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WATER-POWER RESOURCES OF CANADA

The Water Resources Branch, Department of Northern Affairs and National Resources, in its annual review of the water-power resources of Canada and of their development as achieved to the end of the year 1956, points out that the water powers of Canada, although only partly developed, have exercised a marked influence on the economic development of the country.

Throughout the present century, there has been a gradual change from an economy based largely on agriculture to one increasingly dependent upon industrial operations and this transition, closely coinciding with the growth of water-power development, has been accelerating in recent years. The close relationship between water power and industry in Canada is particularly evident in southern Quebec and Ontario which, although lacking in indigenous coal, have become the most highly industrialized regions of the country through the use of their large water power resources. The Province of British Columbia, which is rich in potential water power, also has been making rapid industrial progress coincident with water-power development. These three provinces in particular continue to experience the rapid industrial growth which is evident in varying degree throughout the nation.

From the pronounced activity in hydro-electric construction in Canada during 1956, it is evident that this general trend is continuing vigorously. A total of 845,000 h.p.

of new capacity was brought into operation during the year and the construction of additional hydro-electric capacity is being accelerated.

Figures of power available at Ordinary-Six-Months Flow which total 57,007,000 h.p. may be said to be conservative as these presently recorded water-power resources of Canada will permit an economic turbine installation of about 74,000,000 h.p. Also, the present total turbine installation of 18,356,148 h.p. indicates the development of less than 25 per cent of the recorded water-power resources of Canada.

LARGE RESERVES

Although extensive use of Canada's water-power resources is being made at the present time, large reserves of potential power are still available. It is true in some areas, where the more attractive sites within economic transmission distance of present centres of population already have been developed, that the use of thermal-electric stations is becoming increasingly important. However, remaining reserves of not-too-distant power are sufficient to meet the prospective needs of a considerable part of the more closely settled areas for some years at the very least; also, improvements in the technique of long-distance transmission, including the use of higher voltage, are bringing additional sites within the orbit of existing systems. In

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more remote districts, water power will facilitate the utilization of mineral and other resources and promote the establishment of new communities; from the viewpoint of moving Canada's frontiers northward, the availability of considerable amounts of potential power in the more northern and at present rather inaccessible regions of the country is a definite advantage.

PROVINCIAL DISTRIBUTION

Considerable amounts of water power are being used in all provinces, with the exception of Prince Edward Island, where resources are small. The Provinces of Ontario and Quebec, which contain nearly 50 per cent of the total available power and almost 76 per cent of the developed power, have now developed about 38 per cent of their presently recorded total resources. These central provinces have become highly industrialized by the use of water power. As the development of Canada's natural resources proceeds, the fortunate incidence of water power in proximity to mineral deposits, pulpwood, and other natural resources is becoming more apparent.

British Columbia, traversed by three distinct mountain ranges and with, on the whole, a high rate of precipitation, has many mountainous rivers which offer opportunity for power development. The Province ranks second in available resources and is exceeded only by Quebec and Ontario in installed capacity. A large part of present development is located in the southern portion of the province, but the largest development is the northern Kemano plant of the Aluminum Company of Canada with a present capacity of 600,000 h.p. The British Columbia Power Commission, which was organized in 1945, has become an important power-producing and distributing agency.

In Alberta, the larger hydro-electric developments from which Calgary Power Limited serves a large part of the southern portion of the province, are located on the Bow River and tributaries. The greater part of water-power resources is located in the northern half of the province, rather remote from present centres of population.

In Saskatchewan, water-power developments are confined to mining uses in the northern areas where water-power resources are abundant. The transmission network of the Saskatchewan Power Corporation of the Provincial Government, serving the more settled areas, is supplied exclusively by fuel-power plants. Large reserves of coal, oil, and natural gas are located in both Saskatchewan and Alberta; these fuels provide the more economic sources of power in many parts of both provinces, particularly in southern Saskatchewan.

Of the Prairie Provinces, Manitoba has the largest water-power resources, there being great potential power on the Saskatchewan, Nelson, and Churchill Rivers. The larger present developments are located on the Winnipeg

River and serve Winnipeg, adjacent municipalities, and the transmission network of the Manitoba Power Commission. The Commission is at present serving about 496 cities, towns and villages and is carrying out a vigorous programme of rural electrification. It is estimated that approximately 43,000 farms were receiving service at the end of 1956.

Ontario has large water-power resources, being exceeded in this respect only by Quebec and British Columbia. It has developed about 58 per cent of its recorded available power and ranks second in power production among the provinces. The Hydro-Electric Power Commission of Ontario is the greatest power-producing and distributing organization in Canada; it operates 65 hydraulic generating stations with a total capacity of more than 4,000,000 h.p. the largest development being on the Niagara River at Queenston where the 1956 capacity of the Sir Adam Beck-Niagara Generating Stations Nos. 1 and 2 was 1,820,000 h.p. In addition the Commission purchases nearly 1,000,000 h.p. on contract. At the end of 1956, power was being supplied to approximately 1,345 communities; rural electrification receives special consideration and approximately 139,500 farms are now being served.

The Province of Quebec is richest in water-power resources, containing more than 35 per cent of the total recorded for Canada. Quebec also ranks highest in developed power, its present installation of 8,489,957 h.p. being more than 46 per cent of the total for all provinces and representing the development of about 33 per cent of its presently recorded resources. Two of the larger hydro-electric plants in the world are located in this province; the Quebec Hydro-Electric Commission's Beauharnois development on the St. Lawrence River has a present capacity of 1,408,000 h.p. and the Shipshaw plant of the Aluminum Company of Canada on the Saguenay River is rated at 1,200,000 h.p. Power production in the province is facilitated greatly by the regulation of stream flow by the Quebec Department of Hydraulic Resources through the storage dams it operates on controls. Rural electrification has made good progress and extensions of service through co-operative distribution systems are being fostered by the Quebec Rural Electrification Bureau.

The water powers of New Brunswick and Nova Scotia, although small in comparison with the resources of other provinces, constitute a valuable source of power of which considerable use is being made; both provinces have numerous rivers upon which moderate-sized power sites exist within economic transmission distance of the principal cities and towns; other sites are advantageously situated for the utilization of timber and mineral resources. These provinces also are favoured with abundant indigenous coal supplies. In Prince Edward Island, there are no large streams and consequently water-power sites are limited in size to those used for small mills.

MANITOBA FISHERIES

With the annual marketed value of its products between five and seven million dollars, the commercial fishing industry of Manitoba does not rank high in the economy of the province, according to Information Services, Department of Fisheries. However, it gives employment to some 6,500 fishermen and probably as many more in subsidiary industries such as transportation, fish processing, fish marketing and fish box manufacture. Some 17 freighting vessels transport the catch to market and about 2,500 fishing boats and skiffs are used in the fishery. These craft represent an investment of some \$750,000. Some 100,000 gillnets are used, valued at about \$2.0 million. All told the investment in equipment is about \$3.0 million.

Of the 100 million pounds of fish landed annually in the commercial freshwater fisheries of Canada, about two thirds of the total comes from Manitoba and Ontario. At one time about half Canada's freshwater catch came from Ontario with one-quarter from Manitoba. In recent years Manitoba has forged ahead and on a few occasions caught more than Ontario. In 1951, Manitoba's total catch was about 35.5 million pounds, while Ontario landed about 31 million pounds. In 1952, however, Manitoba's catch declined to 31 million pounds while Ontario fishermen landed about 38 million pounds. In 1954 there was a further decline in Manitoba to 28 million pounds and Ontario fishermen landed 48 million pounds.

SPECIES

In the past 10 years the commercial fisheries of Manitoba have yielded an annual catch of about 30 million pounds. Lake Winnipeg, the seventh largest freshwater lake in North America, has provided almost half of Manitoba's annual catch. From Lake Winnipeg comes the famous Selkirk whitefish which are in great demand in the United States where they are smoked for the delicatessen trade. The Winnipeg goldeye, which made its first appearance from Lake Winnipeg catches, is Manitoba's most famous fish but landings have declined over the years and its contribution to the total is small. The greater part of the goldeye catch now comes from Lake Winnipegosis and the Saskatchewan River.

In poundage, the greater part of the catch is pickerel, followed by whitefish, saugers, pike and tullibee. Other species, in addition to goldeye, are bass (sheepshead), bullheads, carp, catfish, perch, suckers and lake trout.

The areas producing the catch include sixty or more lakes, some of which are quite small. The principal production is from Lake Winnipeg, Lake Manitoba, Lake Winnipegosis, South Indian Lake, Gods Lake, several small lakes in the district of The Pas, and the Manitoba portion of Reindeer Lake.

Processing of fish for market has expanded and the demand for Manitoba fillets increased. New plants have been constructed and existing ones remodelled and improved.

Winnipeg is the centre of the freshwater fishing industry in Western Canada and distributes, in addition to the Manitoba production, large quantities of fish produced in the neighbouring provinces.

METHODS OF FISHING

The summer fishing operation produces somewhat less than half the total catch. The gear in general use is the gillnet and the fishermen operate motor-driven boats, usually about 32 feet long, and skiffs usually about 20 feet long. The boats go out daily and return before nightfall. In the winter the gillnets are set through holes cut in the ice and the fishermen establish camps on the ice right at the fishing grounds and usually stay out a week at a time under semi-Eskimo conditions. Part of the catch is frozen and packed at the camp site and part is hauled in heated cabooses to the packing station to be packed as fresh fish. Tractors and snowmobiles haul it to railheads.

FISHERY REGULATIONS

Under federal legislation the Manitoba Department of Mines and Natural Resources administers the fishing regulations. The regulations provide for conservation measures in the fishing areas and the number and sizes of boats permitted. All fish dealers are required to be licensed under the Fish Dealers Act of Manitoba. Special attention is being paid to quality products by officers of the Department of Fisheries of Canada. The federal Department introduced a system of inspection of all export shipments of whitefish from Canada, which came into full operation on May 16, 1951. Federal officers are stationed at points in the province as well as in other provinces and examine shipments of whitefish destined for United States markets. The whitefish Export Inspection Regulations have been welcomed by the industry and now Departmental officers are being asked to inspect shipments of other fish such as pike, pickerel, lake trout and tullibee. The Manitoba department, like Saskatchewan and Alberta, makes whitefish surveys on commercially fished lakes to determine the quality of the fish for market purposes. The data is gathered by provincial conservation officers in the field and an analysis service is provided by the federal Department of Fisheries in Winnipeg.

The concern over the quality of whitefish originating in Manitoba and other inland provinces led to the establishment of a scientific research station in Winnipeg in 1944. This station is operated by the Fisheries Research

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Board of Canada, the scientific arm of the federal Department of Fisheries, and while the whitefish investigation is still one of its chief responsibilities, it has become concerned with all research problems of the area. One of the more important of these is a programme of studies to determine general principles regarding the best methods to manage lakes so that they will produce the maximum fish crop perpetually. Studies have been conducted on Lake Winnipeg, as well as on Great Slave Lake in the Northwest Territories, to collect data on catch per unit of effort and the size of fish caught. Efficiency of fishing gear is also tested.

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HARBOUR IMPROVEMENT: Transport Minister George C. Marler announced on May 1 that, on the recommendation of the National Harbours Board, a \$57,000,000 programme of capital works for Montreal Harbour, exclusive of expenditures on traffic bridges, had been approved by the Government. Some of the work has already been completed, and some is in course of execution or is being planned. Contracts amounting to \$17,600,000 have been awarded to date.

"The need for the new facilities arises to a considerable extent as a result of the changes, particularly as to the transportation of grain, which will occur as a result of the construction of the St. Lawrence Seaway," Mr. Marler said. "The new work was planned not only to accommodate the increase in transportation traffic which the Seaway is expected to engender but also to serve the needs of the rapidly expanding economy of the Montreal area."

The programme of capital works, with the value of contracts already awarded in brackets, is classified as follows: grain elevators \$27,000,000 (\$6,600,000); wharves and piers \$17,000,000 (\$6,400,000); transit sheds \$5,000,000 (\$1,100,000); dredging and navigation channels \$7,500,000 (\$3,500,000); and miscellaneous items \$500,000.

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BRITISH TEACHERS: Qualified British teachers interested in continuing in their profession in Saskatchewan are being interviewed in Great Britain and Ireland through the months of April and May, Education Minister W.S. Lloyd said recently. The programme, being conducted for the third time in four years, is a joint effort of the Saskatchewan School Trustees Association, the Saskatchewan Teachers Federation, and the Department of Education.

Interviews are being conducted by L.F. Titus, Saskatchewan's chief superintendent of schools, and John MacLeod, superintendent of high schools, at Bristol, London, Birmingham, Manchester, Leeds, Glasgow, Edinburgh, Newcastle-on-Tyne, Belfast and Dublin. Previous programmes resulted in over 275 British teachers coming to the province.

NATO COUNCIL: The Secretary of State for External Affairs, Mr. L.B. Pearson, headed the Canadian Delegation to the ministerial meeting of the North Atlantic Council which convened at Bonn from Thursday, May 2 to Saturday, May 4, Mr. Pearson was accompanied by Mr. L.D. Wilgress, Permanent Representative of Canada to the North Atlantic Council; Mr. R.M. Macdonnell, Deputy Under-Secretary of State for External Affairs; Mr. J.B.C. Watkins, Assistant Under-Secretary of State for External Affairs; and other officials from his Department.

The spring NATO ministerial meeting is traditionally reserved for a review of the international situation as it affects the NATO Alliance, and this year NATO foreign ministers again had an opportunity for exchanging views on international political problems of common concern to the Alliance, thus maintaining and developing the processes of consultation and co-operation among all the NATO governments. This meeting marked the first time since the permanent establishment of NATO in Paris in 1952 that the ministerial meeting had been held away from Paris. It was also the last meeting presided over by NATO's first Secretary-General, Lord Ismay, who is retiring from that office after five years of distinguished service. Lord Ismay's successor will be the Foreign Minister of Belgium, Mr. Spaak.

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FIRST STAGE: First stage in the provision of a nine million dollar television micro-wave link between St. John's, Newfoundland, and Sydney, Nova Scotia, to achieve a trans-Canada coast-to-coast TV hook-up have been completed with the opening of a new Canadian National Telegraphs communications centre in the Newfoundland capital.

Built at a cost of one and a half million dollars, the new centre will provide telegraph, telephone and radio communication between Newfoundland and Canada's remaining provinces and the rest of the world.

The micro-wave link will be completed in 1958 when radar-like towers, up to 220 feet high, will bridge the gap between St. John's and Sydney to complete the Canadian Broadcasting Corporation's hook-up from Victoria, British Columbia, to Newfoundland.

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OIL WELLS: By early April, Saskatchewan's total of oil wells capable of being operated had risen to 2,593, according to a report issued by the Provincial Department of Mineral Resources. The report noted that of this total, 517 were in the Coleville-Smiley field, 262 were at Lloydminster, 250 at Steelman, 198 at Midale, 159 at Lone Rock, 154 at Cantuar, 98 at Weyburn, and 90 at Nottingham.

WATER-POWER RESOURCES OF CANADA

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Owing to lack of stream-flow data, Newfoundland's important water-power resources have been evaluated only tentatively. On the Island, while the rivers are short, topography and run-off conditions are favourable to power development; in Labrador, the Hamilton River has a high power potential which perhaps comprises the largest undeveloped single source of power in Canada. Considerable development has taken place on the Island, the larger developments having been constructed to serve the pulp-and-paper industry.

The water-power resources of the Yukon Territory itself are relatively small; but there exists the possibility of diverting the headwaters of the Yukon River through the Coast Mountains to utilize a high head near tidewater in northern British Columbia. In the Northwest Territories, although resources are of considerable extent, they are located so remotely as to limit their present commercial development to local mining uses and the supply of attendant settlements. Owing to the lack of native fuel and to transportation difficulties, water power is of special importance in the development of mining areas such as Yellowknife, Northwest Territories, and Mayo, Yukon Territory. The construction and management of electric power utilities on a commercial basis in the Yukon and Northwest Territories is the concern of the Northern Canada Power Commission under the Chairmanship of the Deputy Minister of the Department of Northern Affairs and National Resources.

GROWTH OF WATER-POWER DEVELOPMENT

Since the beginning of the present century, following the inception of long-distance transmission of electricity, water-power development in Canada has undergone a remarkable growth, the total installation of 177,323 h.p. at the end of the year 1900 being insignificant in comparison with the 18,356,148 h.p. installed by the end of 1956.

During the present century, the growth in the total of hydraulic installations in Canada has been continuous and the rate of growth has tended to accelerate. In the period 1900-1905, the average annual increase was only 56,000 h.p. but this was stepped up sharply in subsequent years, largely due to improvements in electrical transmission and the building of large central stations. During the period 1906-1922 inclusive, development proceeded at a fairly uniform rate of 150,000 h.p. per year. As a result of the heavier demand for electricity during the prosperous 1920's, the rate of installation increased appreciably in 1923 and continued at a nearly uniform rate of 377,000 h.p. per year for the period 1923-1935 inclusive. As large-scale hydro-electric pro-

jects take considerable time to complete, there is a lag between demand and completion of construction, the former responding quickly to general economic conditions. When the demand for power fell off during the 1930's, projects under way were carried to completion but the result of the economic depression is reflected in the low rate of installation during the years 1936-1939 inclusive. The great demand for power for war purposes accounts for the high average rate of increase of 481,000 h.p. per year during the period 1940-1943 inclusive. Few developments were undertaken in the later war years or in the immediate post-war period, so that only a small amount of new capacity came into operation from 1944 to 1947 inclusive. However, the results of the later post-war programme of construction are apparent in the amount of growth in the years 1948 to 1956, the average rate being about 874,000 h.p. per year. Present programmes of expansion indicate a continuation of this rate of growth for some years. It may be noted that in 1955, over 87 per cent of the total installation of water-power plants in Canada was of the central station type, as compared with 33 per cent in 1900.

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FAREWELL GIFTS: A walrus and a musk-ox, carved in the strong primitive style of the Eskimos, will grace the home of Pandit Jawaharlal Nehru, Prime Minister of India, according to an announcement by the Department of Northern Affairs and National Resources.

These two outstanding examples of Canadian Eskimo art were presented as personal farewell gifts by Mr. and Mrs. Escott Reid to Mr. Nehru and to his daughter, Mrs. Indira Gandhi, who is his hostess, before Mr. and Mrs. Reid left New Delhi for Canada. Mr. Reid has been Canadian High Commissioner in India since November 1952.

The carvings are the work of Oshaweetuk, one of the great carvers from the Cape Dorset settlement on the southern coast of Foxe Peninsula, Baffin Island, N.W.T.

Oshaweetuk carved the walrus and the musk-ox from amphibolite, a fairly soft stone found on south Baffin Island and frequently used by Eskimo carvers. He chose as his subject two animals of fundamental importance to the Eskimo people and he has transmitted to his work a majestic bearing, indicative of the respect in which these two animals are held by the Eskimos. To attain greater realism the material for the tusks of the walrus and the horns of the musk-ox came from their living counterparts.

The carvings were purchased for Mr. and Mrs. Reid by the Department of Northern Affairs and National Resources. Mr. Reid gave Mr. Nehru the walrus and Mrs. Reid gave Mrs. Gandhi the musk-ox.

ELECTION CAMPAIGN

The fight for control of the 265-seat House of Commons in the federal election to be held June 10 got underway last week as the leaders of the four major political parties embarked on extended speaking tours and as campaigning in the ridings throughout Canada struck an accelerated tempo.

Television looms large in this year's election as party leaders and candidates are making use of network and local facilities to reach voters who may not listen to radio broadcasts and who are not attracted to the traditional election meetings.

Prime Minister Louis St. Laurent, leading the Liberal Party in its attempt to regain power; Mr. John Diefenbaker, Progressive Conservative chieftan; Mr. M.J. Coldwell, CCF leader, and Mr. Solon Low, who heads the Social Credit Party, were heard last week on the CBC television network.

Prime Minister St. Laurent said in his telecast speech that Canada has achieved unity under the Liberal Government and that "with each year since Confederation our sense of belonging to one Canada has grown stronger and stronger". The Liberal Party, he said, was "the only national party, with substantial support in Parliament from every province". Referring to "Canada's recent unparalleled progress", Mr. St. Laurent said that while the lion's share of the credit must go to the Canadian people for the use they have made of Canada's abundant natural resources, the Liberal Party had proved by its record that it has the capacity to make constructive contributions to Canada's progress.

Mr. Diefenbaker, leader of the Progressive Conservatives, warned that Canada would become a one-party state if the Liberals were elected June 10 and said that "at no time anywhere, in any country, has democracy ever survived under a one-party system." Mr. Diefenbaker said the Liberals' use of closure to end last year's pipeline debate was only one of many occasions in recent years when Parliament was "deliber-

ately and defiantly denied". He said that Government had refused to answer questions in Parliament and had withheld important information. His party, if elected, would restore the rights of Parliament, the provinces, and the people in Canada, and would allow provinces and municipalities a greater share of the national tax dollar.

Pressure by the CCF had been largely responsible for the enactment of many social security measures now in effect in Canada, Mr. Coldwell, CCF leader said, but the party was not satisfied with the few steps that have been taken. Canada's great wealth would not be shared by all Canadians, he stated, "as long as we have governments dedicated to the serving of specially privileged groups." Mr. Coldwell said that workers and farmers have not "shared in our wealth to nearly the extent that they should". In addition to advocating better treatment of these groups, and of pensioners, Mr. Coldwell called for the abolition of special privileges in taxation and the establishment of a capital gains tax.

Mr. Low, leading the Social Credit Party, proposed the immediate introduction of a federal old age pension of \$60 per month, with the federal government splitting with the provinces the cost of a supplementary \$40, adding up to \$100; a national health insurance programme; financial policies to balance purchasing power with production; reduced taxation to match revenues with carefully controlled expenditures; low interest mortgage loans to every family wanting a home; a two-price system for wheat, barter deals, and acceptance of local currencies in export sales of farm surpluses; low interest loans for small business and farms; federal aid for arterial highways; a new foreign policy; elimination of waste in defence policy; a new immigration policy; vigorous northern development, and a national transferable pension plan for workers.