an hour of his time for the purpose of discussing a project which in the opinion of PFRA engineers and others, qualified to express an opinion, appeared to have immense rehabilitation possibilities. Glancing at his wrist-watch, he replied promptly, "Now would be as good a time as any."

After we had moved some papers which cluttered up the top of his desk, the writer spread out the map, which PFRA engineers had made, showing the approximate location of the proposed dam and other principal features of the project. Getting at once to the heart of the scheme, the writer outlined the great agricultural and industrial possibilities of the project, the key structure of which was a high dam at some point in a section of the river, indicated on the map. "Is the proposed project an alternative to the North Saskatchewan River scheme?" he asked, interestedly. I replied that the two schemes were separate, but complementary, in that both would have to be undertaken if an overall development of the land and water resources of the region was to be achieved. "The project appears to have an immense potential," he said as he studied the map meditatively. It was the crucial moment! "Everything depends upon foundation conditions in that section of the river," I said, pointing my pencil to the section as shown on the map. Then I added, emphatically, "and that can only be determined by exploratory test drilling." "What you want to find out is the depth to bedrock at that particular location in the river valley," he remarked understandingly. "Precisely," I said, "but even so, it will necessitate considerable drilling at different points to determine the best site." I went on to explain that



where the safety factor was the greatest, everything else being equal, the costs of constructing a dam would be the lowest; so that every dollar spent on preliminary drilling tests would be saved many times over in the construction costs.

Cautiously avoiding any statement which might be construed as a commitment, Dr. Barton asked pointedly, "Have you discussed this matter with the Minister?" I replied that I had *not* discussed the matter with the Minister, for the reason that it would be presumptuous of me to do so before first taking up the matter with himself, as Deputy Minister. "It would be all right in this case," he said, then he was good enough to add that as the writer understood the project much better than he did, he felt that I should discuss the matter with the Minister first. "This is a case where the Minister should get the particulars of the project first hand," he said with a gesture of finality.

## A FATEFUL MEETING WITH THE MINISTER

The writer accepted the assignment with mixed feelings of satisfaction and also some misgiving due, in part, to the fact that Mr. Gardiner could hold very strong and unpredictable views on speculative ventures, regardless of the objectives sought or their source of origin. Then too, I was not unmindful of the fact that the Government was, at the time, spending tremendous sums on war measures, in a life and death struggle to preserve the democratic way of life. At first blush, it seemed like an impossible task. There were, however, some saving features, one of which was the close personal friendship which had existed between Mr. Gardiner and the writer since the days when we were associated as Members of the Saskatchewan Legislature. While I had no wish to trade on that friendship, I felt instinctively that such friendship would stand me in good stead in an effort to win Mr. Gardiner's support for the project; and I knew that without the support of the Minister in charge of PFRA activities, the project would be doomed from the start. I felt, too, that the best method would be to approach the matter diplomatically rather than to risk the possibility of outright rejection which might result from a strictly formal presentation. Such a rejection would effectively shut the door to further negotiations. Luckily in this regard, the writer had been invited by Mr. Gardiner to have dinner with him that evening in the Parliamentary Dining Room. I reasoned that the social surroundings of such an elegant and luxurious setting would afford a much better atmosphere for my purpose than the Minister's office, with its cold air of formality. Ministers of the Crown, when enthroned in their seats of authority, are prone to brace themselves in protective mental armor against those who seek aid in obtaining personal favors or who champion causes, as the case may be. Luck was also holding out in another way; we had a table all to ourselves. To make the most of the precious time, after we had placed our orders, and to arouse the

Minister's interest at once, I turned the double-page menu face down on the table, and began to draw, on its blank back, a rough sketch of the South Saskatchewan River from the Elbow west to the Saskatchewan-Alberta boundary. I also sketched in the White Bear Lake Depression area. I then gave the Minister a brief history of the investigations, starting with Captain Palliser in 1857. With the aid of the sketch I was able to show the locations where later surveys made by the engineers of the Department of the Interior determined the feasibility of diverting water from the South Saskatchewan River, by pumping direct from the river or by means of a high dam in the river at these locations or by a combination of these methods. I indicated the location on the map where exploratory test drilling had revealed very unstable foundation conditions; so much so, that the feasibility of constructing a dam in the river at these locations would be a very hazardous venture.

I then drew the Minister's attention to the narrow section some 90 river miles upstream from the Elbow, and went on to explain that PFRA engineers and an eminent geologist were strongly of the opinion that from surface indications there was a more solid river-bank condition in that narrow stretch than had been found in the Elbow section of the river. Consequently, it was reasonable to believe that the bottom of the river, in the narrow section, would also be solid. I explained that if such was the case and if a high dam could be constructed at some point across the river valley in that particular location, water could be diverted from the river to create an immense reservoir which would make water available for irrigation on a large scale, all this in a part of the province which had been plagued with periodic droughts in past years, and a short supply of surface and ground water in the greater part of the area. As the Minister was thoroughly familiar with conditions, there was no need to dwell at length on these unfavorable aspects. The writer stressed instead the multi-purpose nature of the project which included, among other things, hydro-electric power which could be generated by the construction of the two dams, thus providing a greater incentive for the establishment of industrial enterprises in the province.

The Minister listened very attentively as I outlined the various features of the proposed project. Such questions as he asked brought out points which served to strengthen the case for a dam, rather than the contrary.

At the end of the meal, when coffee was being served, I came to the all-important matter which I had been leading up to from the beginning, namely, exploratory test drilling to determine foundation conditions in the river at the location before described. I went on to say that the information obtained in that way would always be available. If, as we had reason to believe, foundation conditions in the bottom of the river, in that section, were such that a high dam could be constructed, the sooner the information could be gained the better; for should a program of public works be undertaken to relieve unemployment at the

end of the war, a start on construction could be made without delay. I ventured to affirm, too, that the project had much to recommend it as a "shelf project," by reason of the variety of jobs which the construction of such an immense undertaking would create. Then to clinch the case, I concluded with the statement that PFRA funds were available for the drilling tests, in the "Engineering Services Primary Allotment," part of which could not be spent, for one reason and another, during that fiscal year.

"Put the full particulars you have given me in the form of a memorandum and we will have a look at it," Mr. Gardiner said, impressively, as he folded his napkin and rose from the table. It was clearly not a commitment, but it did give some insight into the way the Minister's mind was leaning. I was so impressed that I wrote down his exact words in a small note-book which I always carried for jotting down important events and statements while still fresh in my mind.

The following day I reported to Dr. Barton the outcome of my meeting with the Minister; and in order to make sure that Dr. Barton got a correct version of the Minister's statement I read to him what I had carefully written down at the time. "It sounds encouraging. Everything considered, the Minister went about as far as could be expected," he said. Then he went on to say that after he had studied the material "thoroughly" he would discuss the project with the Minister and advise me of the decision reached. He added that in view of the interest which the Minister had already shown in the project, he was "reasonably sure" the test drilling would be approved.

Immediately upon my return to the office in Regina, I discussed the situation, as it then stood, with Mr. Russell. He felt, as I did, that in the circumstances we were perfectly justified in proceeding with such preliminary field investigations as would serve to save valuable time, later on, once the requisite authority had been obtained. To this end field surveys were made to determine critical elevations, reservoir area and the like. William Bock, an experienced field officer on the staff, was detailed to investigate the damage that would be caused to private property in the flooded area and make an estimate of the cost of the same. W. L. Jacobson made a reconnaissance as to the suitability and extent of the irrigable lands in the commanded tracts and reported his findings on May 1, 1944. Some investigations had already been conducted on foundation conditions. These operations were begun in August, 1943, at Site No. 1, N.W. 4-20-16-West 3rd Meridian, near the Pennant Ferry. Hand-operated washbore equipment was used to make these tests. But as this equipment could only put down a hole to a depth of 50 to 60 feet, the work was confined to the foot of the river banks in the valley. The intention was that as soon as authority for drilling was obtained, large drilling equipment would be used to make the tests across the valley and in the river channel after freeze-up, when the ice was strong enough to bear the weight of the big outfits.

In an effort to make the most of the time that would be available for channel drilling on the ice, a number of experienced drillers were canvassed—drillers who were equipped to take undisturbed samples of the over-burden and who would be prepared to move on the job immediately when notified to do so. To this end, conditional agreements were made with four drilling contractors.

Owing to the fact that we were being pressed by provincial authorities and other bodies for information on the progress of the investigations; and more particularly for the reason that time was running out, if we were to take advantage of the heavy ice in the river channel, we became so concerned at the delay in getting the necessary authority that I wrote to Dr. Barton on January 13, 1944, to find out whether or not the submission for test drilling had been dealt with by Council. As there was no immediate reply to my letter I sent the following telegram to Dr. Barton on January 20, 1944:

Reference my letter January Thirteenth re exploratory drilling South Saskatchewan River kindly advise by wire if our recommendation in this connection has been approved stop we have a number of drillers lined up and due to exceedingly mild weather these men are anxious to commence work and we are anxious to have them do so if we are to get any results this season—Geo. Spence.

On January 21, 1944, I received the following telegram:

Geo. Spence Prairie Farm Rehabilitation Office McCallum Hill Bldg. Regina Sask. Council approved test drilling Saskatchewan River Project—James G. Gardiner.

Thus was set to rest at once our fears as to the fate of our submission. No time was lost, subsequently, in executing formal agreements with four drillers, all of whom, in accordance with the understanding previously reached, were ready to move in on the job and begin operations. These agreements were dated February 1, 1944.

Three of the drillers began operations at once on three of the four sites, as selected by Dr. Allan, at narrow points in the 15- or 20-mile section of the river already described. The fourth driller arrived on the work February 23 and started drilling before the end of the month.

So it was that the wheel of events came full circle; the proverbial stone which the builders had rejected, some thirty odd years before, became the head of the corner in a plan designed to bring South Saskatchewan River water to the fertile but thirsty lands in west-central Saskatchewan.

## A WATER SUPPLY FOR MOOSE JAW

The investigation and development of such large-scale, long-range affairs as the South Saskatchewan and the St. Mary-Milk Rivers projects did not preclude work on other rehabilitation schemes, some of which



were also intended primarily for irrigation purposes. In order to record events in their proper orderly sequence, it is expedient at this point to deal briefly with a project *not* primarily concerned with irrigation, but which was of great importance at the time to the City of Moose Jaw; and which also had a bearing on the ultimate outcome of events in the larger sphere.

As a result of the precipitation deficiency, over a period of years, coupled with increased domestic consumption, the water supply shortage in Moose Jaw became extremely critical, so much so that the City authorities and the residents generally became so alarmed with the situation that strong representations were made to the Federal Government for assistance. As shown by previous surveys and investigations, before outlined, the only source of an abundant and dependable water supply was the South Saskatchewan River. It was shown, too, that such supply could be obtained by pumping from the river at the Shellstone-Thunder Creek location to the height of land, from which point the water could be conveyed in an open ditch to a saturation basin near Caron; at that point it was to be pumped direct into the city's distribution system. According to the report of the Saskatchewan Water Commission (1916), this scheme was the least costly of all proposed schemes designed to bring river water to Moose Jaw. This was the deciding factor in the circumstances. Consequently, a formal agreement between the Federal Government and the City of Moose Jaw was duly executed. Shortly stated, the agreement specified that the Federal Government would undertake to instal a pumping plant at the river, and also dig a canal of sufficient capacity and length to convey the water to the Caron storage. Upon completion of the works, and after a trial run to test its practicality, the project would then be turned over to the city for future operation, maintenance and replacement. Construction of this project, by the Prairie Farm Rehabilitation Administration, was started in 1944. The cost of the Federal Government's share of the completed project, as given in the PFRA Annual Report for 1959-60, was \$710,433.

While the project did supply sufficient water for the city's growing requirements, the cost of maintenance on the 64 miles of open ditch was high. Water losses from seepage were also high. Besides, the City of Regina, also in need of additional water supplies, derived no benefit whatever from the project. All in all, the project was regarded, for the most part, as insurance against a Moose Jaw water shortage crisis until such time in the future when, it was hoped, a more comprehensive scheme could be developed which would meet the water needs of both cities from the South Saskatchewan River.

## CHAPTER TEN: THE SEARCH FOR A FEASIBLE SITE

### HOPES AND DISAPPOINTMENTS

The program of test drilling, as reported in the previous chapter, began in an optimistic mood. As it turned out, our hopes were to be subjected to severe strains before the search was complete.

The Order-in-Council authorizing the test drilling, dated January 21st, 1944, recited a bit of background and proceeded to a specific recommendation. Preliminary investigations, including geological studies by Dr. J. A. Allan, had been conducted under PFRA auspices "with a view to determining the feasibility of constructing a dam on the South Saskatchewan River in order to irrigate a large tract of land in West Central Saskatchewan," it said.

The Order affirmed that it was now desirable to carry out about 5,000 lineal feet of test drilling at the four sites considered by Dr. Allan to be the most promising.

It authorized the Department of Agriculture to enter into appropriate contracts with drillers to carry out such foundation tests. The rate was not to exceed \$3.50 per lineal foot and the expenditure was to be chargeable to the parliamentary appropriation for the Prairie Farm Rehabilitation Act.

In an effort to co-ordinate site investigations with geological studies, R. O. Peterson, "Chief Soil Mechanics and Materials Engineer was appointed Supervisor of Foundation Investigation," in which capacity Mr. Peterson worked in close co-operation with Dr. Allan.

As the drills bit into the sub-surface formations, samples were taken at carefully recorded depths. If the depth of unstable material proved too great for the construction of a dam, drilling was discontinued and the site abandoned. To ensure a proper interpretation of the samples thus secured, cores were initially classified in the field and then re-classified in the laboratory. In addition, moisture content and density tests, along with a few other routine tests, were made in the early stages. As investigations progressed, more elaborate testing was carried out "to determine the shear strength, consolidation and permeability characteristics of the samples, and these results were applied in design studies."

The drills operating at all four sites were soon to reveal, much to our disappointment, that surface conditions were a poor indication of what lay beneath. During the final recession of the ice sheets torrents of water had gouged out a deep channel, which throughout the untold centuries since had filled up with silt, sand and gravel until the present channel gave no indication whatever of where the old channel was located. Sometimes the drills revealed its presence on one side of the valley and sometimes on the other—but it was always encountered. Indeed, the depth to bedrock, or firm shale, in the old channel was the determining factor as to the feasibility of any particular site.

Altogether six sites were investigated in a thirteen-mile stretch of the river upstream from Pennant Ferry (Township 20, Range 16) to four miles upstream from the Cabri Ferry (Township 21, Range 18, West Third Meridian). There is no need to give the tedious details of the drilling operations at the aforementioned sites. It will be sufficient, in the circumstances, to quote from a summary report on the investigations by R. O. Peterson, the officer in charge of foundation investigations:

A great depth of sand was found in the riverbed overlying the shale and sandstone at all the sites (at Site 3). The maximum depth of sand encountered in the riverbed was about 90 ft. but sand was found beneath the clay bench on the north side. At Site 5 the maximum depth of sand was about 130 ft. The riverbed was wider than at Site 3, but the banks were good clay underlain by shale and sandstone. At both sites the sand was fine to medium and fairly clean with a layer of soft clay occurring in the sand at Site 3. The bedrock in both cases was similar being interbedded shale and sandstone of the Belly River Formation; most of the shale was of medium hardness but many of the samples were soft and highly compressible.

Dr. Allan and myself have examined every sample taken from these sites. He has submitted a complete Geological Report and has made recommendations regarding further drilling. He favors Site 3 from the available information. The samples have all been tested in the laboratory to determine their physical properties but the results have not yet been studied or a report prepared. In the opinion of the writer a dam of the required height could be constructed at either Site 3 or 5 but would be costly.

While the drilling tests at the six sites had been more or less inconclusive, they did serve to show that surface conditions were a poor criterion of the conditions which might be found in the bottom of the riverbed—or wherever the “old channel” was encountered. Apart from physical conditions, important as these conditions were, there were also economic considerations which had to be taken into account. In other words, would the benefits justify the cost of the project? Such a cost included, among much else, damage to private property in the flooded area. An estimate of the flood damage, as a result of the construction of a dam in the river, was contained in the report submitted by Mr. Bock; and was summarized by Mr. E. L. Gray in a memorandum to the writer dated November 22, 1944. It was estimated that, altogether, the “damage to private property . . . would exceed \$6,000,000.” Still more discouraging was the information contained in a covering memorandum on the Agricultural Report dated June 24, 1944, submitted by Mr. Jacobson, the last paragraph of which stated as follows: “The material obtained as a result of a rather thorough reconnaissance of the area indicates quite definitely that the area is not suitable for any large-scale irrigation development as proposed in connection with this project.”

Despite the unfavorable results of the drilling operations in the section of the river before described, there was no thought of abandoning

the exploratory drilling as long as authority could be obtained and prospective sites remained to be tested as to foundation conditions. In this connection we were not insensible to the strongly expressed views of influential residents in the Cities of Regina and Moose Jaw who favored the Elbow as a site for a high dam in the river. It was argued that a dam situated at, or near, the Elbow would best meet the domestic, industrial and agricultural needs of the urban and rural communities of the area. George D. Mackie, Commissioner, Moose Jaw Board of Trade, expressed his views to this writer in no uncertain terms. The construction of a dam in the Cabri area was too far up the river to be economically feasible as a source of water supply for the City of Moose Jaw, he asserted positively. While Dr. Allan had misgivings as to foundation conditions in the Elbow section of the river, the location could not be ignored on account of its historic significance, which dated back to the time of Palliser and Hind. The exploratory "test borings" conducted by the Department of the Interior in 1913-14, to which reference was made in a preceding chapter, while not conclusive, had shown unstable foundation conditions at the Elbow and at points in a section of the river upstream from that location. But in view of the public interest in that particular location, it seemed desirable to conduct further test drilling in an effort to determine whether or not a dam of the height desired could be constructed in the river at or near the Elbow. Consequently, Site No. 7, a short distance above the Elbow, was selected and the drills moved to the site, where drilling was started November 2, 1944.

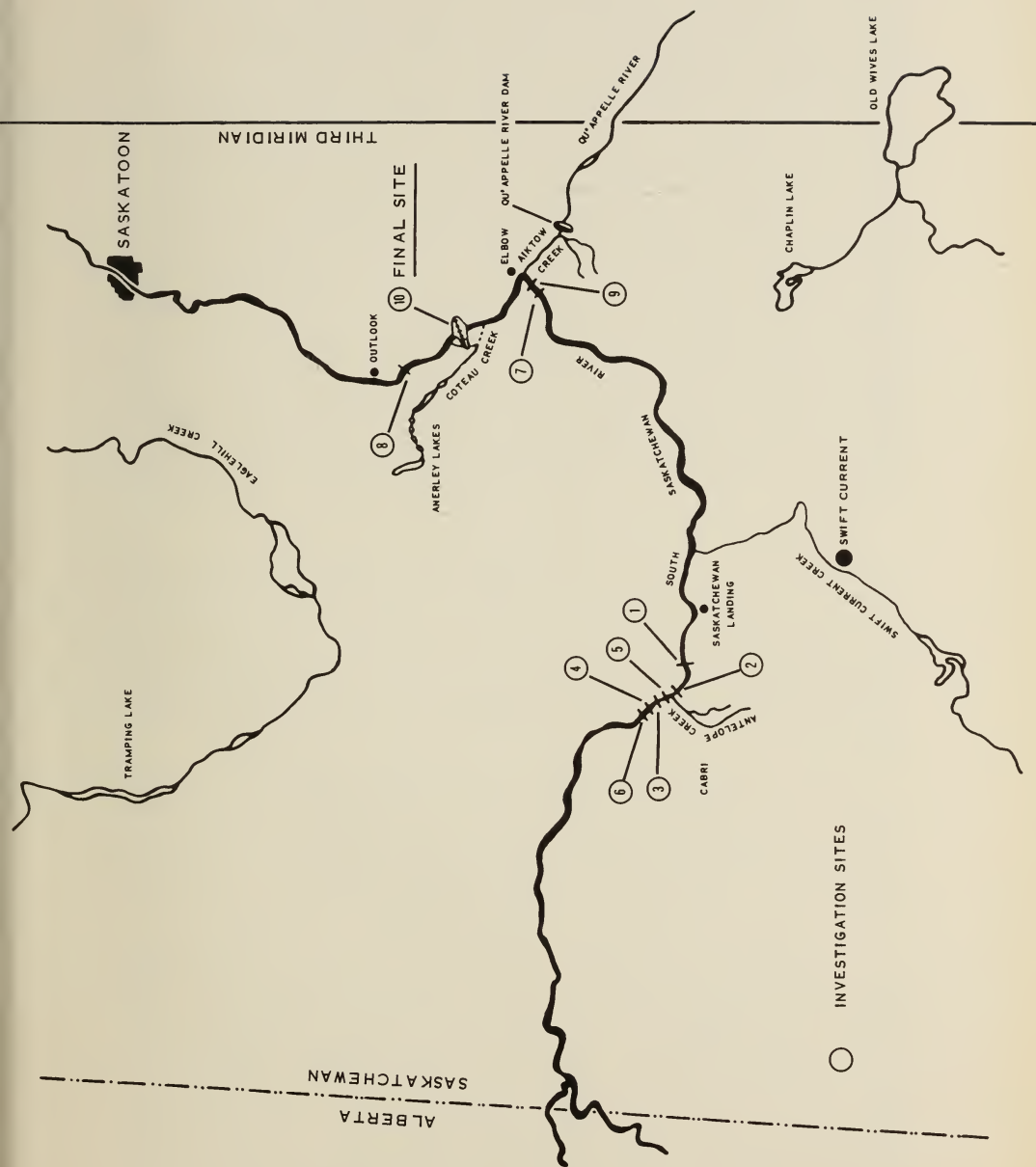
If, as was hoped, foundation conditions were found to be favorable for the construction of a dam, the location provided important topographical and economic advantages over the Cabri or White Bear Lake location in that the banks of the river, in the vicinity of the Elbow, would give support to a much higher dam in the river; thus creating a reservoir of much greater capacity. The flooded area would also be confined to the rough lands in the river valley. Consequently, damage to farm lands would be comparatively insignificant. The power potential of such a high dam would also be much greater. An abundant and permanent water supply would also be assured to the Cities of Moose Jaw and Regina and other urban centers in the area. Best of all, a very large area of dry land could be irrigated from the reservoir. Having raised our sights, in the matter of objectives, our disappointment was all the worse when the drilling revealed a great depth of sand and other unstable material in the bottom of the valley. Indeed, foundation conditions were so unfavorable that Dr. Allan advised drilling at Site No. 7 be discontinued and the site abandoned.

So far the results of the exploratory drilling in a 100-mile stretch of the river had been very disappointing. The operations at all seven

---

The extensive and thorough search for a suitable site for the dam on the South Saskatchewan River is illustrated by this map, which locates the ten sites tested and the site finally chosen.





sites had revealed unstable foundation conditions—without incurring prohibitive costs—which made the construction of a high dam at any of the sites investigated a hazardous undertaking. This, then, was the situation when, one afternoon, E. L. Gray, Superintendent of Water Development, stepped into the writer's office and unfolded a Sectional Sheet which he spread out on my desk. As an introduction to what he wished to discuss, he informed me that he had made a reconnaissance of the river downstream from the Elbow to a point in the river near the Town of Outlook—a distance of 36 river miles. Then, directing my attention to a point on the map approximately six miles upstream from Outlook, he went on to say that outcrops of sandstone were showing along the river banks in that section. There were good indications, therefore, that bedrock would be found near the surface which would support a high dam in that particular location of the river. The topography was also favorable for diversion works and spillway, he asserted. If foundations were such that a high dam could be constructed at some point in that section of the river, an immense river reservoir would be created which would supply water for exactly the same purposes as a dam located at the Elbow would serve; namely, large-scale irrigation, generation of hydro-electric power and an abundant water supply for domestic and industrial purposes throughout the whole area.

According to Mr. Gray's description of the prospective site, it had sufficient merit to justify investigation. Dr. Allan was, therefore, requested to make the necessary geological examination. Our hopes were shored up once more, when Dr. Allan not only approved of the site, but also assured us that foundation conditions would be better the further down the river we drilled. The outcrops of sandstone in that section and at Outlook Bridge were a good indication, he said, that such would be the case.

After a close examination of the geology of the river banks in the locality, Dr. Allan selected Site No. 8, six river miles upstream from Outlook, and indicated a centerline (Line A) where drilling should be conducted. As the first drilling revealed a somewhat unfavorable bedrock condition, Dr. Allan made a further geological examination and specified Line B, in the same section, on which to conduct further tests.

The results of the drilling tests at Site No. 8 can be best summarized by a quotation from the Interim Report on South Saskatchewan River Development, dated May 30, 1947, and submitted by Mr. G. L. MacKenzie, Chief Engineer; this report was "Concurred in by Maj. Gen. H. B. Ferguson, Consulting Engineer." Concerning the drilling tests at Site 8 (Outlook) the report said: "The river profiles at lines 8A and 8B both indicate that the original river channel has been filled with a considerable depth of fine to medium sand, with the greater depth occurring on line A. The test drilling also revealed the presence of water bearing sandstone lenses in the underlying Belly River formation. This permeable material will have to be investigated very thoroughly to deter-

mine whether it occurs only in isolated patches or whether it forms a continuous layer beneath the site."

Shortly stated, the drilling tests had disclosed a general similarity in foundation conditions, at all the sites investigated up to that time. While foundation conditions were of the utmost importance, there were other factors that had to be taken into consideration as well in deciding upon a site for a high dam in the South Saskatchewan River. It was imperative to find a site that would best serve the agricultural and industrial requirements of the area. Investigations had revealed that the greatest economic potential could be developed from a dam situated at some point in the Elbow-Outlook stretch of the river. With this in mind, Site No. 9 located between the Elbow and Site No. 7 was selected. This was one of the sites where "test borings" had been conducted by the Reclamation Branch as far back as 1913-14. Dr. Allan had also made reference to the site in his preliminary report; for these reasons, among others, the site was extensively drilled. Unfortunately, for all who cherished hopes of a high dam located at the Elbow, the drilling disclosed not only a greater depth to bedrock than at any of the sites before investigated, but also badly-mixed layers of unstable material above the bedrock; for which reasons, further investigation of the Elbow section was discontinued.

## THE COTEAU CREEK PROSPECT

This writer has good reason to remember an incident which took place about that time. Early one morning, G. L. MacKenzie, Chief Engineer of the PFRA, was waiting for me at my office door. After a cheery "Good Morning," and without further ado he exclaimed jubilantly, as he spread a Sectional Sheet on my desk, "I think we have found a site!" Then, plucking a pencil from his breast pocket, he indicated a point on the map downstream from the Elbow. "Do you see that?" he asked briskly. "I see Coteau Creek," I replied. "Coteau Creek, yes, but what do you see peculiar about its confluence with the river?" he asked pointedly. "It appears to have two confluences," I said, scrutinizing the location closely. "That is how it looks on the map," he rejoined affirmatively. "Notice how the creek swings north-west for two miles, before it joins the river." Then, directing my attention to a point on the map with his pencil, he went on as follows: "Here you can see the low divide between the present Coteau Creek channel and what may have been the original course of the creek, in glacial times, when the stream flowed in a south-easterly direction to join the river two and a half miles upstream from its present outlet. This depression, together with the valley of Coteau Creek and the river on the east, form the boundaries of a triangular plateau, or tableland, of approximately 750 acres, 150 feet above the river." Then, laying his pencil down across the section of the river shown on the map, immediately east of the plateau,

he continued: "If foundation conditions are favorable for the construction of a dam in this section, the river can be diverted round the site by way of the Coteau Creek valley, and the dam *constructed in the dry*."

This circumstance, Mr. MacKenzie declared, would be a great advantage in the construction of the dam, from an engineering standpoint. It would also result in a considerable saving in construction costs. Mr. MacKenzie explained too, that the volume of earthfill would be very much less than at Site No. 8 (Outlook), with a corresponding reduction in the amount of riprap required—all of which meant lower costs.

The storage capacity of the reservoir which would be created by a dam in the river at Coteau Creek would be something of the order of 7,000,000 acre-feet. Storage was a matter of the "utmost importance" he said emphatically. The main benefits, such as irrigation, power and flood control, all depended upon the available storage, he affirmed. While a dam of the same height at Site No. 8 would create approximately the same amount of storage, a dam at the Coteau Creek location, being 14 miles upstream from Site No. 8, would result in a pond level fifteen feet higher, which, he emphasized, was an important consideration for irrigation purposes.

"This is the third time I have had a prospective site brought to my attention," I said reflectively. "That is all right so long as the river holds out," he quipped, with a broad good-humored grin.

After having listened to Mr. MacKenzie's impressive description of the proposed site, there was no doubt, no doubt whatever, in this writer's mind that the Coteau Creek location should be thoroughly investigated. To this end, Dr. Allan was immediately requested to give priority to an examination of the topographical and geological conditions in that section of the river, and to report his findings as soon as possible in the circumstances.

The result was that Dr. Allan selected Site No. 10, "about three-quarters of a mile upstream from the mouth of Coteau Creek" and indicated a base line where the drilling tests should be first undertaken.

In an effort to determine which one of the two sites: No. 8 (Outlook) or No. 10 (Coteau Creek), had the best foundation conditions, both sites were extensively drilled. This drilling revealed that the general foundation conditions were similar. The other conditions before outlined were, therefore, determining factors in the selection of Site No. 10 (Coteau Creek) for final development. It was at this stage in our operations that this writer took upon himself the responsibility of enlisting the services of Major General H. B. Ferguson of Washington, D.C., who by a fortunate circumstance was employed at the time as Consulting Engineer on the St. Mary River Dam in Alberta. General Ferguson was a Past President of the Mississippi River Authority and in that capacity had been in charge of flood control measures in the lower Mississippi River. Therefore, he had an insight from practical experience into



treacherous bottom and riverbank conditions. Indeed, the Mississippi River could be said to be an engineer's guinea-pig in that connection.

As General Ferguson occupied an office in the Regina headquarters of the PFRA he was able to keep in close touch with the different investigations which were being conducted at the Coteau site, despite the fact that he was not officially connected with these investigations at that time. Later, the writer saw to it that his professional services on the project were officially recognized.

In order to gain first-hand knowledge, General Ferguson went over the ground in company with Mr. MacKenzie, Dr. Allan and the writer. He also conferred with the Chief Soil Mechanics and Materials Engineer, R. Peterson, on foundation conditions, from time to time, as the investigations progressed.

In pursuing his studies, as revealed by the exploratory drilling, General Ferguson came to the same conclusion previously reached by PFRA engineers; namely, that the foundation conditions were such that the only feasible type of dam, in the circumstances, would be an earthfill structure. One of the major problems, in design studies, was, consequently, the means which should be used to divert the river while the dam was under construction. When riverbank and other natural conditions are favorable, as was the case at the Coteau site, tunnels are the means employed in most cases for this purpose. The design engineers, therefore, favored the tunnel method of river diversion at the Coteau site.

It is not necessary to describe at length the distinctive features of earthen dams, the construction of which (earth-masonry) dates back to the time of the Pharaohs, if not before. It might be appropriate, however, at this juncture, to explain that there is such a great variation in conditions, typical of every major river in the world, that there is no well-defined formula for the construction of dams in these large rivers. Fortunately for human betterment and progress there are no restrictive boundaries, in the free world, to the unfettered exchange of ideas and information. Nowhere is this more in evidence than in the engineering field, and particularly in the planning and construction of large projects designed for the control and development of a country's water resources.

Investigations had disclosed that conditions in the South Saskatchewan River were very similar to those which had been encountered in the Missouri River in the United States. Hence it was deemed desirable that a party of PFRA engineers, who were concerned with the design of the Coteau Dam, should inspect the newly constructed Fort Peck Dam on the Missouri River, Montana, rated at that time as "the world's largest earth dam." This dam had created an immense reservoir with a total storage capacity of 19,400,000 acre-feet. The arrangements also included a visit of inspection to the Garrison Dam, then under construction on the Missouri River in the State of North Dakota. The PFRA inspection party included the following: George Spence, Director; Maj. Gen. H. B. Ferguson, Consulting Engineer; G. L. MacKenzie, Chief

Engineer; Dr. J. A. Allan, Consulting Geologist; G. W. Parkinson, Chief Design Engineer; R. Peterson, Chief Soil Mechanics and Materials Engineer; R. Bing-Wo, Senior Design Staff Engineer.

The PFRA party was shown over the Fort Peck Project by the Resident Engineer and other engineers qualified to give information on any matter on which special information might be desired. Among the things which were of special interest to the members of our party were the four diversion tunnels, power plant, spillway and, of course, the huge earth embankment, 250 feet high and 4 miles long, impounding, as before stated, a total of 19,400,000 acre-feet of water.

One of the features which drew our attention was a row of iron pipes, evenly spaced across the toe of the downstream slope, which stuck up two or three feet out of the embankment. The pipes were fitted with elbows from which water was pouring into the channel below the dam. One of the U.S. project engineers gave the quantity of water, in gallons, which the pipes were discharging every twenty-four hours. Mr. Parkinson made a quick mental calculation. "That amount of water would supply the entire water needs of the City of Regina," he said impressively. The writer ventured to ask if the flow was leakage. "It is controlled seepage," the engineer asserted confidently. Someone remarked that the water was as clear as crystal. "It had better be clear! If it ever becomes muddy we are in for trouble—mighty serious trouble!" the engineer exclaimed forcefully.

The Garrison Dam was of particular interest to PFRA engineers, for the reason that river conditions at the Garrison Site on the Missouri River were similar, in many ways, to those which had been revealed by the test drilling on the South Saskatchewan River. Then too, for the most part, the same methods of construction carried on at Garrison would also be employed at Coteau, in that Garrison was a rolled earthfill dam and tunnels were being used as a means of river diversion. But as the Missouri River is a much larger river than the South Saskatchewan, eight tunnels were being used to contain the flow while the fill was being placed, as against five tunnels proposed in the case of the Coteau Dam. Hydro-electric power would be generated at the tunnel outlets of both dams. When completed, Garrison and Coteau would also be the same height—210 feet above the stream bed. The Coteau Dam would contain a volume of 72,000,000 cubic yards of rolled fill, as compared with 65,000,000 cubic yards in the case of the Garrison; but the reservoir behind the Garrison Dam would store a total of 23,000,000 acre-feet of water.

All of this serves to show that an opportunity to inspect a gigantic project such as the Fort Peck Dam and to confer with their opposite numbers engaged in the construction of the Garrison project, similar in many particulars to that which was then on their own drafting boards, was helpful to the PFRA engineers; and the opportunity to discuss problems common to both projects was likewise helpful to the engineers

who were faced with the immediate necessity of solving such problems. Most of all, it illustrates how by such co-operation engineers have been able to build projects which are, at once, the marvel of our time and the hallmark of modern progress and prosperity.

But, to get back, the PFRA engineers spent the greater part of their time at Garrison scrutinizing plans, and discussing, with the engineers in charge of construction, such matters as were of particular concern to them at that time. Among much else, they inspected the test-hole cores of the critical sections in the river valley. One of the problems which aroused the interest of every member of our party was the deep seams of lignite coal which had been encountered in the spill-way and tunnels. As the seams were water-bearing the coal had to be excavated and replaced with impervious material. The quality of the coal was such that it deteriorated very rapidly when exposed to the air, for which reason it could not be stockpiled. Then too, the amount which had to be excavated was so great that if put on the market every coal mine in the State, we were told, would have to shut down. Hence the problem—what to do with it? Two methods of disposal were being considered. The coal could be buried beneath a heap of earth, or dumped into the cold deep water of the reservoir where it would keep indefinitely, and from which watery repository it could be fished out again should the need for its use ever arise.

As our party had been accorded a cordial welcome by the project engineers at both Fort Peck and Garrison, followed by a whole-hearted desire to give information on all the different matters connected with the two large projects, on which our engineers desired particular information, there was nothing more that anyone could desire, or had a right to expect, in the circumstances. But, happily, the end was not yet. Before our departure we were invited to stay and have dinner with the engineers in their new headquarters at Garrison, an invitation which we accepted gladly, coming, as it did, at the close of what had been a very strenuous day.

As we entered the large new dining hall, the most impressive sight which met the eye was a long table extending from one end of the room to the other, a table on which the only decoration was food! After a liberal round or two of refreshments at the buffet, as a starter course, we sat down to the table, and had placed before us bowls of hot mashed potatoes crowned with big hunks of butter, heaping platefuls of baked biscuits with that delicious rich nutty flavor, hot out of the oven. Half-pound squares of creamery butter were evenly spaced along the table; also a select variety of side dishes to complement the main course. This was a large thick juicy grilled beef-steak, served sizzling hot and cooked as only camp cooks can cook steak. Large mugs of steaming coffee was also placed before us, diffusing an appetizing aroma throughout the whole room. It was every man for himself, as we plowed our way into tender delicious steak and reached for liberal helpings of other delicacies



on the table. Thus began a friendship between two groups of trained men, to whom the International Boundary was no real barrier.

As soon as it was known that it would be feasible to construct an earthfill dam across the South Saskatchewan River at either Site No. 8 (Outlook) or Site No. 10 (Coteau Creek) a stage in the investigations had been reached when it became necessary to submit an Interim Report to the Federal Government. As irrigation was the primary purpose of the project, the report would have to give the location of the irrigable lands, together with a tolerably accurate estimate of the total acreage which could be commanded from the reservoir and, most important, a detailed description of the soils in the irrigable tracts. The writer, therefore, made arrangements with the Department of Soils, University of Saskatchewan, to conduct, during the season of 1946, a soil survey of a specified area contiguous to the reservoir. To expedite matters and ensure that the officers who would be engaged in the field investigation would have a full understanding of what was required, Dr. J. Mitchell, Head of the Department of Soils, called them together, in his office, for a preparatory briefing on organization and the type of survey which would be carried out to meet requirements. The writer, who was also present at the meeting, stressed the need for completing the investigations during the field season of 1946, so that a report on the soils could be submitted early in 1947 to the Federal Government, together with the Interim Report on the engineering features. As the area which could be covered in one field season was limited by the trained staff available, it was decided that a reconnaissance type of survey was all that could be undertaken in the circumstances. If, as was hoped, the project was approved for development, a more detailed survey could then be made. In the meantime it was agreed that a survey showing the major soil and topographic features, together with the basic engineering data which would be contained in the Interim Report, would enable the authorities to appraise the possibilities of irrigation in the area under investigation.

This survey, as planned, was completed during the field season of 1946, and a report entitled "Reconnaissance Soil Survey Of The South Saskatchewan River Irrigation Project," by H. C. Moss, W. K. Janzen and J. E. McClelland, dated February, 1947, was submitted to our Regina Office.

The area mapped included lands on both sides of the South Saskatchewan River, comprising a total of approximately 1,300,000 acres. The "soil types in relation to irrigation," were classified in five distinct grades and given in "Table 3" as follows:

Grade 1	Very good soils .....	127,616
Grade 2	Good soils .....	426,189
Grade 3	Fair soils .....	310,605
Grade 4	Poor (Doubtful) soils .....	175,155
Grade 5	Very Poor (Unsuitable) soils .....	289,306
		<hr/> 1,328,871



Discussing the soils in the lower grades, the report states significantly as follows: "Since there are 800,000 acres of land classified as Grades 1, 2 and 3, the development of the project does not depend upon the utilization of the doubtful Grade 4 soils. In other words, the testing or reclamation of these soils is not an immediate problem. As the better soils are developed it would be worth while to deal with the more promising Grade 4 soils, and so extend the benefits of irrigation as widely as possible."

As before stated, the total irrigable area in the first three grades was not a final determination, mainly because the acreage specified in these grades was based on a reconnaissance-type survey only and also for the reason that sizable tracts of good quality lands were not included in the designated area—tracts that could be commanded by pumping from the reservoir—and were "designated for future soil surveys." These included lands along Thunder and Moose Jaw Creeks and in the Briercrest and Avonlea Creek area. Lands in the Qu'Appelle Valley were not included in the original soil survey. Then too, it might be feasible, as a result of low-cost power generated at the dam, to pump to higher elevations, thereby increasing the irrigable area considerably. Sprinkler irrigation on the more rolling lands which could not be served by the open ditch method could also be a factor. True, more detailed engineering and intensive soil surveys could reduce, indeed at a later date did reduce, the total in the first three grades. But an increased acreage of irrigable lands which might be brought about by the means above stated could more than offset such reduction and equal or even exceed the 800,000 acres specified in the soils report. That is, however, speculating as to values in the future.

The main substance of the soils report was incorporated into the Interim Report, together with a soils map showing, in colors, the five distinct grades of soil in the area mapped. Discussing the classification of soils in the first three grades, amounting in all to 864,410 acres, the Interim Report stated that it was expected that considerable land included in the total would "be eliminated when detailed topographic surveys are made, because of poor topography." The report then went on to state further that "it was necessary to have a definite figure for the ultimate irrigated area for the purpose of making water studies, and an estimated value of 500,000 acres was used."

The Interim Report gave a general description of the dam and appurtenant works, and in that connection also dealt with the means that would be used to prevent the entire flow of the South Saskatchewan River from spilling over the divide into the Qu'Appelle River when the reservoir reached an elevation of 1,758 feet. These preventative means were described in the report as follows: "The pool formed by a dam at the Outlook or Coteau Creek Site would back up the valley of Aikto Creek and a low dam would be required at the summit between Aikto Creek and the Qu'Appelle River drainage basins. This dam . . . would

be provided with outlet works, to control the diversion of water down the Qu'Appelle Valley."

As before stated, investigations had been conducted at both Site No. 8 and Site No. 10, in an effort to determine the best site in the circumstances, all things considered. In dealing with that particular situation, the report contained the following definite statement: "Based on the preliminary information now available, it appears that Site No. 10 is more favourable for the construction of a dam of the height now proposed." Then follow the reasons why Coteau Creek was chosen for development. As the advantages of the Coteau Creek site over the Outlook site have been stated before, there is no need for detailing these advantages again. Suffice it to say that much less earthfill would be required, and the higher elevation of the Coteau Creek site was also an important advantage, in that it would command a greater area by gravity flow and reduce the pump lift to the higher levels of the irrigable area as well. In addition to the benefits before outlined, the report stressed the importance of the hydro-electric power potential. "This power can be generated," the report stated, "at the damsite by the installation of hydraulic turbines and generators." This power would be available for pumping water for irrigation; in addition to which, the report affirmed, "large amounts of commercial power" would also be "available for sale." The report contained a map showing the location of the dam "with respect to the major towns and cities in the province." A table was also shown on the map which gave a "Population Break Down." According to the table, "53% of the population of the province live within a radius of 125 miles of the dam and 69% within a radius of 150 miles of the dam. This information emphasizes the excellence of this location (Site No. 10) as a power generating and distribution centre for the province." In the section dealing specifically with "River Regulation," the report made the following significant statement on upstream storage: "In addition to the benefits mentioned . . . the dam would serve a useful purpose by reducing the variation in the river flow. This would materially improve power development possibilities at other sites below the dam." In other words, by supplementing the flow of the river, during the season of low water, with stored water released from the Coteau Creek Dam, a number of known sites downstream—sites with but only very limited storage capacity—would be made economically feasible for development.

In giving an estimate of the cost of the dam and appurtenant works, stress was laid on the fact that the investigations, at the date of the report (May 30, 1947), were not complete, and that "further detailed structural studies" would result in changes, "some of which will be major modifications of any layout presented in this report." Subject to such qualifications, "a reasonable estimate of the cost of the construction of a dam at Site No. 10, with a crest elevation of 1840, including the items of river diversion and spillway, are set forth in the following tabulation," the report announced. It is not necessary for the purpose of

this record to set down the full tabulation here, for the reason that changes were later made, changing the cost factor in some particulars. Briefly summarized, the estimated cost of the dam and "auxiliary structures," as set out in the tabulation, which included the Aiktow Creek-Qu'Appelle Dam, totalled \$55,300,000, to which an amount of \$11,-060,000 was added to cover contingencies, bringing the grand total to \$66,360,000. These costs were, of course, computed on the cost of materials and labor current at that time. In the concluding paragraph of the "Summary" the report stated that "the period required for construction is estimated at ten years, and two years are estimated for completion of investigations and plans."

As the intent of the Interim Report was to set forth, in some detail, the progress of the investigations; as the report contained the first authoritative information on the outcome of the investigations; and, having in mind, too, the need for complete accuracy in the interpretation of the report, the writer has been at pains to quote such passages as had a direct bearing on the conclusions reached as a result of the investigations. The quotations would have little or no meaning, however, if the most important statement of all was left out of the record. This statement was contained in the section headed "Observations," and was as follows: "Based on the results of these preliminary investigations, it can now be said with a fair degree of certainty that an earthfill dam can be constructed at either Site 8 (Outlook) or Site 10 (Coteau Creek) and, further, the topography is suitable for the location of the appurtenant works. Investigations have indicated that there are ample supplies of suitable impervious and pervious material available for the construction of an earth dam at either site."

Hence it can be said that, after a thorough exploration of a 130-mile stretch of the South Saskatchewan River, and a lapse of ninety years, or more, a vision survived. True, as originally envisaged the purpose was navigation, which purpose had to yield to the pressure of social and commercial progress, on the one hand, and the dictates of dire necessity on the other hand. Certain it was that, in the cause of water conservation and use, the vision of those dedicated pioneers of former days was brought appreciably nearer to realization.

## CHAPTER ELEVEN: THE WINNING OF PUBLIC SUPPORT

### ADVOCATES OF THE PROJECT

It was one thing to establish the engineering feasibility of a South Saskatchewan dam. It was another thing to persuade governments and taxpayers to undertake such a large project. As events proved, ten years were to elapse between the location of a satisfactory site and the decision of governments to embark on the mammoth program.

The drive for public and government support for the South Saskatchewan project had begun some time before the test drillings were finished. In the following pages some account will be given of the manner in which the Canadian public and their governments were made familiar with the potential benefits.

Those of us entrusted with executive responsibility always had to keep in mind one geographical fact, namely, the vast distance between the populated portions of Eastern Canada from those of Western Canada. People living in Eastern Canada have a somewhat imperfect knowledge of conditions in Western Canada and vice versa. For these reasons we were glad of every opportunity of enlightening the public, and the Members of Parliament in particular, who voted the annual appropriations necessary to carry on the various activities of the Administration under the authority of the Act. It was, therefore, a matter of great satisfaction to the writer, when, as Director, I was asked in 1943 to appear before a Special Parliamentary Committee on "Reconstruction and Re-Establishment" which had been appointed to investigate and recommend projects which would best meet the situation, should chronic unemployment set in after the war.

As there were no restrictions either laid down or implied in the nature of the evidence which the writer was invited to give, I decided it would be appropriate to submit a formal statement covering the entire PFRA program, as carried on at that time—a statement which I proposed to read into the records of the Committee. I also had a large-scale map made for the purpose of illustrating what had been accomplished and to show the location of large projects which were then under investigation and study, including the North Saskatchewan and South Saskatchewan Rivers projects.

Then, for good measure, I selected fifty or more representative lantern slides, which I thought might also come in handy for the occasion. I was notified to appear before the Committee on Wednesday, April 7, 1943, in a committee room of the House of Commons, where the hearings were being held. The arrangement was convenient to such Members of Parliament as might want to attend; and many of them attended.

As I was the first witness to be heard in the forenoon, there was



ample time to put up the large map on the platform for all to see; on which I could point out particular features of the projects under discussion. Mr. J. G. Turgeon, Chairman of the Committee, presided. At the opening of the proceedings I filed the following documents:

Fifth Annual Report of the Secretary of the Land Utilization Branch of the Department of Agriculture, Saskatchewan.

The Keystone Province, Manitoba, for March and April, 1942.

St. Mary and Milk Rivers Water Development Committee Report.

Further storage and irrigation works required in Southern Saskatchewan.

As the "Minutes of Proceedings and Evidence" are recorded in the official report of the Committee, no useful purpose would be served in repeating the details of the proceedings here. Suffice it to say that I put myself entirely in the hands of the Committee.

The questions ranged over the greater part of PFRA activities, so much so that only about half of my statement had been given when the Committee adjourned to meet again on the following Thursday, April 8. When the hearing was resumed Thursday forenoon, I submitted a list of forty-two water development projects to which consideration might be given by the Committee for post-war development, all of which would give employment during construction, and some of which, such as the power and large-scale irrigation projects, would create secondary industries, thus furnishing permanent employment.

At the time of the hearing, the South Saskatchewan River project had not advanced to a stage where it could be included in the list of projects submitted. This project was discussed however at considerable length, and from the investigations which were then underway I was able to state that the immense project looked "promising." To that extent, at least, the Committee was made aware of what the future might hold in store in the way of large projects.

In view of developments since, it might be worth while to give a short quotation from the official report of the proceedings when the matter of an overall plan of water development was under discussion. This was a plan which would include all three prairie provinces. On this theme, I said:

In furtherance of this objective, and particularly because the provinces have charge of the administration of the water rights, each in their own provinces, consideration should be given to the advisability of setting up an interprovincial board, or commission. The function of this board, or commission, would be to advise the government concerned—dominion or provincial—in all matters having to do with water storage and stream control, both for power development and irrigation. All with a view to devising a comprehensive water development plan designed to make the best economic use of the available water supply in the three prairie provinces. This overall plan, when finally approved by the governments concerned, could then be carried out in stages as the circumstances might warrant, or a method of construction similar to that which has been recommended for the development of the St. Mary and Milk rivers by the committee who studied that development.

While the evidence I submitted had taken up almost the entire time of the Committee in the course of a two-day hearing, there was a request for still more information on PFRA projects; in compliance with which the chairman announced that I would "show pictures of that development which will bring to our mind the future possibilities of developments of that nature in the prairie provinces tomorrow night at 8:15 in the railway committee room in the House of Commons. . . . The showing will be open to all Members and Senators and their friends, and it should be well worth seeing." As some Members of the Government were present at the showing, it can be said that the opportunity we had hoped for was realized in full measure.

There was good reason to believe that the showing had been well worth while, from the number of Members of Parliament and Senators who came forward at the close of the meeting and expressed their thanks for the information they had gained on the work which was being carried on by the PFRA, and gave their assurance that we could depend upon their support when the appropriations for the various projects came before Parliament.

As the feasibility of the project became more generally known, pressure built up to persuade the Federal Government to undertake the immediate construction of the dam. Municipal bodies and Boards of Trade passed resolutions to that effect. In addition to the existing organizations which came out in active support of the projects, the Saskatchewan Rivers Development Association (SRDA) was formed to popularize and to promote the proposed project.

To this end, the annual meetings invariably featured special attractions in addition to the regular business of the association. Among other things, conducted tours of the irrigation districts in Southern Alberta were organized; and notable authorities on irrigation and related matters were invited to address the meetings and answer questions—all in an effort to make the residents of south-western Saskatchewan more water conscious, thereby stimulating greater public efforts to induce the Federal Government to undertake the construction of the proposed project with as little delay as possible.

It can be stated, too, that the efforts to promote the project were not confined to local organizations. The most prominent and authoritative public body of all, so far as provincial authority goes, is the Legislative Assembly. The Saskatchewan Legislature passed a resolution on March 28, 1946, requesting the Federal Government to expedite all engineering, agricultural and economic surveys necessary to determine the location of a dam, or dams, on the river for irrigation, for power and as a "source of water supply for the Cities of Moose Jaw and Regina and for urban communities within the serviceable area."

Vision is an inborn faculty of the individual alone. Organizations for such causes, as are here dealt with, are merely the instruments by which such individual visions can become a reality. Surprisingly strange

was the fact that a retired Toronto businessman became one of the most zealous advocates of a comprehensive plan to conserve and put to beneficial use, on the dry prairies, water originating on the eastern slope of the Rocky Mountains.

The late John R. MacNicol, Member of Parliament for Davenport (Toronto), had no selfish interest to serve by his persistent advocacy of a gigantic scheme first conceived, as before stated, in the imaginative brain of that foresighted pioneer, William Pearce. Both inside and outside Parliament, John MacNicol raised his influential voice in support of such a cause.

In an effort to get authentic information at first hand, he spent some time in the Regina Office of the PFRA studying reports and maps, and conferring with the writer and staff engineers who had taken part in the surveys and studies of the North Saskatchewan-Red Deer Rivers scheme.

Not content with the information which he was able to acquire in that way, John MacNicol undertook the strenuous task of seeing for himself the prospective reservoir sites, before described, on the headwaters of the North Saskatchewan, Clearwater and Red Deer Rivers; which, together, formed such an important part of the overall or ultimate development of the water supplies originating in the mountains. John MacNicol was not deterred from his self-imposed task by the difficulties which he knew full well he would experience in traversing the far reaches of the rivers where storage sites had been located.

Armed with a blue-print on which the different sites were marked, John MacNicol employed an experienced guide who could supply saddle and pack horses for his journey over the rugged terrain of the higher elevations. Then, stocking up on food supplies for a prolonged stay in such inhospitable surroundings, he added the indispensable bed-roll to his other worldly goods, and slept under the stars until he had inspected all the important reservoir sites which had been previously located on the headwaters of the aforementioned rivers.

This writer was curious to know what had animated John MacNicol, at his age—he was then in his late sixties—to undertake such an arduous adventure, which appeared to be altogether unnecessary in such circumstances. John MacNicol had been a successful businessman; he could well afford to spend his spare time seeing the world, and otherwise enjoying his remaining years in ease and comfort. When questioned by the writer as to his reasons, he replied that promoting the cause of water conservation and development on the dry plains of the Western provinces in every way he could gave him greater satisfaction and happiness than he could ever get from trips to foreign lands.

After he had satisfied himself as to the possibilities of the gigantic scheme, he immediately embarked upon a campaign for the special purpose of popularizing the proposed project. Equipped with a large-scale map and lantern slides, he toured Western Canada, in successive



years, delivering illustrated lectures in the cities and other centers of population in an effort to make the residents more aware of the rich heritage which would be theirs, provided that the Federal Government constructed the capital works that were necessary for the conservation of a natural resource. This would otherwise continue to run waste, for the reason that the construction of such works was far beyond the financial means of any individual, corporation or community. Besides, as before stated, it was recognized that the conservation of great natural water resources such as the glacial run-off from the Rocky Mountains was primarily the responsibility of the Federal Government, because of its interprovincial implications.

No one knew better than the Hon. Member for Davenport that very large sums of public money would be required for the full development of these resources—a fact which did not perturb him in the least. Expenditures for the conservation of water resources for use on the dry prairies was, he said, “an investment in the future,” an investment designed to ensure greater stability to the farming industry in the region and thus strengthen the economy of the country as a whole.

John MacNicol was under no illusions as to the real situation. He was well aware, as were others who had given serious thought to the matter, that if the construction of the great conservation project was ever to be undertaken by the Federal Government, it was imperative to have the support of the people in Eastern Canada as well as the support of the Western residents. To this end, John MacNicol addressed public meetings in Toronto and elsewhere in the Eastern provinces. But the best forum of all, for such a purpose, was the House of Commons.

Exercising his privileges as a Member of Parliament, John MacNicol took every appropriate opportunity to impress upon his fellow Members the importance of conserving and utilizing every drop of the mountain run-off on the dry prairie lands. To this end, he freely spent time and considerable sums of his own money in an effort to bring about a condition which he sincerely believed would enhance the well-being of the prairie dwellers and bring abiding good to the country as a whole. It can be said, therefore, that no history of water development in the prairie region would be complete which failed to record the contribution which John R. MacNicol made in his time and place to that cause.

The unemployment which it had been feared might result with the return of the fighting forces at the end of the war did not take place, for the reason that there was a backlog of civilian projects which, due to shortage of materials and labor, had had to be postponed until hostilities ceased. Consequently there was no immediate need for those “shelf projects” for which plans had been made. This was particularly true in the case of projects involving large expenditures of public funds.

A period followed, therefore, during which the South Saskatchewan project was left in abeyance, waiting for a more favorable climate at Ottawa.



This naturally gave rise to some disappointment and even impatience among those who were thoroughly convinced of the value of the project and anxious to see some action started.

The mood of those days can perhaps best be illustrated by relating an amusing incident which took place one warm summer afternoon at the Coteau Creek site. A group of PFRA engineers were comfortably seated on the bank of the river listening to Dr. Allan, as he explained the bedrock conditions which the drilling tests had revealed.

Picking up one of the cores, he broke off a piece with a small geological hammer which he always carried in his kit when conducting geological examinations. Then, holding up the broken fragment for all to see, he tapped the samples lightly with the handle of the hammer to give his words greater emphasis. "This," he said, "is soft shale. It could be properly classified as 'Young Rock.'" A wag in the group immediately quipped, "I wouldn't worry too much about that, Dr. Allan—it will be old enough before the Government gets round to building the dam."

## A ROYAL COMMISSION APPOINTED

Though the South Saskatchewan project did not fit into any post-war "shelf" category of works to combat unemployment (which in any event, as related, did not develop), the Federal Government could not ignore the very considerable body of opinion which had been building up in favor of the program. In this situation it adopted a device frequently employed in similar situations in earlier years, namely, the appointment of a Royal Commission to investigate the proposal and to make recommendations. This Royal Commission was appointed in an Order-in-Council dated August 24, 1951.

The Commissioners named were: Dr. T. H. Hogg, Toronto, Ontario, Chairman. Mr. G. A. Gaherty, Calgary, Alberta, and Dr. John Widtsoe, Salt Lake City, Utah, U.S.A. Mr. Burton T. Richardson, Ottawa, Ontario, was appointed Secretary to the Commissioners.

The Commissioners were authorized to "investigate and report:

- (1) Whether the economic and social returns to the Canadian people on the investment in the proposed South Saskatchewan River Project (Central Saskatchewan Development) would be commensurate with the cost thereof;
- (2) Whether the said Project represents the most profitable and desirable use which can be made of the physical resources involved.

At the conclusion of its investigation and studies, which of necessity, by reason of the terms of the Order-in-Council, ranged over many different aspects of the inquiry, the Commission brought out a detailed and voluminous report. The report was signed by all three Commissioners, and was dated October 29, 1952.

The "Appendix"—Part III of the report—consisted of submissions and statements filed with the Commission by public bodies and indivi-

duals. The Hon. I. C. Nollet, Minister of Agriculture for Saskatchewan, and this writer, to mention two, filed submissions and statements with the Commission, typical of individual cases and public groups.

There is no need to dwell on the details of the Commission's findings and recommendations, the substance of which were set out in Part I of the report under the section headed "Findings and Recommendations." These concluded, in part, as follows:

- (1) The Commission finds that at present the economic returns to the Canadian people on the investment in the proposed South Saskatchewan River Project (Central Saskatchewan Development) are not commensurate with the cost thereof; though the Project would yield social returns which, while they cannot be measured for the purpose of this Report, would be of great value to the region in which it is situated.
- (2) The Commission recommends that, when the time comes that the Project represents the then best use of water for irrigation, the present finding should be reviewed in the light of changing conditions.

The report then outlined, at considerable length, the considerations "which might be taken into account" in the light "of changing conditions." The final recommendation was as follows:

- (10) The Commission recommends that irrigation projects that are under construction and possible extensions thereto should be pushed to completion, and that early investigations be made of such projects as may be constructed at a reasonable cost so that the development of irrigation may proceed as rapidly as is consistent with economic conditions and agricultural needs.

In short, while not condemning the project outright, the report did outline certain alternatives to the proposed South Saskatchewan River project.

This author is only concerned with facts, As far as the facts could be ascertained at that time, it can be said with reasonable certainty that the report did not meet with universal approval. Indeed, there were those who, from scientific knowledge, or practical experience, or both, voiced strong disagreement with the findings and recommendations of the Commission.

As this writer had resigned as Director of the PFRA to become a Member of the Canadian Section of the International Joint Commission, I felt free to canvass the situation at all levels of authority—municipal, provincial and federal. I can, therefore, say from personal knowledge that even some Ministers of the Crown were not in agreement with the report. The Right Honorable James G. Gardiner, Minister of Agriculture, to name one, expressed strong disagreement with the main findings and recommendations as set out in the report. There were also other Ministers who could not accept the alternatives proposed by the Commission as a substitute for the proposed South Saskatchewan River project. The Leaders of the Opposition Parties in Parliament also

declared their unqualified support of the project, regardless of the Commission's findings and recommendations.

Instead of dampening the ardor of those who championed the project, the report seemed to have the opposite effect. This writer recalls a statement which a farmer resident in the Outlook area made to him on one occasion, when we were discussing the report. "No damned city Ginks are gonna tell us dirt-farmers, who have been here for the greater part of our lifetime, what's best for us, and get away with it," he declared heatedly. This was typical of the growing trend of public opinion in favor of the Federal Government's undertaking the construction of the project, with the least delay possible.

In an effort to get as much information as possible in the circumstances, the Prime Minister, the Right Honorable Louis S. St. Laurent, expressed a wish to discuss the matter with the writer, a discussion which took place in the Prime Minister's office forthwith.

As far as this writer can recall, the main substance of our discussion on that memorable occasion hinged on the high estimated cost of the project. The actual cost of it, the Prime Minister asserted, might greatly exceed the estimated cost—as was usually the case in projects of this kind, with so many unknown contingencies.

I explained that the South Saskatchewan River project should not be considered on the basis of a single isolated project, but rather as an important part of an overall comprehensive development, designed to meet, as far as physically and economically possible, the drought problem. This was a problem which had periodically ravaged the central plains region with devastating consequences to man and beast, ever since the first days of prairie settlement. It was this serious situation, I said, which Parliament had sought to remedy as far as possible by the enactment of the Prairie Farm Rehabilitation Act in 1935. I went on to say that if such a desirable objective was to be attained, every feasible means should be employed to conserve and put to beneficial use all available water supplies in the region. This involved the construction of both small projects and large projects, on a river-basin basis—which basis, I said, was now recognized by leading engineers everywhere as the only system by which a country's water resources can be developed in an entirely satisfactory manner.

I stressed the fact that the proposed project, by reason of topographic and geographic features, together with its great power potential and large-scale irrigation possibilities, was an essential and ruling part of any comprehensive scheme of water development in the central prairie region. Such a development, if carried out in orderly and progressive stages, over a period of years, would put a green belt through the dry heart of the Palliser Triangle, from the foothills in the west to the Lake region in the east, and thus eliminate large expenditures from the public treasury in the matter of agricultural aid and for the relief of human distress when severe drought struck the region. In the course of

our discussion, the Prime Minister expressed deep concern for the plight of the people in the area during these severe protracted droughts, but he gave no indication as to whether he was in agreement with the means proposed for dealing with the problem.

Members of Parliament and other notable individuals, with whom the writer discussed the situation, were at a loss to understand why the Government was deferring a decision in the circumstances. In an effort to get enlightenment on the matter, the Hon. John G. Diefenbaker, Leader of the Progressive Conservative Party, asked a question during a discussion on the South Saskatchewan River project in the House of Commons on June 10, 1954, which elicited the following answer from the Prime Minister: "There have been investigations and I have considered the reports of all those investigations. I have not yet come to the conclusion that I can take the responsibility of recommending this project to Parliament, as an undertaking of value to the nation equivalent to its cost to the nation, and I am not going to make any such recommendation until, in my own mind and conscience, I feel it is something that I can honestly do."

Since the physical difficulties of proving a site for a high dam across the South Saskatchewan River had been mastered, the Prime Minister's statement was disconcerting, to say the least. There was some encouragement, however, in the fact that his statement was qualified by the use of the words, "not yet come to the conclusion," implying that a later favorable decision was not ruled out. There was the possibility that in the light of more information, and for other reasons, in the near or distant future, he might feel justified in recommending the undertaking as being in the national interest. There were some encouraging indications elsewhere that all was not lost. Dr. L. B. Thomson, who had succeeded this writer as Director of the PFRA, was having no difficulty in obtaining appropriations for further investigations necessary to complete the plans then on the drafting boards. Not only that, but the services of some world-renowned engineers, such as Dr. A. Casagrande, Harvard University, Cambridge, Massachusetts, and Dr. K. Terzaghi, also of Harvard University, were being retained in a consulting capacity on the project. Then too, shortly after the Interim Report of May 30, 1947, had been submitted to the Government, the Right Hon. J. G. Gardiner, Federal Minister of Agriculture, began to canvass the situation in an effort to find out what the Provincial Government was prepared to do in the matter of developing the irrigation systems. These were, as before stated, the primary purpose of the proposed project. There was also the matter of developing the power potential which would be created by the construction of a high dam in the river.

Such developments were rightly regarded as wholly a provincial responsibility. An opening for these timely and necessary overtures by the Federal Minister was given in a public statement made by the Hon. T. C. Douglas, Premier of Saskatchewan at that time, to the effect



that the Province was vitally interested in the project. Of particular interest too, in this regard, was the fact that in 1952, when the Royal Commission submitted its report to the Federal Government, these preliminary talks had advanced to the negotiating stage, in an effort to reach a formal agreement on the points at issue.

It could be reasonably assumed, and was assumed, that if the Federal Government had no intention whatever of undertaking the construction of the project, it could hardly be expected to sanction the expenditures of the large sums involved in further investigations; nor would the Government have been interested in any cost-sharing agreement with the Province.

In short, it was quite evident that the Federal Government was anxious to secure all the information possible, in the circumstances, on the many aspects of the proposed project, as a basis for a proper and final determination of its worth to the Nation, from a social and economic standpoint.

As matters stood, the Royal Commission report and the statement by the Prime Minister notwithstanding, there were, as before stated, many well-grounded reasons why the project should be undertaken, not the least of which was the irrevocable verdict of history.

There was a still further reason for hope in the fact that the project had a tenacious and vigorous champion, at the very heart of authority, in the person of the Right Honorable J. G. Gardiner, Federal Minister of Agriculture. Mr. Gardiner was a resident of Saskatchewan, and had been operating a grain and livestock farm in the Lemburg district for many years. In addition to his practical experience at grass-roots level, Mr. Gardiner had also been Premier of Saskatchewan for some years before he became Federal Minister of Agriculture; he had full knowledge, therefore, of the handicaps which the farmers on the high dry plains had to contend with. In addition to adverse climatic conditions, there was a further disadvantage in that many large areas were very short of both surface and ground water supplies.

Narrowed down to the simplest terms, Mr. Gardiner had specific knowledge both from personal experience and from his studies of PFRA reports to state, positively, that the proposed project would largely overcome the problems common to a very large area of the prairie provinces. In proof of this statement he explained that the geographical location of the dam and the elevation at which the water would be maintained in the immense river reservoir, extending upstream for a distance of 140 miles, would raise the ground water tables in many localities adjacent to the reservoir. Water could be released from the reservoir for irrigation and other purposes. He explained, too, that the topography was such that water could be conveyed through canals and natural channels to make up deficiencies in rural and urban communities in widely separated areas. Even points in the Province of Manitoba, he asserted, could be supplied from the vast reservoir—points that were

situated hundreds of miles distant from the source of supply. Mr. Gardiner's assertions, in this regard, have since been fully borne out by topographical investigations and studies.

Mr. Gardiner was so impressed with the potential of the proposed project that he lost no opportunity of expressing his views to all and sundry on the worth of the undertaking to the Province and the Nation. Just how many Members of the Government stood with the Minister of Agriculture in the matter is not within the knowledge of this writer. Such matters of policy are closely kept secrets under the Parliamentary system of cabinet solidarity. Certainly, the statement of the Prime Minister, in the House of Commons, did not indicate unanimity at that particular time. In all probability, this was the main reason why Mr. Gardiner requested this writer to have another talk with the Prime Minister. He would, he said, arrange for such a meeting.

As on the former occasion, the meeting took place in the Prime Minister's office. After stating that he was pleased to have another opportunity of discussing the project with me, he went on to say that the estimated cost in relation to the number of people who would be directly benefited by the project was causing him concern. Glancing at a sheet of paper, which lay on his desk, he said that a rough calculation indicated that only a very small percentage of the people resident in the recognized drought area of the prairie provinces could be rehabilitated by the irrigation of 500,000 acres, as defined in the PFRA Interim Report.

I explained that the comparison failed to take into account some important considerations. The benefits of large-scale irrigation, which is what it was, extended far beyond the boundaries of the area under the ditch. It was an accepted axiom, I said, by all who were in a position to know, that every acre under irrigation in such large systems would stabilize twenty acres of adjoining dry land on a livestock basis. I stated further that the vast grazing areas of the prairies, while not suitable, for topographical and other reasons, for the production of cereal crops, did produce native grass of a quality not surpassed anywhere in the world.

Consequently, these grass-land areas were among the nation's great natural resources. Unfortunately, these native pasture-land areas could not be utilized to maximum advantage because of a lack of winter feed and fodder. These could only be supplied by large-scale irrigation. I went on to say that, while we produced a "grass-fed steer" that was equal to the best in the world, it was a fact, nevertheless, that the great bulk of our range cattle are dumped on the markets every fall in an unfinished condition. This means not only a loss to the producer, but a great loss to the economy of the country as a whole. The situation was such, I continued, that it was useless to advocate mixed farming unless the conditions were present which made that system possible.

I stressed the fact that the whole PFRA program was designed to bring about a more diversified system of agriculture in the area of scant

or low rainfall, thus lessening the hazards of one-crop farming, the result of which was hardship and despair when crops failed from severe droughts.

I concluded my explanatory statement by relating some cases of hardship due to crop failures during the protracted drought of the thirties, of which I had personal knowledge. My purpose was to give specific examples of the human, or social, implications of the problem. Later, I had the satisfaction of learning from Mr. Gardiner that my recital of particular cases of hardship had made a "great impression" on the Prime Minister. Particularly impressive was the case of the farm woman, before related, who was too ashamed to be seen, by strangers, wearing clothes made from flour sacks and wornout shoes—shoes which were not even matched. However great the impression, the Prime Minister gave no indication at the conclusion of our discussion that he was ready, as the responsible head of the Government, to recommend to Parliament that the proposed project was in the national interest and should, therefore, be undertaken without undue delay.

## A NEW GOVERNMENT DECIDES TO ACT

In the general election campaign held in the spring of 1957, one of the campaign promises of the Conservative Opposition was that if returned to power at Ottawa, it would undertake the South Saskatchewan River dam. On election day, June 10, 1957, the Liberal strength in the House of Commons fell from 170 to 105 seats, while the Conservative party under the Hon. John G. Diefenbaker rose to 110, its highest total since 1930. Neither party enjoyed a clear majority, but the St. Laurent Government decided to resign, and Mr. Diefenbaker's party took office. The way in which the new government implemented its promise concerning the South Saskatchewan project will be related in the next chapter.

## CHAPTER TWELVE: THE PROJECT GETS UNDER WAY

### THE INAUGURAL CEREMONIES

The first step taken by the newly-elected Federal Government in 1957 was to complete the negotiations with the Provincial Government of Saskatchewan, initiated earlier by the Right Honorable J. G. Gardiner. These negotiations looked toward an agreement on the power and irrigation aspects of the project.

The first session of Parliament of the new federal regime opened with the Speech From the Throne, read on October 14, 1957. It contained the following reference to the South Saskatchewan project: "My Ministers will advance this National development policy further by initiating new discussions with the Government of Saskatchewan in order to make possible the early commencement of construction of the dam on the South Saskatchewan River."

On the following Friday, in debate on the Address in Reply to the Throne Speech, Prime Minister Diefenbaker stated specifically that immediately an agreement was reached "between this Government and the Government of Saskatchewan, and the allocation to the Province of Saskatchewan and its Government of the primary responsibilities for those things which are a provincial responsibility alone . . . we intend to proceed at the earliest possible date to the commencement of this project, after it has received—I hope it will—the approval of Parliament."

In July of the following year, such negotiations were successfully concluded; and on September 1, 1958, the Prime Minister moved the following resolution in the House of Commons: "That it is expedient that the Houses of Parliament approve the agreement between the Government of Canada and the Government of Saskatchewan respecting the South Saskatchewan River Project, signed on the 25th day of July, 1958, and that this House do approve the same." After some discussion the motion was carried unanimously, on a recorded vote.

There is no need to go into the many legal stipulations embodied in the Agreement. The purpose of this record will be served by giving a brief synopsis of the provisions governing the sharing of costs, for example, those which would be borne by Saskatchewan and those which would be borne exclusively by Canada.

This sharing of cost is specified in Part I as follows:

- (1) Canada and Saskatchewan will share the cost of the work, seventy-five per cent thereof to be borne by Canada and twenty-five per cent to be borne by Saskatchewan in accordance with this Agreement.
- (2) Notwithstanding anything in this Agreement, the share of the cost specified in clause 3 that is to be borne by Saskatchewan shall not exceed twenty-five million dollars.



It will be understood that the cost-sharing arrangement was brought about for the reason that the penstocks and other works necessary for the generation of hydro-electric power, together with the irrigation works, constituted, in the words of the Prime Minister, "a provincial responsibility alone."

The next significant event in the history of the project was the inaugural ceremony which was held on May 27, 1959, at the site of the dam, "to initiate officially the start of construction on the dam." An estimated 15,000 people from near and far, in Canada and also from nearby points in the United States, were in attendance at the ceremonies.

Among the special features on that occasion was an out-door luncheon, provided by the Saskatchewan Rivers Development Association for the official party. A number of guests who had been active in one way and another in promoting the project were also invited. Included in this class was the Right Honorable James G. Gardiner; the writer also received an invitation. Altogether, over 200 guests were present at the luncheon.

The setting for the feast—for that is what it turned out to be—had been carefully chosen. No better selection could have been made for the purpose, within a radius of fifty miles from the dam site, than the secluded scenic River Park on the outskirts of the Town of Outlook.

Tables and camp chairs were placed in the shade of tall age-old elm trees that formed a leafy arch over a sheltered glade on the bank of the river valley.

Ten or more large portable barbecues were grouped in a central position among the tables, an arrangement which enabled the attendants, waiting on the tables, to serve the thick slabs of succulent beef steaks, cooking on the grids, sizzling hot. Best of all, every guest had his, or her, steak served to taste—rare, medium or well done. Buttered rolls and apple pie, together with trimmings and other delicacies which went with the main course, were also placed upon the tables for the guests to pick and choose from. Steaming mugs of coffee were served to complete the feast! Then, as a final touch, artistic horn-handled steak knives were handed to the guests as souvenirs of the historic occasion.

The program for the afternoon had been carefully arranged beforehand. The Saskatchewan Dragoons' Band entertained the vast crowd assembled at the site of the dam for an hour or more with martial and other music, before the start of the official ceremonies at 2 p.m. Almost on the minute, a flight of six T-33 Jets from the RCAF station at Saskatoon streaked over the site in close formation, and then disappeared in the western haze, to reappear in a few passing seconds to swoop down low over the assembled crowd. This manoeuvre was repeated three times in rapid succession. It was, indeed, a spectacular opening for the official ceremonies.

A stage had been built on a step of level ground, part way up the river bank. The location was particularly good for the reason that the

bank curved in a way which formed a natural amphitheatre in front of and above the stage. The wide steps leading up to the large platform were decked with three colorful runners; a large coat of arms provided a suitable backdrop and gave the stage a somewhat official aspect, as befitted the launching of a joint federal-provincial enterprise.

Just as Dr. William B. Tufts, President of the Saskatchewan Rivers Development Association and chairman of the ceremonies, began to lead the official party through the crowd to the platform, the Saskatchewan Dragoons' Band struck up a popular march which met with a hearty response from the vast crowd assembled on the river bank and greatly enlivened the start of the ceremonies.

The chairman in introducing the two Government Leaders, Prime Minister Diefenbaker and Premier Douglas, said, among other things, that the event was a gesture of gratitude to the two Governments and their Leaders, "who we believe have read the future correctly and have acted for the Nation's benefit." The events of the day were "epoch making" in the history of Saskatchewan, and would "be long remembered in all of Canada," he said.

Premier T. C. Douglas gave the official address for Saskatchewan, in which he stressed the great importance of water in the economy of the province. The dam, he said, was essential to the future development of Saskatchewan. "Our economy is expanding and changing and if this is to continue we must have an adequate supply of water." The construction of the dam could mark "the economic turning point in the province's history." Discussing the historic background of the dam, he said that the vision of the explorer Professor Yule Hind of a dam at the site, "conceived 100 years ago," had never been lost.

The main, or formal, inaugural speech was made by the Prime Minister, the Right Honorable John G. Diefenbaker. Part of the text of the Prime Minister's address was published in the *Moose Jaw Times* of May 28, 1959, from which the following quotations are taken. The Prime Minister dealt, for the most part, with the national aspects of the project. "Canada as a nation seeks to ensure that there will be less heartbreak and surer hope in this region in years to come," he said. It was in a spirit of co-operation and joint recognition of the needs of the people of the province, as well as the people of Canada as a whole, that Canadians had joined together in the House of Commons and the Senate, to support the necessity of the work to the ends that those hardships of the past, "shall be but memories in the future," he said. He also spoke, as did Premier Douglas and the chairman, of the historical background of the dam. More than one hundred years ago, Captain John Palliser and Henry Yule Hind had the vision of a dam across the South Saskatchewan River. "We meet on this occasion beside a river of history," he said. Some of those who were present would remember the cruel

---

The South Saskatchewan River as it looked  
in 1958. Marker indicates site of dam.





years as well as the kind. "None of us can erase from memory the days of toil, the barren times, when the fields were dry, when the dust piled high against the fences, when the wind storms stripped the paint from the walls of homes built with pride and sacrifice. Those days were often days when poverty made farms prisons for men, women and children, when darkened fields told the story of blasted hopes, but hope was never surrendered to despair," he said.

They had met to "launch the beginnings of new hope and a new day," he said. "It is my honor and privilege to declare the inauguration of the South Saskatchewan Dam Project; to declare it officially under way, a project which in the days ahead will be a symbol of triumph over the struggles of the past, whereby the people of today will lay the foundations for greater opportunity and hope, not only for Saskatchewan, but for Canada as a whole. In other words, in building here this great project for the benefit of generations yet unborn, we make our contribution in a spirit of unity among the races the building of that Canada whose destiny is founded in the heritage of its people as the richness of its resources." Pausing momentarily, he concluded: "Mr. President, Mr. Premier, my fellow Canadians, I now declare the inauguration of the construction of the South Saskatchewan River Dam." Then he pulled the switch. Instantly, there was a loud blast, as half a ton of dynamite exploded and shot a mass of river-bottom earth mushrooming hundreds of feet into the still air. It was split-second timing, which gave the crowd, looking down from the hillside, a breathless thrill.

Another event in the afternoon program worthy of mention here, was the ritual ceremony of inducting Prime Minister Diefenbaker into the Sioux Indian Tribe. This ceremony was carried out by Chief William Little Crow and his braves of the Wood Mountain Band of the Dundurn Reserve.

The Prime Minister was given the honorary title "Chief Tatonka Moni" (Walking Buffalo) by Chief William Little Crow, who placed the traditional eagle-feather head-dress on the Prime Minister's head. The Prime Minister was also presented with a beaded buckskin jacket by William Eagle of the same band.

Elizabeth Royal, a comely seven-year-old Indian maiden suitably attired in distinctive Indian costume, presented the First Lady, Mrs. Diefenbaker, on behalf of the Moose Woods Band, with a beautifully beaded buckskin handbag.

The ritual ceremonies were concluded with a dance on a stage built for the purpose, a dance in which about twenty members of the band took part, dressed up in full regalia for the act. Altogether, it was a very interesting ceremony which added color and entertainment, and fitted the occasion.

---

The Gardiner Dam photographed from the air in 1966.





Also among the acts put on in the afternoon for the interest of the vast crowd was a display of large earth-moving equipment, bulldozers and the like, which paraded the roadway then in use for operations at the site.

The program was concluded with a daylight fireworks display which was particularly spectacular, in that it illuminated the sky overhead in an aurora of rainbow colors and set a series of flags floating down by parachute among the assembled crowd.

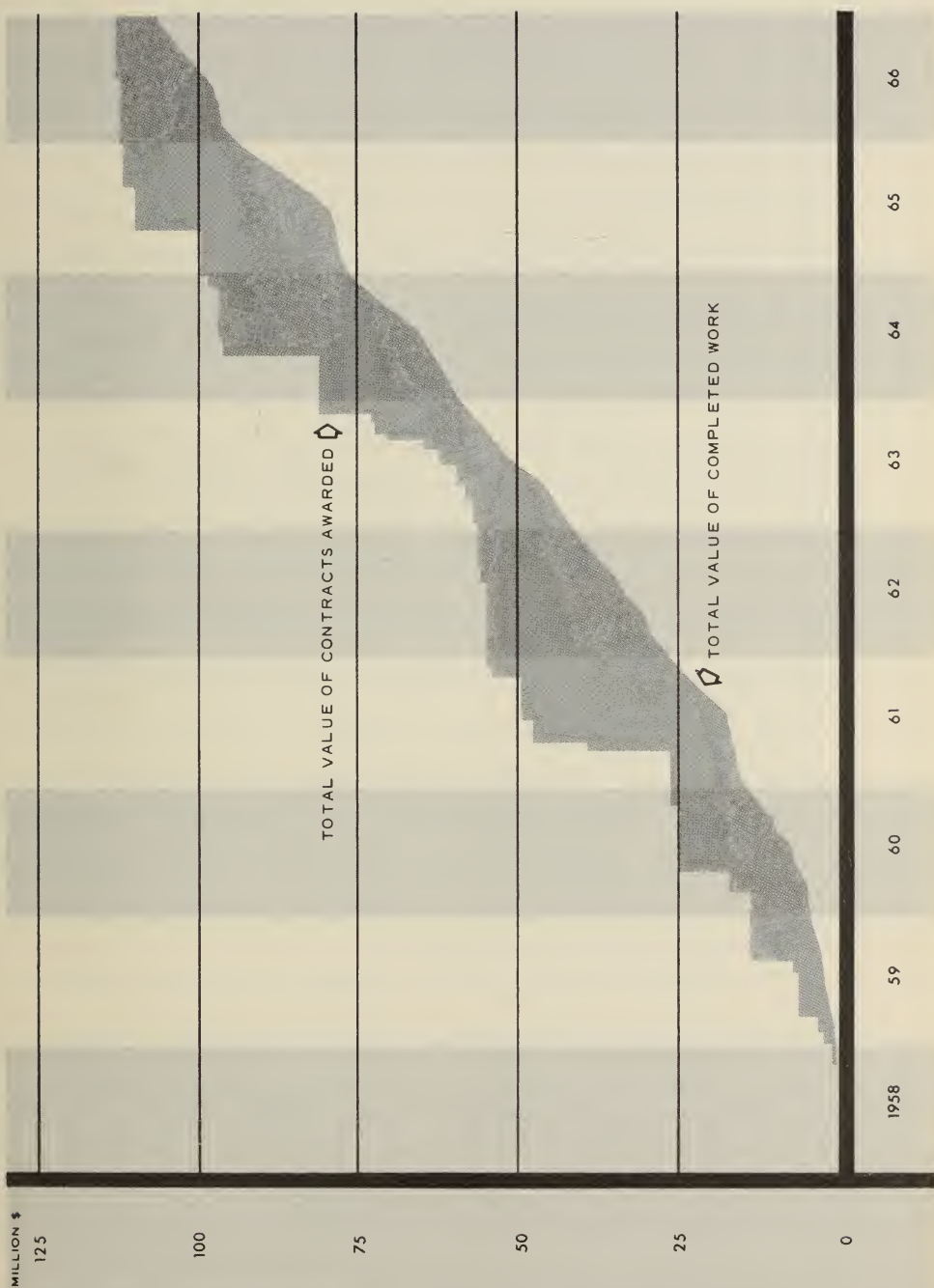
The main events marking the inaugural ceremonies have been given for the reason that these events serve to show the public interest which the project had aroused and the enthusiastic response which the inaugural ceremonies called forth. As is often the case in such proceedings, preliminary work had been started on the dam six months or more before the official inauguration; eight contracts had been awarded, and were by then under way. Additional contracts were awarded, from time to time, as the work progressed. Some of the largest of these were for the excavation of five large diversion tunnels, 4,400 feet long and 20 feet in diameter.

In order to divert the flow of the river into the tunnels, so that the dam could be constructed "in the dry," it was necessary first to construct an earthfill cofferdam. The construction of such a work is a critical operation in its final stage—the stage which is known by construction engineers as "closure." Precautions are taken, therefore, to ensure the success of such an operation, as much can happen that cannot be foreseen or provided for in advance. The conditions in each case are so diverse that there is no definite engineering formula for the operation. Obviously, a period of low flow in the river is preferred for the closure.

The method usually followed in the construction of an earthfill cofferdam is to begin bulldozing the fill across the river from both banks at the same time, thereby narrowing the channel through which the river flows, until a stage is reached when a vigorous and concentrated effort for a short time, say an hour or so, can achieve closure.

There is some choice in the matter of materials which can be used to carry out the critical operation. They may be sand, gravel, earth or a mixture of the same. The availability of material is usually the determining factor in a particular case. In a critical situation, if too much of the material bulldozed into the river is being washed away by the increased force of the flow as the opening in the fill is rapidly narrowed in the last stages, rocks can be dumped into the open gap in the fill, to stem the erosive effects of the rapid flow.

Several very active years followed the inauguration ceremony, and on February 14, 1964, the work on the South Saskatchewan River dam had reached the stage when closure could be undertaken with every hope of success. Unlike the inaugural ceremonies, for reasons which





can be readily understood from what has been before stated, no advance announcement of the date was given to the general public. Consequently, while there was a considerable number of people present on the important occasion, they were largely confined to PFRA engineers and officers of the Federal and Provincial Governments, who, in one way and another, were connected with the project. Representatives of the press and radio and a few others who were likewise in close touch with developments also were present.

The Director of PFRA, M. J. Fitzgerald, not only gave this writer an invitation to attend the closure operation, he also accorded me a front seat in the plane that was flying him, and one or two others, to the scene of activity. So, if the following description is in any way inadequate, it does not arise from any lack of opportunity to view, in person and on-the-spot, all stages of the critical operation.

Before touching down on the air-strip at the dam, which we reached at 10 o'clock in the forenoon, our pilot circled the scene of activity so that we had the benefit of seeing the whole operation, then in progress, as it could not be seen at ground level. Twelve giant bulldozers, six on each end of the fill, were engaged in bulldozing the loose material which had been previously piled into position on both banks of the river, into the rapidly narrowing gap in the cofferdam. It was imperative to fill the gap rapidly, as the swift flow was washing away much of the material being bulldozed into the river. In other words, the success of the operation depended entirely upon the rapidity with which the material could be bulldozed over the ends of the fill into the gap through which the water was flowing.

After we had landed and found a suitable observation point on the west bank of the river, about a hundred feet upstream from the toe of the fill, we learned from a PFRA engineer that the gap in the fill had been narrowed to 40 feet or less. I was anxious to know how much of the material which was being bulldozed over the ends of the fill into the gap was being washed down the river by the force of the current, and turned to one of the PFRA engineers standing beside me for the answer. "About seventy-five per cent," he replied.

The answer was not just an engineer's guess. Hydraulic model tests had been conducted to determine, among much else, the percentage of the material which would be washed away in the last stage of the bulldozing operations. It was, indeed, an unrelenting battle between the onslaught of puny man and the tremendous latent forces of nature. A compensating factor, in the struggle, was that while the velocity of the flow increased as the gap was narrowed by the bulldozing operations, the pond level above the fill was slowly but surely rising, with the result that more and more water poured into the diversion tunnels.

We had been told that lunch would be served in the engineer's dining hall, promptly at high noon. Just before we left our observation post, I placed a flat stone on its edge, two or three inches above the



level of the water in the pond above the fill. "The water level will be up to that mark when we come back from lunch," I forecast. It was a pure guess on my part, but when we returned to the spot three quarters of an hour later the stone was entirely under water and the gap, in the fill, had been narrowed to less than twenty feet.

Then, to obtain a downstream view of the flow, the Chief Engineer of PFRA, J. Gordon Watson, C.E., and the writer, crossed the fill and took up our stand on a mound of earth just below the downstream toe of the embankment. From this vantage point we could see the muddy water gushing through the narrow gap as it fell from pond level above the dyke to the river level below.

We watched intently as the twelve powerful machines bulldozed large masses of loose material into the gap from both ends of the fill. Cameras, of all shapes and sizes, appeared from nowhere. The writer can recall hearing one spectator declare that he had never in his life before seen "so many cameras to the square yard."

The situation became more tense by the minute as the opening in the fill was being rapidly narrowed by the bulldozing operation, while the swift flow through the opening cut its way through in a narrow muddy boiling stream, carrying much of the bulldozed material with it down the river.

Then, while cameras clicked, four powerful bulldozers—two on each end of the fill—ground forward abreast pushing two great masses of loose material, which, in a passing minute or two, cascaded into the gap and landed in a great heap right into the narrow opening in the dyke. They sealed off, completely, every trickle of the flow! Closure had been achieved!

I glanced at my watch and noted, for the record, that it was "1:53 p.m., February 14, 1964." The few of us who had been standing together, watching the operations, immediately clambered up the slope of the loose fill to the top, where the bulldozers were levelling and compacting the loose material. I turned to the Project Engineer, Walter B. Thomson, C.E., who stood beside me, and suggested to him that we should walk across the newly-created earth bridge. Consequently, we stepped out together, walking abreast to the other side of the channel.

It can be said, therefore, that for the first time since the dawn of creation, two exultant humans, in the persons of Walter B. Thomson and this writer, walked across the mighty South Saskatchewan River Valley on dry land!

After the river had been diverted into the tunnels, the construction of the channel section of the dam could be undertaken immediately. The east and west embankments had been completed before closure of the cofferdam could be made, for the reason that certain structures had to be erected on the west embankment, including structures for the control of the flow through the tunnels.

A contract was therefore awarded on March 19, 1964, for the

construction of the embankment in the channel section. Over two years from the date of closure were required to complete the dam and the appurtenant works; and by that time the Aiktow Creek-Qu'Appelle River summit dam had also been completed. About one more year, depending upon flow conditions in the river and other things, would be required to bring the large reservoir of 8,000,000 acre-feet capacity up to full supply level. Thereafter the stored water would be available for the purposes before outlined, and the vision of those incomparable and dedicated pioneers, William Pearce, J. S. Dennis and others whom they inspired by their zealous service in the cause of water conservation and use on the open plains, would be appreciably advanced toward complete fulfillment.

## POSTSCRIPT: SHAPING THE FUTURE

Mere humans are not endowed with the faculty of seeing into the future; they can, however, observe trends which shape the future. At the time of this writing, farm units have greatly increased in size, due to the transition from animal to machine power. This trend is increasing as farm equipment becomes larger and more powerful. In recent years too, there has been a considerable increase in the cattle population on prairie farms—an increase due, for the most part, to the increased stockwatering facilities which have been brought about by the PFRA program of water development under the classification: Individual, Neighbour and Community Projects. A further fact in this connection, which has an important bearing on the existing situation, is the enormous grazing potential of the prairie region, a potential which is only realizable if adequate water supplies are made available for grass-land development.

In short, grass and water are two indispensable requirements in a livestock economy. Then too, adequate water supplies are not only essential for stockwatering purposes, there is also the necessity for producing feed and fodder, to carry the cattle over the winter months. The only dependable means of producing adequate supplies of feed and fodder is by large-scale irrigation; particularly where operations are largely on a livestock basis. Irrigation on a large scale will also bring about the establishment of secondary industries, as evidenced in Southern Alberta—not to go farther afield. All of which has been stated, in one connection and another, in previous chapters of this record.

All in all, the importance of water in the economic and domestic life of the people resident in the low or scant rainfall area of the great plains cannot be too strongly stressed: a vast area, over five times the size of the combined Maritime Provinces of Nova Scotia, New Brunswick and Prince Edward Island, with an inestimable agricultural potential in excess of these provinces. This potential can only be fully realized to the degree that water supplies are made available. Surely, it is not beyond the wisdom of Parliament and the Canadian people generally

to strengthen the economy of the nation by the rehabilitation of such a vast area. Certainly, it cannot be said that the best use has been made of the region's water resources while great rivers run waste through parched farm and grasslands to the ungrateful sea.

In a previous chapter particulars of the investigations and studies with reference to diverting waters from the North Saskatchewan, Clearwater and Red Deer Rivers were given in considerable detail. The possibility of creating storages on the headwaters of these and other rivers, originating on the eastern slope of the Rocky Mountains and foothills, was also investigated and found to be feasible. Improved topographic maps, which have since become available, reveal that waters from rivers flowing north, from the same source, can also be diverted for agricultural and other purposes in the prairie region. Specifically, water can be diverted from the Peace River, Little Smoky River, Athabasca River, McLeod River, Pembina River, Sturgeon River, Ram River, and the Beaver River into the North Saskatchewan River. Farther east, water can be diverted from the Churchill River into the Saskatchewan River and thence into the Nelson River to increase the flow of these rivers for hydro-electric development and other purposes. The waters of these rivers on the eastern slope of the Rocky Mountains, combined with the rivers on the western slope, also running waste, together with the headwaters of the mighty Yukon River in the Yukon, comprise an immense untapped water potential which, if and when fully developed, would strengthen the economy of Canada as a whole, to a degree which would put Canada in an enviable position among Western nations.

The first requirement to such a desirable end is a National Water Resources Policy. Such a policy cannot be formulated until a precise and comprehensive engineering investigation and study has been made. Such an investigation would determine the actual amount of Canada's vast water resources, together with the best means of conserving and utilizing the great potential available for development.

True, such a policy, to be sound in principle and adaptable in practice, should also be based upon economic feasibility. Hence the necessity for an economic examination and study of the relevant factors, in conjunction with the engineering investigations. But, in such a study, first things should come first; until the total available water supplies, from all sources, have first been determined, economic and other related studies would only be an exercise in futility. Consequently, the physical investigations should not be tied to the other studies in a way which would hamper and delay the outcome of the engineering investigations.

The reason for haste in getting on with such investigations is primarily that the time has come when it is recognized that an adequate and pure water supply is essential if Canada is to maintain present and future growth as a great industrial and agricultural nation. It is, there-

fore, imperative that the development of such a valuable natural resource should proceed on the basis of authentic information. As before stated, such information should be secured prior to the formation of a National Water Resources Policy.

A fortunate circumstance, in this connection, is that the Federal Government has an engineering organization fully competent to carry out the necessary investigations. The engineering branch of the Prairie Farm Rehabilitation Administration has had long experience in water resource development. Then, too, they have first-hand knowledge of conditions in the North and Northwest, where the investigations will, for the most part, be conducted. Indeed, many of the investigations will be within the orbit of their present activities. All that is necessary, therefore, for an early start, is a directive from the Federal Government to that effect.

Another, and equally important, reason for a National Water Resources Policy is the fact that some large and influential interests in the United States are looking with envious eyes at Canada's immense water resources in the West and Northwest region: resources which are running waste to the Arctic and Pacific Oceans. The vast potential, as represented by the headwaters of the Yukon River, in the Yukon, can also be cited as an example of a great water resource running waste without serving any useful purpose.

All of which has stimulated a desire, on the part of these interests, to share with Canada the great water potential which they have concluded, from Canada's manifest lack of interest, is of little or no use to Canada either now or in the foreseeable future.

That the proposal on the part of United States' interests to share in Canada's vast water resources is more than a pipe-dream, more than idle speculation, is evident from recent developments. The Ralph M. Parsons Company, Los Angeles, one of the largest engineering and technical firms in the United States, undertook to make a study of what is spoken of as the "water-shortage problems" in the Central Western States and California. These studies resulted in the conclusion that the only solution was the importation of a large quantity of fresh water from Canada. Thus it came about that The Ralph M. Parsons Company was one of the first to advance the concept that water should be regarded as a continental resource and should, therefore, be developed on a continental rather than on a regional, or river-basin basis. For these reasons The Parsons Company became the strongest advocates of such a system—so much so, that the proposed scheme became generally known as the "Parsons Plan."

The main contention in support of the plan is that dry areas in Western Canada could be supplied with large quantities of water—areas which could not be supplied in any other way. Water-short areas in the Middle Western and Western United States and Northern Mexico could



also be supplied with large quantities of water by such a comprehensive system.

In order to carry out such a colossal undertaking gigantic works would have to be constructed, such as dams, large storage reservoirs, huge canals for conveying large quantities of water to distant areas, tunnels, siphons, locks, pumping plants, and other works. In a "News" sheet issued by "The Ralph M. Parsons Company Public Relations Department," the following statement is made: "The heart of the system is a 500-mile long storage reservoir in Canada, in what is known as the Rocky Mountain Trench, at an elevation of 3000 feet." It is further stated by the same authority that, "The name given the Parsons water and power plan is NAWAPA, which is short for North American Water and Power Alliance. The Plan recommends a co-operative venture by the three nations—Canada, Mexico and the United States, and calls for a redistribution of water and power on a continental basis for the mutual benefit of each."

The magnitude of the proposed Plan can be best summarized by quoting a statement contained in one of the "News" sheets by the same authority, which is as follows: "Total cost of construction of the North American Water and Power Alliance program might be about \$100 billion, including costs of financing and contingencies, and would require over 30 years construction time."

As could be expected in the circumstances, the Parsons Plan has aroused a great deal of interest not only by the general public but also in high levels of Government in Washington, D.C.

In a "News" item, reporting a meeting of the Calgary Chamber of Commerce, in Calgary, December 11, 1964, at which representatives of The Ralph M. Parsons Company were present, the following statement was made by Mr. Moore, speaking on behalf of that company: "As a result of the public announcement, and subsequent briefings to government officials in Washington, D.C., a Senate Subcommittee under the Chairmanship of Senator Frank E. Moss of Utah was formed to study the concept and recommend appropriate follow-up action." Mr. Moore went on to say that, "This work has been completed and a report printed. The report recommends a full-scale feasibility study. Senator Moss has also written to our Secretary of State, Dean Rusk, asking that he officially approach the Canadian Government for the purpose of obtaining Canada's reaction to such a study."

For the lack of authentic information on two all important factors, namely, the over-all available amount of Canada's vast water resources, and the present and future, or ultimate, needs within our own borders, for such water supplies, it is not possible to say, with any degree of certainty, whether the colossal Parsons Plan would be a good or a bad scheme for Canada. What can be said, is that no negotiations whatever should be opened with the United States Government on the Plan until the investigations can be conducted on the basis of established physical

and economic facts, rather than assumptions. Hence the necessity for haste in starting and pursuing our own investigations and analytical studies, as before outlined.

The hydro-electric power potential of the Upper Yukon River, in Canada, is also of great magnitude. Surveys and studies of the region have disclosed that waters within the Upper Yukon basin could be diverted to sites at lower levels, in British Columbia, where large amounts of hydro-electric power could be generated for the development of a rich mineral region.

A detailed report on all the ramifications of Yukon River development would be out of proportion here. But there are interesting international implications. The "Alaska Panhandle" at present effectively blocks Canadian access to a deep water seaport. It also greatly restricts the hydro-electric head which a power station at the nearest point to tidewater would afford.

Under the Boundary Waters Treaty of 1909, parties injured in the United States as a result of diversions from the Yukon River basin in Canada, which would lessen the flow of the Yukon River at the International Boundary, could claim compensation in a Canadian court for such injuries. Studies for a great hydro-electric development on the American portion of the Yukon River have been carried out. Canadian diversions upstream would, therefore, have to be planned so as to forestall compensation claims for injury to such an American project.

Though Canadian surveys are preliminary and limited in scope, it is known that among the projects specified on the main stem of the Yukon River and its principal territories, which originate in the large drainage basin to the east and empty into the Yukon River between Whitehorse and the International Boundary, dams can be constructed which will trap flood waters in large storage reservoirs, from which water can be released to augment the flow of the river at the Yukon-Alaska boundary. This would ensure that conditions would remain as favorable for power development at Alaskan sites, after diversions were made for Canadian use. Indeed, such regulation of the flow would improve conditions for the development of hydro-electric power downstream in U.S. territory.

These large-scale future plans and international factors stress the need for further and more detailed surveys and analytical studies. Armed with authentic engineering data, Canada would be in a position of strength in conducting any negotiations which might be necessary with the United States. Canada could then state clearly and with certainty not only what could be done but what *would* be done to ensure that no injury to United States' interests would result from any diversions of headwaters to points outside the basin, should the United States proceed with major hydro-electric works on the U.S. portion of the Yukon River.

All of which is to say that the time has clearly come when Canada should undertake, without delay, comprehensive and intensive investiga-

tions and full-scale feasibility studies to determine all available water supplies within Canada's borders; to the end that a National Water Policy can be established and a program of orderly and progressive development inaugurated.

Let it be said, that it was not for nothing that the dedicated pioneers of former days—William Pearce, J. S. Dennis and C. A. Magrath, to mention three of the pioneers—strove to convince governments of their time as to the necessity of adopting a water conservation and utilization policy. Their efforts in such a great cause were stimulated by visions of the prairie region of Western Canada becoming a land where security and social well-being would prevail.

It is for those of us, of another and later generation, to ensure that their efforts were not in vain, that in the fullness of time their vision will become a living and enduring reality.

## ACKNOWLEDGMENTS

I take advantage of this means to express my sincere thanks to Mr. M. J. Fitzgerald, Director of The Prairie Farm Rehabilitation Administration, for the very great interest he has taken in my efforts to record events in connection with water conservation and use in the prairie region—events which date back for more than one hundred years.

I particularly desire to express my gratitude to Mr. Fitzgerald for his earnest and effective efforts in securing the publication of my work, all the more so because the agency chosen was very appropriately the Canada Department of Agriculture. This, among other things, will ensure a Canada-wide distribution of the book.

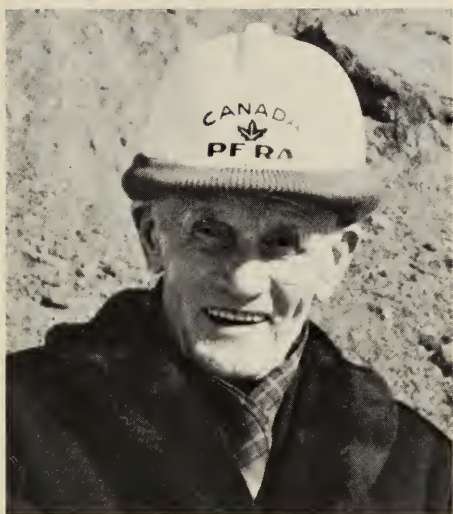
I am also greatly indebted to the senior engineers of the PFRA for their assistance. It would have been impossible for me to deal with the many technical and intricate matters involved in giving an intelligent description of the various works without the specialised knowledge the PFRA engineers had at their disposal—knowledge which they freely and very willingly made known to me.

When matters requiring research came up I had every assistance from Mr. Allan R. Turner, Provincial Archivist, and the staff of the Saskatchewan Archives and Legislative Library, in locating relevant records which enabled me to trace the development of the prairie region from the time of Captain John Palliser and Henry Youle Hind to the present day.

I am also very grateful to Professor Wilfrid Eggleston, noted journalist and author, for his able and painstaking editing of the manuscript, which has greatly improved the construction and arrangement of the material, thereby making the book more presentable and readable to the general public.

GEORGE SPENCE  
Regina, January, 1967





George Spence filed on a homestead south of Swift Current in 1912, right on the Montana boundary. He used to say that he farmed in Canada but turned his team around in the United States. Rainfall was scanty and evaporation high in the heart of Palliser's Triangle, water was scarce and precious—these facts left an abiding impression. A homesteader at 33, Mr. Spence had many years of eventful life behind him and half a century of public service still to come. He had been born in the Orkney Islands, had been educated in England and at Edinburgh, had emigrated to Canada just as the "Last Great West" was opening up, had mined for gold in the Klondyke, had farmed in Manitoba and had run surveys for the C.P.R. He was married in 1919 to Ivy Irene May of Windthorst, Saskatchewan, and they had two daughters. His experiences on the homestead on the High Plains made him an ardent supporter of conservation measures. He served with the Better Farming Commission of 1920, sat in the Saskatchewan Legislature, twice won a seat in the House of Commons at Ottawa, joined the Saskatchewan Cabinet and held several important portfolios. In 1938 he was chosen first director of the Prairie Farm Rehabilitation Administration (PFRA). He held this post for nine years, during which time he had the privilege of initiating and encouraging a large and varied program of rehabilitation, restoration, conservation and better land use; and helped launch a number of important irrigation projects. From 1947 to 1957 he served on the International Joint Commission. Among many awards and recognitions, he was made Commander of the Order of the British Empire (C.B.E.) in 1946 and Doctor of Laws (L.L.D.) by the University of Saskatchewan in 1948.











