DOMINION OF CANADA

REPORT OF THE DEPARTMENT

OF

MINES AND RESOURCES

INCLUDING

REPORT OF SOLDIER SETTLEMENT OF CANADA

FOR THE

FISCAL YEAR ENDED MARCH 31, 1937

To His Excellency the Right Honourable Baron Tweedsmuir of -Elsfield, G.C.M.G., C.H., Governor-General and Commander-in-Chief of the Dominion of Canada.
MAY IT PLEASE YOUR EXCELLENCY:

The undersigned has, the honour to lay before Your Excellency the Annual Report of the Department of Mines and Resources, including a Report on Soldier and General Land Settlement, for the fiscal year ended March 31, 1937.

Respectfully submitted,
T.A. CRERAR,
Minister of Mines and Resources.
47398 - 1 1/2

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REPORT

OF THE

DEPARTMENT OF MINES AND RESOURCES

INCLUDING

REPORT OF SOLDIER SETTLEMENT OF CANADA

FOR THE FISCAL YEAR ENDED MARCH 31,1937

Honourable T.A. CRERAR,
Minister of Mines and Resources,
Ottawa.

SIR, - I have the honour to submit herewith the first Annual Report of the Department of Mines and Resources which came into being on December 1, 1936, under the authority of Chapter 33 of the Statutes of Canada, 1936. The report covers the work of the former Departments of Mines, Interior, Indian Affairs, and Immigration up to that date, and of the new Department from then to the end of the fiscal year.

As shown in the accompanying chart, the Department is divided into five branches, namely, the Mines and Geology Branch, the Lands, Parks, and Forests Branch, the Surveys and Engineering Branch, the Indian Affairs Branch, and the Immigration Branch, each in charge of a Director. As well, the services common to each branch have been centralized in one unit in the office of the Deputy Minister. This unit now does the work that was carried out separately in the former Departments by the Editorial, Legal, Personnel, Purchasing, and Mail Distributing Sections.

The functions of the new Department are those of the former Departments and include as well, those of the Hydrographic Service Division which previously was part of the old Department of Marine. They may be summarized briefly as follows:

Mines and Geology Branch

The undertaking of scientific, technical, and other investigations designed to further the development of the mining, metallurgical, and related industries in the Dominion; the administration of The Explosives Act, 1934; the investigation of matters relating to a national fuel policy, and the administration of legislation providing assistance to the Canadian coal industry; and the maintenance of the National Museum of Canada.

Lands, Parks, and Forests Branch

The administration of the mineral, fur, and other natural resources of the Yukon and Northwest Territories; the handling of business arising from the local Governments of the two Territories; the administration of the National Parks of Canada, including the marking of historic sites of national importance and the administration,of the Migratory Birds Convention Act; the conduct of scientific investigations in regard to the safeguarding, management, and maximum utilization of the Dominion's forest resources, and the maintenance of the Federal Land Registry office.

Surveys and Engineering Branch

The establishment of accurate survey control points throughout Canada; the determination and demarcation of the International Boundary; the compilation and printing of hydrographic charts, maps, and plans; astronomical and geophysical research; the investigation of the water and power resources of Canada as a whole; the furnishing,of information and advice to all Branches of the Department on engineering matters, and the design and construction of

buildings and engineering works in park areas and in Indian Reserves.

Indian Affairs Branch

The administration of the Indian Act; the maintenance of Indian agencies throughout the Dominion; the provision of medical welfare and training services for the Indians of Canada; and the administration of Indian lands and trust funds.

Immigration Branch

The general administration of all immigration work coming under the Immigration Act, the Chinese Immigration Act, and the Immigration Aid Societies Act. This includes the organization and maintenance of the immigration inspectional services throughout Canada and Overseas.

The establishment of the Department as of December 1, 1936, was 3,905 employees, made up as follows:

...	Permanent	Temporary	Exempt	Total	Vacancies1
Administrative Offices	64	...	3	67	2
Mines and Geology Branch	339	7	46	392	16
Lands, Parks, and Forests Branch	361	67	214	642	7
Surveys and Engineering Branch	361	35	271	667	23
Indian Affairs Branch	360	55	793	1,208	22
Immigration Branch	563	297	69	929	8
Totals	2,048	461	1,396	3,905	78

[1These positions, which come under the Civil Service Act, were provided for in the establishment but were allowed to remain unfilled. They are included in the other totals.]

These figures do not include employees engaged under the Special Supplementary Estimates whose numbers change from day to day.

The reorganization made possible, certain immediate reductions of staff and to that extent economies were effected. At present, however, the Department is housed in twenty-four buildings in the City of Ottawa and it is, therefore, difficult to attain the full benefit of the joining together of the four Departments until more satisfactory office accommodation is secured. In the meantime the elimination of overlapping services, with the resulting economies and greater efficiency in administration, can only be brought about gradually.

The following is a statement of the revenue and expenditures for the Department for the fiscal year ending March 31, 1937, including the expenditures made under the Special Supplementary Estimates.

STATEMENT SHOWING TOTALS OF REVENUE AND EXPENDITURE FOR DEPARTMENT FOR FISCAL YEAR 1936 - 37

...	Revenue	Expenditure	Total Expenditure
Mines and Geology Branch -	19,653 18	...	...
Civil Government and other regular votes of Branch	...	1,133,813 68	...
Coal subventions	...	2,222,920 53	...
Miscellaneous items provided by Statute	...	54,714 77	...

...	...	...	3,411,448 99
Lands, Parks, and Forests Branch - Surveys and Engineering Branch (Former Interior Department including Hydrographic Service) -	510,982 06	...	...
Civil Government and other regular votes of Branches	...	2,872,919 54	...
Miscellaneous items provided by Statute	...	14,434 64	...
Hydrographic Service - all grants	5,230 69	432,715 59	...
...	...	...	3,320,069 77

...	Revenue	Expenditure	Total Expenditure
Indian Affairs Branch -	1,806 97	...	...
Civil Government and other regular votes of Branch	...	4,642,296 90	...
Miscellaneous statutory items	...	261,583 51	...
...	...	...	4,903,880 41
Immigration Branch -	24,681 53	...	...
Civil Government and other regular votes of Branch	...	1,311,086 94	1,311,086 94
...	$562,354 43	...	$12,946,486 10

SPECIAL SUPPLEMENTARY ESTIMATES

...	Expenditure	...	...
Mines and Geology Branch -	...	...	...
Geological Surveys, etc.	295,858 16	...	...
Assistance in improving transportation facilities into mining areas	1,171,149 03	...	...
...	...	1,467,007 19	...
Lands, Parks, and Forests Branch - Surveys and Engineering Branch (Former Interior Department) -	1,741,891 46	1,741,881 46	...
Indian Affairs Branch -	167,126 72	167,126 72	...
...	...	...	3,376,015 37
...	...	...	$16,322,501 47

Appended hereto are the reports of the Directors of the five Branches, which briefly summarize the activities of the whole Department during the year.

Your obedient servant,
CHARLES CAMSELL,
Deputy Minister.

ORGANIZATION CHART

MINES AND GEOLOGY BRANCH
DEPARTMENT OF MINES AND RESOURCES
Organization Chart, Mines and Geology Branch.

MINES AND GEOLOGY BRANCH
JOHN McLEISH, DIRECTOR

The Mines and Geology Branch discharges the duties and activities of the former Department of Mines, together with air and topographical surveys - except legal surveys - transferred from the Topographical and Air Survey Bureau of the former Department of the Interior.

In the reorganization off the Department of Mines and Resources there has been a redistribution of units and of functions within the Mines and Geology Branch. As is shown in the organization chart on page 12 the Branch now comprises four main units: the Bureau of Geology and Topography, replacing the former Bureau of Economic Geology; the Bureau of Mines, replacing the former Mines Branch; the National Museum of Canada; and the Dominion Fuel Board.

The mining industry reached a new record in 1936 when the value of the production exceeded $361,000,000, as compared with the previous high of $312,000,000 in 1935. Dividends from mining companies reached a total of over $82,000,000, compared with slightly over $60,000,000 in 1935.

Gains were recorded in almost all lines of production. Gold, with an average price of $35.03 an ounce, accounted for more than a third of the total value of mineral production for the year. Records were established by all the principal metals except cobalt, silver, and selenium, and by all of the non-metallics except salt, sulphur, sodium sulphate, and magnesitic dolomite. Canada is the leading producer of nickel, the platinum metals, and asbestos; is second in the output of bismuth, radium, and zinc; third in cobalt, copper, and cadmium; and fourth in gold, silver, and lead. New production areas are showing very promising results under development, and new finds of importance continue to be made in many of the older camps, and mines, thus, adding to reserves, and extending the mining life of the areas concerned.

Although the industry's growth is encouraging, particularly in the production of gold and the non-ferrous base metals, many mineral products are being drawn from foreign sources of supply, as is evidenced by the large imports of iron and steel, coal, petroleum and its products, clays and clay products, and various industrial minerals. The value of such imports exceeds $100,000,000 a year.

Minerals, however, are a wasting asset, and the more rapid the increase in production, the greater is the necessity for the application of the scientific knowledge of geology and mineralogy in finding new ore-bodies, and of chemistry, metallurgy, and mineral technology in producing commercial products from otherwise waste material. Thus the growth of mining is resulting in a heavy demand on the services of the Branch. The value of geological information to prospectors and exploration companies in their search for new deposits, and of test work on ores to mine operators and executives in the efficient design of milling plants, is being increasingly recognized.

The Government has continued to encourage and assist the industry wherever possible, with research and investigative work in geology, mineral technology, and mineral economics as a central feature of its, services. Much greater attention than in former years was given toward developing among Canadians an appreciation of the economic importance of the industry, and toward widening the interest of local and outside capital in Canadian mineral developmert. The

Department's mining newsletter service to the High Commissioner's office in London was continued until interrupted near the close of the year by the reorganization.

The Canadian Government Motion Picture Bureau co-operated with the Branch in the production of motion picture films depicting gold mining in the Porcupine, Kirkland Lake, and Noranda gold areas.

Activities of the year are reviewed in some detail in succeeding pages.

In the Bureau of Mines' Ore Dressing and Metallurgical Laboratories, tests on gold ores continued in the lead, although rising base metal prices have increased activity in that field. In the growing field of industrial minerals (including ceramics) the Bureau has co-operated with industry, although ceramic work has been held up to some extent by staff depletion. Laboratory and field work essential to the more extensive and efficient use of Canadian fuels was continued.

The services of Dr. William Henry Collins, Director of the Geological Survey since 1920, and Acting Director of the National Museum of Canada since 1926, were lost by his deathon January 14, 1937. Dr. Collins was regarded as an authority on North American Precambrian geology, and made an outstanding contribution to geological literature in his studies of the Sudbury nickel-copper deposits.

ASSISTANCE TOWARD MINING TRANSPORTATION

The Branch administered, in co-operation with the Provincial Governments, and the Department of Labour, a special supplementary vote by Parliament of $1,500,000 to aid in improving transportation facilities into mining areas. The assistance was undertaken as a means of reducing transportation costs into mining properties throughout Canada where such costs were so high as to retard development. Agreements were made with the provinces concerned, whereby the work was to be carried out under the direction of the provincial governments, with the understanding that two-thirds of the total expenditures in each case would be contributed by the Dominion Government, and one-third by the respective provinces. Projects in Yukon Territory and in the District of Mackenzie in the Northwest Territories, were financed and carried out by the Dominion Government.

Work on the projects extended from July 1936, to March 1937, and in October a peak of 5,000 persons were employed. By the end of the fiscal year approximately 355,000 man-days of work had been provided, which is exclusive of the employment given in the supply of construction and other materials, and in equipping and provisioning the camps; and it is estimated that over $1,000,000 was paid in salaries and wages. The agreements called for maximum expenditures as shown hereunder:

...	Maximum Dominion Contribution	Maximum Provincial Contribution	Total Value of Works Covered by Agreement
...	$	$	$
Nova Scotia	25,000	12,500	37,500
Quebec	350,000	175,000	525,000
Ontario	375,000	187,500	562,500
Manitoba	270,000	135,000	405,000
Saskatchewan	80,000	40,000	120,000
Alberta	25,000	12,500	37,500
British Columbia	300,000	150,000	450,000
...	1,425,000	712,500	2,137,500

Appropriations for work in the Northwest and Yukon Territories were as follows:

Northwest Territories (including some work on navigation aids, on Lake Athabaska)	37,500
Yukon Territory	20,000
Provision for Dominion-financed works	$57,500

Thus provision was made by the Dominion Government and the provinces concerned for expenditures totalling $2,195,000. As unavoidable delays in Organization prevented the completion of several of the projects by the close of the fiscal year, the total amount expended, exclusive of administrative costs, was $1,882,900, which was apportioned as follows:

...	Approximate Value of Works Executed
Nova Scotia	$37,000
Quebec	525,000
Ontario	490,600
Manitoba	322,000
Saskatchewan	80,300
Alberta	nil
British Columbia	375,000
Yukon Territory	20,000
Northwest Territories	33,000
...	$1,882,900

MINING, TRANSPORTATION PROJECTS, 1936 - 37

Nova Scotia	
Moose River Mines road	Mount Uniacke road
Tangier - Caribou and Moose River Mines road	Oldham road
Manganese Mine road	Goldenville road
Renfrew Mine road	Salmon River road
Montague Mine road	Beaverdam road
Caribou Mine road	Wine Harbour road
Quebec	
Latulipe - Guillet Township road	Shawkey - Val d'Or road
Malartic road	Sigma - Louvicourt road
Malartic - Shawkey road	Perron Mine road
Ontario	
Pickle Crow road	Calabogie - Black Donald road
Beardmore - Sand River road	Bidgood Mine road
Elk Lake - Matachewan road	Little Long Lac - Bankfield road
Red Lake - Red Lake Gold Shore road	Geraldton - Hardrock road
Raymore - Ross Mine road	Lakefield - Canadian Nepheline road
Delnite Mine road	Gogama - Three Duck Lake road

Michipicoten area roads	Red Lake - Red Lake - Madsen road
Valora - Sturgeon Lake road	Matheson - Garrison Township road
Lochalsh - Goudreau - Algold road	Preston - East Dome road
Goldpines - Woman Lake road	Clark Mine road
Collins - Obonga Lake road	Tip Top Siding - Ardeen Mine road
Gowganda - Tyranite road	Afton Mine road
Tyranite - Houston Lake road	Geraldton - Hutchison Lake road
Wendigo Mine road	Goward - Cuniptau bridges
Manitoba	
Mafeking - The Pas highway	Gods Lake road
Gurney Mine road	Manigotagan - Wanipigow (Hole) River road
Herb Lake road	Wanipigow (Hole) River Caribou Lake road
Flin Flon - Channing road	...
Ilford - Moose Nose Lake road	Manigotagan - Long Lake portage
Regina Lake Airport road	Long Lake - Wadhope and Gunnar road
Wabowden - Setting Lake road	Gold Creek dam
Thicket portage	Pack Sack road
Gold Lake road	Manigotagan River and Lake dams
Cranberry portage	...

Saskatchewan	
Prince Albert Airport dam	Goldfields dock
Flin Flon - Beaver Lake road	Midwest Chemical Company road
Waskesiu - Montreal Lake road	...
British Columbia	
Manson Creek - Peace River road	Kootenay Lake road and trail
Bridge River road	Kaslo - New Denver road
Nelson - Nelway road	Perry Creek road
Sheep Creek road	Wisconsin Mine trail
Salmo - Ymir road	American Creek - Excelsior trail
Relief Arlington Mine road	Barkerville road No. 38
Big Missouri Mine road	Willow River - Sugar Creek road
Taseko Lake road	Barkerville - Antler Creek road
Dolly Varden railway	Barkerville - Bear Lake road
Hedley Mine road	Bullion Placer Mine road
Vidette Mine road	Williams Lake - Likely Main road
Telegraph Creek - Dease Lake road	Keithley Main road No. 5
McDame Post - Quartz City trail	Dentonia Mine road
Unuk River trail	Takla Landing - Vital Creek road
Leech River trail	Likely - Keithley road
Koksilah River trail	Bayonne Mine road
Cowichan Lake - Chemainus trail	Ashloo Mine road
Arrowsmith - Cowichan Lake trail	Gold Mountain Mine road
Campbell Lake - Buttle Lake trail	Dash Creek trail
Sproat Lake - Wreck Bay trail	Mud Creek Mine road
Zeballos River road	Athelstan Mine road
Hudson Bay Mountain trail	Pacific Eastern Mine road
Telkwa River Coal Mine road	Hixon Creek road
Northwest Territories	
Fort Smith bank protection	Resolution, Great Slave Lake aeroplane landing
Fort Franklin wharf	Great Slake Lake navigation aids
Great Bear Lake Navigation lights	Lake Athabaska navigation aids
Yukon Territory	
Sulphur Creek road	Silver King road and Minto bridge
Hunker - Dominion road	...

BUREAU OF GEOLOGY AND TOPOGRAPHY

The Bureau of Geology and Topography carries out the activities of the former Bureau of Economic Geology, together with all topographical mapping; and administers the National Aerial Photographic Library.

The Bureau's duties are: to promote, by geological and related work, the discovery and development of the mineral

resources of Canada; to contribute to the knowledge of the geology and geography of Canada; and to disseminate such knowledge by the issue of reports and maps, and by other means.

The Bureau has four main divisions, namely: the Geological Survey, Development, Topographical Survey, and Draughting and Reproducing Divisions, the duties of which, as well as their activities during the year, are dealt with on subsequent pages.

There were forty-eight geological parties in the field in 1936, ten of which were in British Columbia; four in Alberta; five in Saskatchewan; seven in Manitoba; five in Ontario; six in Quebec; four in New Brunswick; three in Nova Scotia; two in Yukon; and two in the Northwest Territories. These parties were engaged chiefly in examining promising areas for prospecting, and in obtaining information

that will be of aid in the development of mineral deposits. The Bureau continued to issue reports on the results of its geological field work as soon as possible after the completion of the work. During the year thirty-eight preliminary geological reports and forty-four maps were published.

The Topographical Survey had parties working in British Columbia, Quebec, Nova Scotia, and the Northwest Territories. The results of such field work are used largely in compiling maps for publication.

GEOLOGICAL SURVEY

The Geological Survey consists of what was formerly the Geological, Mineralogical, Paleontological, and Pleistocene Geology, Water Supply, and Borings Divisions of the Bureau of Economic Geology. It also administers the British Columbia Office in Vancouver.

The Geological Survey promotes the discovery and development of Canada's mineral resources by means of geological studies, the results of which are presented to the public in the form of geological maps and reports. The field studies are carried out in particular districts to determine areas favourable for prospecting, and to obtain information on mineral deposits that will be of direct value to prospectors and operators. The Geological Survey does not search for mineral deposits, nor does it examine and report upon mineral properties, except when the purpose is to obtain information that is applicable to a district as a whole. The nature and extent of the underground water resources of districts are also determined. Other investigations made serve as a basis for the proper classification, of soils for agriculture and forestry. The report of the Draughting and Reproducing Division lists the geological maps published, or in varying stages of progress. The reports published are listed in the section on publications.

Besides the printed reports and maps, brief accounts, of the results of various investigations are issued in the form of mimeographed statements, accompanied in many instances by photographic copies of generalized geological maps.

YUKON

H.S. Bostock continued the study and mapping of the geology of Ogilvie map-area (latitudes 63° to 64°, longitudes 138° to 140°).

J.R. Johnston made a detailed study of the lode gold occurrences on Freegold Mountain.

NORTHWEST TERRITORIES

A.W. Jolliffe examined new mineral discoveries, and collected information on the progress in the development of known deposits in the Great Slave-Great Bear Lakes region.

J.F. Henderson studied and mapped the geology of Nonacho Lake map-area (latitudes 61° to 62°, longitudes 110° to 112°).

BRITISH COLUMBIA

E.D. Kindle examined mineral properties north and east of Usk, in an area tributary to the Canadian National Railways.

E.J. Lees studied and mapped the geology of the west half of Smithers map-area (latitudes 54° to 65°, longitudes 127° to 128°).

M.F. Bancroft examined mineral properties in Smithers area.

J.E. Armstrong commenced the study and mapping of the geology of the west half of Fort Fraser map-area (latitudes

54° to 55°, longitudes 125° to 126°). 47398 - 2

J.G. Gray commenced the study and mapping of the geology of the east half of Fort Fraser map-area (latitudes 54° to 55°, longitudes 124° to 125°).

A.H. Lang completed the study and mapping of Keithley Creek map-area (latitudes 52° 45' to 53°, longitudes 121° to 121° 30').

N.F.G. Davis made a detailed study of the northwestern part of the Barkerville gold belt in the vicinity of Island Mountain.

D.A. McNaughton made a detailed study of mineral properties in Greenwood area.

C.E. Cairnes and C. Tolman studied and mapped the geology of the west half of Kettle River map-area (latitudes 49° to 50°, longitudes 119° to 120°).

H.M.A. Rice studied and mapped the geology of the east half of Nelson map-area (latitudes 49° to 50°, longitudes 116° to 117°).

ALBERTA

R.L. Rutherford completed the study and mapping of the geology of Edmonton and Peace Hills Map-areas (latitudes 53° to 54°, longitudes 108° to 114°; and latitudes 52° to 53°, longitudes 112° to 114°).

G.S. Hume completed the study and mapping of the geology of Vermilion map-area (latitudes 53° to 54°, longitudes 110° to 112°), and commenced the study and mapping of the geology of Pekisko map-area (latitudes 50° 15' to 50° 30', longitudes 114° to 114° 30').

R.T.D. Wickenden commenced the study of the underground water resources of Milk River map-area (latitudes 49° to 50°, longitudes 110° to 112°).

L.S. Russell continued the study and mapping of the geology of Milk River area, and an adjacent map-area (latitudes 49° to 50°, longitudes 110° to 113°).

SASKATCHEWAN

R.C. McMurchy studied and mapped the geology of Foster Lake map-area (latitudes 56° to 57°, longitudes 107° to 108°).

C.O. Hage studied and mapped the geology of Fort Pitt map-area (latitudes 53° to 64°, longitudes 108° to 110°).

R.T.D. Wickenden completed the study of the underground water resources of southwestern Saskatchewan (latitudes 49° to 52°, longitudes 109° to 110°).

R. Graham made a detailed study of the geology of an area near Avonlea.

H.C. Cooke studied the mineral deposits in the neighbourhood of Goldfields.

MANITOBA

D.L. Downie studied and mapped the geology of East Gods Lake map-area (latitudes 54° to 55°, longitudes 92° to 94°).

T.L. Tanton studied the mineral deposits of Echimamish River area.

F.A. Kerr completed the detailed study of the geology of an area near Flinflon.

F.H. McLearn continued the study and mapping of the geology of Swan River map-area (latitudes 52° to 53°,

longitudes 100° to 102°).

A.W. Johnston studied and mapped the geology of the west half of Carroll Lake map-area (latitudes 51° to 52°, longitudes 95° to 96°); the east half of Hecla map-area (latitudes 51° to 52°, longitudes 95° to 96°); the west half of Deer Lake map-area (latitudes 52° to 53°, longitudes 95° to 96°); Berens River map-area (latitudes 52° to 53°, longitudes 96° to 98°); and Norway House map-area (latitudes 53° to 54°, longitudes 96° to 98°).

C.H. Stockwell made a detailed study of mineral deposits in an area in the vicinity of Beresford Lake.

ONTARIO

T.L. Tanton studied and mapped the geology of the east half of Quetico map-area (International Boundary to latitude 49°, longitudes 90° to 91°).

J.S. Stewart continued a detailed investigation of the gas and oil fields of southwest Ontario.

J.F. Caley commenced the study of the geology and underground water resources of Hamilton-Toronto map-area (latitudes 43° to 44°, longitudes 79° to 80°).

L.J. Weeks completed the study and mapping of an area bordering the Canadian National Railways, between Kapuskasing and Hearst.

A.E. Wilson studied and mapped the geology of areas east of Ottawa.

QUEBEC

G.W.H. Norman studied and mapped the geology of the east half of Opemisca map-area (latitudes 49° 45' to 50°, longitudes 74° 30' to 74° 45').

G.F. Flaherty. studied and mapped the geology of Perron map-area (latitude 49° 15', longitudes 78° 30' to 79°).

J.C. Sproule completed the mapping of the geology of the east half of Waswanipi map-area (latitudes 49° to 50°, longitudes 76° to 77°).

B.C. Freeman completed the mapping of the geology of the west half of Waswanipi map-area (latitudes 49° to 50°, longitudes 77° to 78°).

L.J. Weeks studied and mapped the geology of Duverny map-area (latitudes 48° 30' to 48° 45', longitudes 77° 30' to 78°).

H.C. Gunning and J.W. Ambrose made a detailed study of the mineral deposits of Malartic Township.

NEW BRUNSWICK

B. Rose continued the study and mapping of the geology of Plaster Rock-Nipisiguit Lake district.

S.C. Perry continued the study and mapping of the geology of St. George map-area (latitudes 45° to 45° 15', longitudes 66° 30' to 67°).

F.J. Alcock completed the study and mapping of the geology of Loch Lomond map-area (latitudes 45° 15' to 45° 30', longitudes 65° 30' to 66°), and Cape Spencer map-area (latitudes 45° to 45° 15', longitudes 65° 30' to 66°).

C.S. Evans studied and mapped the geology of Petitcodiac map-area (latitudes 45° 45' to 46°, longitudes 65° to 65° 30').

NOVA SCOTIA

J.T. Wilson completed the study and mapping of the geology of Liverpool map-area (latitudes 44° to 44° 15', longitudes 64° 30' to 65°); Malaga Lake map-area (latitudes 44° 15' to 44° 30', longitudes 64° 30' to 65°); Kejimkujik map-area (latitudes 44° 15' to 44° 30', longitudes 65° to 65° 30'); and Sherbrooke Lake map-area (latitudes 44° 30' to 44° 45', longitudes 64° 30' to 65°).

P. Armstrong continued a detailed study of gold-bearing deposits.

W.A. Bell made detailed studies of various sections of Carboniferous strata.

PALEONTOLOGICAL SECTION

E.M. Kindle made field studies of various Palaeozoic section's in Gaspe Peninsula, P.Q.

C.M. Sternberg carried on paleontological work in Steveville area, Red Deer Valley, Alta.

A. LaRocque made collections of Pleistocene fossils from areas bordering the lower St. Lawrence River Valley, P.Q.

The following specimens were presented to the Geological Survey, and have been added to the paleontological, and other, collections:

Vertebrate Fossils

Fenley Hunter, Flushing, N.Y.: skull of Bison aff. B. occidentalis from near Las Vegas, Nevada; also a large collection of Oligocene mammals from Cypress Hills, Sask., by Mr. and Mrs. Hunter in 1936.

Calgary Zoological Society: skeleton of small hadrosaur; by exchange.

Invertebrate Fossils

Arthur English, Newfoundland; borings of marine organisms in wood from seashore near mouth of Little God River, west coast of Newfoundland; collected by donor in 1935; Recent.

Carroll Lane Fenton, West Liberty, Iowa: metatype of Cruziana irregularis F. and F. from Lake Louise shale, Banff National Park, Alta.; metatype of Archaeonassa fossulata F. and F. from Mount Whyte formation near top of No. 4, Walcott's section, Ross Lake, Yoho National Park, B.C.; Cambrian.

P.J. Jennings, Superintendent, Banff National Park, Banff, Alberta: holotype of Cruziana jenningsi Fenton and Fenton (Trilobite nest), from moraine, eastern slope of Mount Assiniboine, west of Lake Gloria, Alta., collected 1933; Cambrian.

I.W. Jones, Quebec Bureau of Mines, Quebec: a collection of fossils from St. John River Basin, Gaspe County, P.Q.; Devonian and Silurian.

G. Marshall Kay: 11 slides of ostracodes from Healy Falls, Northumberland County, Ont.; Ordovician, Mohawkian, Rockland formation.

Arthur Keith, Washington, D.C.: 36 lots of fossils from Rimouski, Matlane, and Amqui districts, P.Q.; Silurian mainly.

Homer P. Little, Clark University, Worcester, Mass.: a small lot of Utica shale fossils from the southeast tip of Grenfell Tickle, Cape Chidley, 1934, said to be from talus; collected by W. B. Brierly; Ordovician.

G. Stewart and M.A. Fritz: a collection of fossils from the bank of Rideau River, opposite Strathcona Park, Ottawa, Ont.; collected by the donors;

Collingwood (Ordovician).

F.B. Whiteside, 1961 East First Avenue, Vancouver, B.C.: specimens from upper pit of former Matthias Gold Mining Company, on Wolverine Creek, tributary to north fork of Quesnel River, Cariboo District, B.C.; dug out of clay bank, 40 feet above bedrock, 150 feet of overburden above; Pleistocene?

Concretions and Sediments

Grant S. Peart: pebble, with calcite deposit from high gravel bar north of Burlington, Ont. (old high-level bar of Lake Ontario); Pleistocene.

Victor Sinclair: a concretion containing Mallotus villosus from Greens Creek, near Ottawa, Ont.; Pleistocene.

B.L. Bowling, Iowa State Highway Commission, Mason City, Iowa: a specimen of rills and mud-cracks from

Devonian limestone, east edge of the city of Iowa Falls, Hardin County, Iowa.

MINERALOGICAL SECTION

Some 5,800 specimens were received and reported upon, which is more than in any past year, but there was a slight decline in the number of specimens distributed for educational purposes.

Many verbal reports were also furnished to visitors seeking information on minerals and their commercial applications.

Two and a half months were spent by one of the staff in Ontario and Quebec collecting the minerals and rocks necessary for the preparation of educational collections.

Mineralogical exhibits were prepared for the following: Central Canada Exhibition, Ottawa, Ont.; Board of Trade, Prince Albert, Sask.; Department of Trade and Commerce, to be displayed at,Cleveland, Ohio; Canadian National Railways, to, be displayed in New York; Leeds Modern School, Leeds, England; International Exposition at Paris.

In connection with the work on silicosis and asbestosis close co-operation was maintained with officials of the Ontario and Quebec Departments of Health, and with officials of McIntyre Porcupine Mines, Limited.

Chemical analyses were made of the following rocks and minerals: rhyolite, Abitibi County, P.Q.; granite, Temiscamingue County, P.Q.; soda granite, Malartic Township, P.Q.; dyke rock, Malartic Township, P.Q.; syenite porphyry, Fournière Township, P.Q.; tube mill dust, and dust from cleaner, McIntyre Mines, also dust from Gleaner (vacuum) from Pullman cars, in connection with work on silicosis; aplite, Thetford Mines, P.Q., for Asbestos Corporation; knebellite (?) from H.P.H. Group, Nahwatei Lake, B.C.
Educational Collections

A total of 38,280 specimens, or 1,073 collections, were issued, 12,670 of which were sent to prospectors.

Educational collections were distributed as follows:

Province	Standard	Grade 2	Grade 3	Grade 4	Miscellaneous	Prospector's	
...	...	...	...	...	...	Minerals	Rocks
Yukon	0	0	0	0	0	0	0
British Columbia	1	0	0	0	8	30	17
Alberta	0	0	0	0	1	14	3
Saskatchewan	0	0	0	0	4	15	10
Manitoba	0	0	1	0	7	6	5
Ontario	2	0	17	0	29	105	80
Quebec	0	0	25	600	11	38	25
Maritime Provinces	0	0	0	0	0	5	5
Foreign	0	0	0	0	5	3	1
...	3	0	43	600	65	216	146
Number of specimens	432	0	1,720	20,000	3,458	7,560	5,110

The following specimens were received:

Laumontite crystals from Osakayama Noka, Minaminakayamamura, Imatate-gun, Fukui-ken, Japan.

One quartz ball, diameter 6.5 cm., from Shimmatsu Ichikawa, Kitashinjomura, Imatate-gun, Fukui-ken, Japan.

Covellite from Kozak mine, South Goudreau, Ont., from E.M. Burwash, Department of Mines, Toronto, Ont.

Gold ore, donated by W. Hosking, Manager, McWatters Gold Mines, Limited, Rouyn, P.Q.

Nickel coins: six from various countries; three Chinese 5, 10, and 20 fen; one 5-franc nickel coin bearing a portrait of King Leopold III, recently issued by the Belgian Government; presented by International Nickel Company, through A.J. Wadhams, Vice President.

Gold ore: rich, polished specimen, from John Knox, General Manager, Ont.

Hollinger Mines, Limited, Timmins,

Two gold specimens presented by J.H. Stovel, General Manager, Dome Mines, Limited.

Two specimens "Sigma ore" showing free gold; presented by J. H. Stovel, General Manager, Dome Mines, Limited.

Two specimens of native copper "found in rock cut about 15 feet below the surface, about 58 miles west of Sault Ste. Marie, Ontario, on the section of the Trans-Canada Highway between Carp River and Mamainse, about a mile west of Coppermine Point"; presented by D.J. McCarthy, 58 Kendal Avenue, Toronto, Ont.

Nontronite (chloropal); three specimens from Nickel Plate mine (Hedley Mascot); presented by V. Dolmage, Vancouver, B.C.

Lead-zinc-copper ore from the Chimney group, 13 1/2 miles down stream from Smithers, B.C.; presented by G.H. Ballard, Smithers, B.C.

Disseminated molybdenite ore, 800 pounds, and 1,000 pounds of mica schist, from Phoenix Molybdenite mine, Renfrew, Ont.; presented by Mr. Clayton.

Corundum in feldspar, 1,750 pounds, from Burgess mine, New Carlow, Ont.; presented by H. Armstrong.

Microcline feldspar, 800 pounds, from MacDonald feldspar mine, Monteagle Township, Ont.; presented by P. MacDonald.

Sodalite, 700 pounds; presented by T. Morrisson, Bancroft, Ont.

Pyroxene in calcite, 1,700 pounds; presented by W. Robinson, Bancroft, Ont.

Granular talc, 1,000 pounds; from Henderson mine, Madoc, Ont.

Niccolite, 750 pounds; presented by J.C. Dean, Cobalt, Ont.

Graphite ore, 1,000 pounds; from Black Donald graphite mine.

WATER SUPPLY AND BORINGS SECTION

Samples from a number of wells in Saskatchewan, drilled for oil and gas, were examined in co-operation with the Department of Natural Resources of the province, and samples from wells in Ontario were examined in co-operation with the Natural Gas Commissioner of the province. Partial mineral analyses were made of 942 samples of underground water. Of these analyses 652 were made in connection with ground water surveys in Saskatchewan, and 273 in connection with the ground water survey in Ontario, the remainder being on water samples from oil, gas, or water wells. Sixteen reports were prepared on mineral samples sent to the Department for identification; and a partial analysis was made of a marl sample from British Columbia. Information was supplied to inquirers as to the possibilities of ground water supplies at various places, and logs of a number of old wells were supplied to operators and prospectors searching for oil and gas.

R.T.D. Wickenden acted as ground water expert with the Water Development Committees under the Prairie Farm Rehabilitation Act. He examined well samples from the Prairie Provinces. Samples from Alberta, examined by the Department of Lands and Mines of that province, were re-studied in part by geologists of this Department.

Gas, oil, and water well samples received numbered 27,193, of which 13,261 were sent in through the courtesy of the Petroleum and Natural Gas Division, Department of Lands and Mines, Alberta; 959 through the courtesy of E. Swain, Supervisor of Mines, Department of Natural Resources, Saskatchewan; 11,814 through the courtesy of R.B. Harkness, Natural Gas Commissioner, Department,of Mines, Ontario; 55 from Quebec; and 1,104 from New Brunswick, the latter through the courtesy of A. Creighton, Manager, New Brunswick Gas and Oilfields, Limited, Moncton.

BRITISH COLUMBIA OFFICE

Increased use made by the public of the services offered by the British Columbia Office is indicative of the interest in the mining industry of the province. A total of 4,260 visitors seeking information registered at the office, and a large number of inquiries were handled by mail and by telephone. A total of 3,650 reports, and 947 separate maps, were

distributed.

DEVELOPMENT DIVISION

The duties of the Development Division include: the maintenance of an inventory of economic geological areas, and studies arising therefrom; the maintenance of an aerial photographic library, and studies arising therefrom; assistance in the development of the mineral, and other natural resources; and administering the general services of the Bureau of Geology and Topography.

NATIONAL AIR PHOTOGRAPHIC LIBRARY

Excellent progress was made in developing the National Air Photographic Library in its application to the investigation and development of the natural resources. About 24,600 photographs were added during the year, bringing the total of original photographs to 692,000. These photographs are chiefly of mining areas, and were taken in almost every province, and in the Northwest Territories, and cover a total area of some 42,000 square miles.

The use made of the photographs is significantly shown by the fact that during the year 33,000 prints were purchased through the Library; approximately 50,000 were loaned to other departments; 30,000 were used for plotting maps; and more than 30,000 were examined by engineers, prospectors, and other visitors to the Library, making a total of over 140,000.

Use made of the photographs by the Library aerial survey engineers in choosing suitable locations for roads into mining areas resulted in large savings in the cost of construction, and in the subsequent maintenance of the roads. In Manitoba, for instance, a road was shortened by 13 miles through the use of the photographs.

Studies were made of potential muskrat areas, drought areas in Western Canada, timber areas in Saskatchewan, and water power and water storage areas in various parts of Canada.

The technical assistance of the Library engineers was of particular value in the interpretation to visiting prospectors and mining engineers of photographs of areas difficult of access, but having interesting possibilities.

Some 200 lantern slides of aerial photographs were added to the Library collection, bringing the total collection to over 1,000. The slides are widely used by various departments and other organizations for lecture purposes.

Following is a list of the main areas photographed during the year, photographs of which were added to the Library:

Area	Square miles
Mistawak Lake	2,500
Kipawa (Earthquake area)	900
Cape Breton National Park	1,000
Northwest Territories	24,000
Road areas in Manitoba and Ontario	400
Prince Edward Island (for hydrographic work)	500

PHOTOGRAPHIC SECTION

Following is the work done during the year:

Contact prints	4 by 5 to 36 by 48	16,335
Bromide enlargements	4 by 5 to 40 by 72	1,907
Exposures developed	1 by 1 1/2 to 5 by 7	4,996

Dry plate negatives	4 by 5 to 20 by 24	1,150
Wet plate negatives	8 by 10 to 24 by 30	157
Zinc plates etched	11 by 14 to 24 by 30	4
Lantern slides	3 1/2 by 4	1,085
Photos and maps mounted	...	1,108
Total	...	26,742

LIBRARY

Accessions to the library include:

Books (by purchase)	175
Books (by gift)	347
Books (complete unbound volumes by purchase)	195
Books (complete unbound volumes by gift or exchange)	519
Pamphlets	543
Maps	278
Canadian Government documents	830
British and Foreign Government documents	1,186
Scientific societies' bulletins, proceedings, and transactions (by exchange)	1,783
Periodicals and continuations subscribed for	347
Volumes bound	283

There were 6,447 recorded loans, an increase of 747 over the previous year. Inter-library loans amounted to 319 volumes, and 124 volumes were borrowed from other libraries. Cards added to the catalogue numbered 5,999, of which 102 were bibliographical entries and 60 biographical. The analysing of important monographs and other material in periodicals added 1,143 new titles to the catalogue. Pamphlets catalogued amounted to 184, maps to 104, and lantern slides to 156. A total of 871 cards were filed in the corresponding indexes.

Seventy-two new exchanges were established, 10 of which represented geological societies, 5 new geological survey series, 7 biological, 9 anthropological, 6 zoological, 5 botanical, 4 mineralogical, 10 in the field of geography and meteorology, and 16 in general science.

Gifts included 18 volumes from the late Dr. Malte's library; 12 volumes of Bulletins of the Geological Society of China; 8 volumes of Memoirs from the University of Vytautas le Grand; 3 volumes of Florentino Ameghino's Obras Completas; 13 volumes of Anales de l'Institut du physique de Globe de l'Université de Paris; books and pamphlets from the late Dr. W. H. Collins' collection; and books presented by W. Perkins-Bull, H.C. Cooke, and Eugene Poitevin.

GEOLOGICAL INFORMATION AND DISTRIBUTION

During the year 96,760 publications of the Geological Survey and National Museum, exclusive. of French editions, were distributed. Of these 11,840 were sent to addresses on the regular mailing lists, and 84,920 were distributed in compliance with written and personal requests for named publications, or requests for general or specific information. A total of 9,809 French publications were distributed in reply to written and verbal requests.

TOPOGRAPHICAL SURVEY

The Topographical Survey has three main sections: Topographical Mapping, Map Compilation, and Air Mapping. The Topographical Mapping Section carries out, all topographical mapping from ground surveys. The Map Compilation Section prepares all manuscripts for submission to the Draughting and Reproducing Division. The Aerial Surveys Section carries out control surveys for, and plots all maps made from, aerial photographs.

TOPOGRAPHICAL MAPPING
British Columbia

W.H. Miller supervised field parties working in Manson Creek and Hazelton areas. The sheets were:

Manson Creek (East half)	Latitude 55° to 56°; longitude 124° to 125°.
...	R.J. Parlee in charge.
Manson Creek (West half)	Latitude 55° to 56°; longitude 125° to 126°.
...	H.A.S. West in charge.
Hazelton (West half)	Latitude 55° to 56°; longitude 127° to 128°.
...	C.H. Smith in charge.
Hazelton (East half)	Latitude 55° to 56°; longitude 126° to 127°.
...	F.P. Duvernet in charge.

This work is for publication on a scale of 1 inch to 4 miles, with 500 - foot contours. Field work was by photo-topographical methods, supplemented by reconnaissance traverse and vertical sketching. Horizontal control was based on existing triangulation connected with the Geodetic Survey net along the Canadian National Railways. Triangulation previously carried out by the British Columbia Department of Lands was incorporated. Elevations were based on the Geodetic Survey datum.

R.C. McDonald mapped an area in the vicinity of Tyaughton Lake for publication on a scale of 1 inch to 1 mile, with contour interval 100 feet. The area was mapped by photo-topography, supplemented by plane-table traverse. Horizontal control was extended from previous work in the area by the Geological Survey. Vertical control was extended from the same triangulation, and the Cadwallader Creek levels of the B.C. Power Company were included.

A.C. Tuttle topographically mapped the east half of the Nelson sheet, latitudes 49° 00' to 50° 00', longitudes 116° 00' to 117° 00'. Publication scale will be 1 inch to 4 miles, with contour interval 500 feet. Field work was by photo-topographical reconnaissance methods, supplemented by traverse and vertical sketching. Horizontal and vertical control was extended from Geodetic Survey triangulation along the International Boundary, and was connected with previous work by the British Columbia Department of Lands, and the Slocan triangulation of the Geological Survey.
Quebec

H.N. Spence carried out transit stadia control for vertical aerial photography in Mistawak area, latitudes 49° to 50', longitudes 78° to 79° 30'. This work is connected to previous traverses on Harricanaw River, and to land lines of the Quebec Government.

J.W. Spence completed the detailed mapping of a series of sheets in the vicinity of Noranda. The maps are on a scale of 1 inch to 800 feet, with contour interval 10 feet, and provide a base for detailed geological study of the area. The five sheets in the series are Noranda, Waite, Amulet, Newbee, and Lake Dufault. They were done by plane-table, with horizontal and vertical control connected to work of the Geodetic Survey.

Nova Scotia

J.A. Macdonald continued the mapping of a series of five-minute sheets covering the Sydney-Glace Bay coalfield. Control for these sheets is by transit and tape, or transit and stadia, and detail is taken from vertical air photographs. The map will be on a scale of 1 inch to 1,000 feet. No contours will be shown, although levels were run for the determination of essential data on problems of the coalfield

Northwest Territories

D.A. Nichols again accompanied the Eastern Arctic Expedition. He continued investigations on the uplifted marine beaches of the eastern Arctic regions, and made a contoured map of Eric Cove, Wolstenholme, P.Q., on a scale of 2,000 feet to the inch, contour interval 100 feet, with the location of important beaches marked. He re-visited the northern ports and obtained further information on the raised strand-lines; found new marine fossils in the beaches; and collected rock types from the various localities visited. He obtained a complete set of anchor samples showing the character of the bottom sedimentation at the various anchorages, and took views and motion pictures, of geographical and ethnological interest.

FIELD WORK BY THE FORMER TOPOGRAPHICAL AND AIR SURVEYS BUREAU

British Columbia

C.H. Taggart completed the topographical mapping of the Sumas sheet, latitudes 49° 00' to 49° 15', longitudes 122° 00' to 122° 30', and carried on work for the Chilliwack sheet, latitudes 49° 00' to 49° 15', longitudes 121° 30' to 122° 00'. Both sheets are for publication on a scale of 1 inch to 1 mile.

Ontario

The plotting that had been done from vertical air photographs for the Port Arthur-Fort William sheet, latitudes 48° 00' to 48° 30', and longitudes 89° 00' to 90° 00'; and the Kaministikwia sheet, latitudes 48° 30' to 49° 00', and longitudes 89° 00' to 90° 00', was checked in the field and the roads classified. The Geodetic Service of Canada co-operated in obtaining this information. Both sheets are for publication on a scale of 1 inch to 2 miles.

C.B.C. Donnelly ran 89 miles of chain traverse and 376 miles of stadia traverse for control of the Capreol sheet, latitudes 46° 30' to 47° 00', and longitudes 80° 00' to 81° 00'; and the Evelyn sheet, latitudes 47° 00' to 47° 30', and longitudes 80° 00' to 81° 00'. The work was perpetuated by 81 permanent monuments. Both sheets are for publication on a scale of 1 inch to 2 miles.

E.S. Fry made astronomical observations at two points in Spirit Lake map-sheets, latitudes 50° 00' to 53° 00, longitudes 92° 00' to 94° 00'; and at one point near the northerly limit of Sandy Lake map-sheet, latitudes 53° 00' to 54° 00', and longitudes 92° 00' to 94° 00', to supplement existing control. The maps are for publication on a scale of 1 inch to 4 miles.

Quebec

P.E. Palmer obtained information in the field for contouring on vertical air photographs, with the aid of the stereoscope, the northern half of the Grand-Mère sheet, latitudes 46° 45' to 47° 00', longitudes 72° 00' to 73° 00'. This sheet will be published on a scale of 1 inch to 2 miles.

A.O. Gorman ran traverse surveys to provide control, and obtained information in the field for contouring on vertical air photographs, with the aid of the stereoscope, over three-fourths of the Joliette sheet, latitudes 46° 00' to 46° 30', and longitudes 73° 00' to 74° 00'. This sheet will be published on a scale of 1 inch to 2 miles.

A.O. Gorman ran traverse surveys to provide control for the St. Michel map-sheet, latitudes 46° 30' to 47° 00', and longitudes 73° 00' to 74° 00'. He ran and levelled 200 miles of chain traverse, and established 69 permanent monuments.

A.M. Perry obtained ten astronomical observations on the Lac Opataca mapsheet, latitudes 50° 00' to 51° 00', longitudes 74° 00' to 75° 00'; and Lac Evans map-sheet, latitudes 50° 00 to 51° 00', longitudes 76° 00' to 78° 00', to supplement and tie in existing control. These sheets are for publication on a scale of 1 inch to 4 miles.
Nova Scotia

W.A. Fletcher ran 126 miles of chained traverse with trigonometric and barometric levelling for mapping the area covered by the new National Park in Cape Breton. This area is to be contoured from vertical air photographs and the map is to be published on a scale of 1 inch to 2 miles.

Northwest Territories

J. Carroll and E.S. Fry made thirty astronomical observations in an area north of Great Slave Lake, extending easterly from Yellowknife River to Thelon River. The area is included in seven map-sheets for publication on a scale of 1 inch to 4 miles.

MAP COMPILATION

The regular office work comprises the compilation of maps resulting from topographical surveys in the field, and from air surveys, and the preparation of base maps for the Draughting and Reproducing Division. Besides this work 21 preliminary maps and diagrams and 126 maps and diagrams for water supply papers were prepared.

GEOGRAPHIC BOARD OF CANADA

The Chief Topographical Engineer is also Chairman of the Geographic Board. The following report, prepared by the Secretary, outlines the functions, personnel, and activities of the Board:

The duties of the Geographic Board of Canada, created by Order in Council December 18, 1897, are: to advise and rule on all questions concerning geographic names in the Dominion that arise in the departments, of the public service. All departments are to accept and use in their publications the names and orthography adopted by the Board.

W.H. Boyd and J.H. Corry, Department of Mines and Resources, are, respectively, Chairman and Secretary of the Board, the other members being F.C.C. Lynch, G.A. Young, F.H. Peters, A.M. Narraway, A. Dickison, F. Anderson, N.J. Ogilvie, Department of Mines and. Resources; J.E. Lyon, Department of National Defence, and E.E. Gagnon, Department of Transport.

The Executive Committee comprises F.H. Peters and A. Dickison.

During the past year the Board passed upon thousands of names for some fifty, map-sheets. Inquiries, and reports for information on the Correct designation, meaning, location, and history of geographical names have been received from other departments, and from local and foreign sources.

DRAUGHTING AND REPRODUCING DIVISION

Maps Published April 1, 1936, to March 31, 1937

Publication Number	Title	Remarks
...	NORTHWEST TERRITORIES	...
377A	Eastern portion of Great Slave Lake (West half), District of Mackenzie; scale, 1 inch to 4 miles.	Geology. For separate distribution.
378A	Eastern portion of Great Slave Lake (East half), District of Mackenzie; scale, 1 inch to 4 miles.	Geology. For separate distribution.
...	YUKON	...
340A	Carmacks sheet; scale, 1 inch to 4 miles	Geology. For memoir by H.S. Bostock, and separate distribution.
...	Tantalus Butte-Tatchun Lake area, illustrating probable chief structural features; scale, 1 inch to 2 miles	Geology. For memoir by H.S. Bostook.
350A	Teshlin-Quiet Lake area; scale, 1 inch to 4 miles	Geology. For memoir by E.J. Lees, and separate distribution.
372A	Laberge sheet; scale, 1 inch to 4 miles	Geology. For memoir by H.S. Bostock, and separate distribution.
373A	Ogilvie sheet; scale, 1 inch to 4 miles	Topography. For separate distribution.
394A	Pelly River area; scale, 1 inch to 8 miles	Geology. For memoir by J.R. Johnston, and separate distribution.
...	BRITISH COLUMBIA	...
348A	Gun Lake area (Bridge River), Lillooet District; scale, 1 inch to 1/2 mile	Topography. For separate distribution.
349A	Cadwallader Creek area (Bridge River), Lillooet District; scale, 1 inch to 12 mile	Topography. For separate distribution.
367A	Tahtsa-Morice area, Coast District; scale, 1 inch to 4 miles	Geology. For separate distribution.
368A	Smithers sheet (West half), Coast District; scale, 1 inch to 4 miles	Topography. For separate distribution.
369A	Smithers sheet (Fast half), Coast District; scale, 1 inch to 4 miles	Topography. For separate distribution.
370A	Fort Fraser sheet (West half Coast District; scale, 1 inch to 4 miles	Topography. For separate distribution.
...	Claims in the vicinity of the mine of B.C. Nickel Mines, Limited, Yale District; scale, 1 inch to 800 feet	Geology. For memoir by H.C. Horwood.
...	Geology of mineral claims, Second Relief mine, Kootenay District; scale, 1 inch to 500 feet	Geology. For memoir by W.E. Cockfield.

Publication Number	Title	Remarks
...	SASKATCHEWAN	...
339A	Goldfields area; scale, 1 inch to 1 mile	Geology. For memoir by F.J. Alcock, and separate distribution.
363A	Tazin Lake sheet; scale, 1 inch to 4 miles	Geology. For memoir by F.J. Alcock, and separate distribution.
364A	Fond-du-Lac sheet; scale, 1 inch to 4 miles	Geology. For memoir by F.J. Alcock, and separate distribution.
365A	Stony Rapids sheet (West half); scale, 1 inch to 4 miles	Geology. For memoir by F.J. Alcock, and separate distribution.
357A	Lac-la-Ronge sheet (West half); scale, 1 inch to 4 miles	Geology. For separate distribution.
358A	Lac-la-Ronge sheet (East half); scale, 1 inch to 4 miles	Geology. For separate distribution.
...	MANITOBA	...
343A	Granville Lake sheet (West half); scale, 1 inch to 4 miles	Geology. For separate distribution.
344A	Granville Lake sheet (East half); scale, 1 inch to 4 miles	Geology. For separate distribution.
345A	Portion of Seal River; scale, 1 inch to 4 miles	Geology. For separate distribution.
346A	Seal River area; scale, 1 inch to 12 miles	Geology. For separate distribution.
374A	Herb Lake area (North sheet); scale, 1 inch to 1,000 feet	Geology. For memoir by C.H. Stock-well, and separate dis-tribution.
375A	Herb Lake area (Centre sheet); scale, 1 inch to 1,000 feet	Geology. For memoir by C.H. Stockwell, and separate dis-tribution.
376A	Herb Lake area (South sheet); scale, 1 inch to 1,000 feet	Geology. For memoir by C.H. Stockwell, - and separate distribution.
...	ONTARIO	...
347A	Papaonga area, Kenora District (Patricia portion) scale, 1 inch to 2 miles	Geology. For separate distribution.
354A	Pigeon River area (Sheet I), Thunder Bay District; scale, 1 inch to 1 mile	Geology. For memoir by T.L.Tanton, and separate distribution.
355A	Pigeon River area (Sheet II), Thunder Bay District; scale 1 inch to 1 mile	Geology. For memoir by T.L. Tanton, and separate distribution.

Publication Number	Title	Remarks
...	ONTARIO - Concluded	...
356A	Pigeon River area (Sheet 111), Thunder Bay District; scale 1 inch to 1 mile	Geology. For memoir by T.L. Tanton, and separate distribution.
366A	Cow River area, Sudbury and Algoma Districts; scale, 1 inch to 2 miles	Geology. For separate distribution.
...	Index map showing relative positions of thirty-two gold-bearing areas of Ontario east of Lake Superior; approximate scale, 1 inch to 75 miles	For memoir by E.D. Kindle.
...	QUEBEC	...
286A	Escuminac sheet, Bonaventure County; scale, 1 inch to 1 mile	Geology. For separate distribution.
383A	Ville-Marie Sheet (West half), Témiscamingue County; scale, 1 inch to 1 mile	Topography. For separate distribution.
384A	Ville-Marie sheet (East half), Témiscamingue County; scale, 1 inch to 1 mile	Topography. For separate distribution.
385A	Guillet Lake sheet (West half), Témiscamingue County; scale, 1 inch to 1 mile	Topography. For separate distribution.
386A	Guillet Lake sheet (East half), Témiscamingue County; scale, 1 inch to 1 mile	Topography. For separate distribution.
...	NEW BRUNSWICK	...
342A	Serpentine Lake sheet, Victoria and Northumberland Counties; scale, 1 inch to 1 mile	Topography. For separate distribution.
391A	Plaster Rock sheet (East half), Victoria County; scale, 1 inch to 1 mile	Topography. For separate distribution.
392A	Plaster Rock sheet (West half), Victoria County; scale, 1 inch to 1 mile	Topography. For separate distribution.
393A	Tuadook Lake sheet (West half), Victoria and York Counties; scale, 1 inch to 1 mile	Topography. For separate distribution.

Other Map-Work in Varying Stages of Progress

...	Title	Remarks
...	BRITISH COLUMBIA	...
1	Cranbrook sheet, Kootenay District; scale, 1 inch to 1 mile	Geology.
2	Willow River sheet (East half), Cariboo District; scale, 1 inch to 1 mile	Geology.
3	Willow River sheet (West half), Cariboo District.; scale, 1 inch to 1 mile	Geology.
4	Eagle-McDame area, Cassiar District; scale, 1 inch to 4 miles	Geology.
5	Ashcroft sheet (East half), Kamloops District; scale, 1 inch to 4 miles	Topography.
6	Ashcroft sheet (West half), Kamloops, Lillooet, and Yale Districts; scale, 1 inch to 4 miles	Topography.
7	Kettle Valley sheet (West half), Similkameen and Osoyoos Districts; scale, 1 inch to 4 miles	Topography.
8	Hope sheet (East half), Yale District; scale, 1 inch to 4 miles	Topography.
9	Hope sheet (West half), Yale District; scale, 1 inch to 4 miles	Topography.
10	Keremeos sheet, scale, 1 inch to 1 mile	Geology.
...	ALBERTA	...
11	Fallentimber sheet (East half), west of Fifth meridian; scale, 1 inch to 1 mile	Topography.
12	Fallentimber sheet (West half), west of Fifth meridian; scale, 1 inch to 1 mile	Topography.
13	Bearberry sheet (West half), west of Fifth meridian; scale, 1 inch to 1 mile	Topography.
14	Wainwright-Sullivan sheet (East half); scale, 1 inch to 4 miles	Geology.
15	Wainwright-Sullivan sheet (West half); scale, 1 inch to 4 miles	Geology.
...	SASKATCHEWAN	...
16	Battleford-Tramping Lake sheet (East half); scale, 1 inch to 4 miles	Geology.
17	Battleford-Tramping Lake sheet (West half); scale, 1 inch to 4 miles	Geology.
...	MANITOBA	...
18	Elizabeth-Dauphin claims, Herb Lake area; scale, 1 inch to 75 feet	Geology.
19	Part of Rex group of claims, Herb Lake area; scale, 1 inch to 175 feet	Geology.
...	ONTARIO	...
20	Manitoulin Island, Manitoulin District; scale, 1 inch to 4 miles	Geology
21	Espanola sheet, Sudbury District; scale, 1 inch to 1 mile	Geology.
22	Copper Cliff sheet, Sudbury District; scale, 1 inch to 1 mile	Geology.
23	Hearst-Kapuskasing area (East sheet), Cochrane and Algoma Districts; scale, 1 inch to 4 miles	Geology.
24	Hearst-Kapuskasing area (East sheet), Cochrane and Algoma Districts; scale 1 inch to 4 miles	Geology.
25	Shebandowan sheet, Thunder Bay District; scale, 1 inch to 1 mile	Geology.

...	Title	Remarks
...	ONTARIO AND QUEBEC	...
26	Ottawa sheet (East half), Carleton and Hull Counties; scale, 1 inch to 1 mile	Geology.
27	Ottawa sheet (West half), Carleton and Hull Counties; scale, 1 inch to 1 mile	Geology.
...	QUEBEC	...
28	Chibougamau sheet (East half), Abitibi Territory; scale, 1 inch to 4 miles	Geology.
29	Chibougamau sheet (West half), Abitibi Territory; scale, 1 inch to 4 miles	Geology.
30	Opemisca sheet (East half), Abitibi Territory; scale, 1 inch to 1 mile	Geology.
31	Megantic sheet (West half), Frontenac County; scale, 1 inch to 1 mile	Geology.
32	Ville-Marie sheet (East half), Témiscamingue County; scale, 1 inch to 1 mile	Geology.
33	Ville-Marie sheet (West half), Témiscamingue. County; scale, 1 inch to 1 mile	Geology.
34	Guillet take sheet (East half), Témiscamingue County; scale, 1 inch to 1 mile	Geology.
35	Guillet Lake sheet (West half), Témiscamingue County; scale, 1 inch to 1 mile	Geology.
36	Cadillac area, Cadillac Township; scale, 1 inch to 1,500 feet.	Geology.
37	Part of Cadillac belt, Cadillac Township; scale, 1 inch to 600 feet	Geology.
38	Vertical section, O'Brien Gold Mines, Limited, Cadillac Township; scale, 1 inch to 60 feet	Geology.
39	Plan of third level, O'Brien Gold Mines, Limited, Cadillac Township; scale, 1 inch to 60 feet	Geology.
40	Canadian Pandora Gold Mines, Limited, Cadillac Township; scale, 1 inch to 200 feet	Geology.
41	Isometric diagram of the underground workings, Canadian Pandora Gold Mines, Limited, Cadillac Township; scale, 1 inch to 60 feet	Geology.
42	Lake Etchemin area, Dorchester and Beauce Counties; scale, 1 inch to 1 mile	Geology.
43	Desboues sheet (East half), Abitibi County; scale, 1 inch to 1 mile	Geology.
44	Desboues sheet (West half), Abitibi County; scale, 1 inch to 1 mile	Geology.
45	Thetford sheet (East half), Megantic, Beauce, and Frontenac Counties; scale, 1 inch to 1 mile	Geology.
46	Thetford sheet (West half), Megantic, Beauce, and Frontenac Counties; scale, 1 inch to 1 mile	Geology.
47	Disraeli sheet (East half), Wolfe, Frontenac, and Megantic Counties; scale, 1 inch to 1 mile	Geology.
48	Disraeli sheet (West half), Wolfe, Frontenac, and Megantic Counties; scale, 1 inch to 1 mile	Geology.
49	Warwick sheet (East half), Wolfe and Arthabaska Counties; scale, 1 inch to 1 mile	Geology.
50	Index to cadastral subdivisions of Thetford areas; scale, 1 inch to 2 miles	...
...	NEW BRUNSWICK	...
51	Sevogle Rivers area, Northumberland County; scale, 1 inch to 2 miles	Geology.
52	Woodstock area, Carleton and York Counties; scale, 1 inch to 2 miles	Geology.
53	Petitcodiac sheet (East half), Kings, Westmorland, and Albert Counties; scale, 1 inch to 1 mile	Topography.
54	Petitcodiac sheet (West half), Kings and Westmorland Counties; scale, 1 inch to 1 mile	Topography.

...	Title	Remarks
...	NOVA SCOTIA	...
55	Bras d'Or sheet, Cape Breton and Victoria Counties; scale, 1 inch to 1 mile	Geology.
56	Sydney sheet (East half), Cape Breton County; scale, 1 inch to 1 mile	Geology.
57	Sydney sheet (West half), Cape Breton County; scale, 1 inch to 1 mile	Geology.
58	Glace Bay sheet, Cape Breton County; scale, 1 inch to 1 mile	Geology.
59	Oxford sheet (East half), Cumberland and Colchester Counties; scale, 1 inch to 1 mile	Geology.
60	Oxford sheet (West half), Cumberland and Colchester Counties; scale, 1 inch to 1 mile	Geology.
61	Springhill sheet, Cumberland and Colchester Counties; scale, 1 inch to 1 mile	Geology.
62	Kejimkujik sheet (East half), Digby, Annapolis, and Queens Counties; scale, 1 inch to 1 mile	Geology.
63	Kejimkujik sheet (West half), Digby, Annapolis, and Queens Counties; scale, 1 inch to 1 mile	Geology.
64	Malaga sheet (East half), Queens and Lunenburg Counties; scale, 1 inch to 1 mile	Geology.
65	Malaga sheet (West half), Queens and Lunenburg Counties; scale, 1 inch to 1 mile	Geology.
66	Liverpool sheet (East half), Queens and Lunenburg Counties; scale, 1 inch to 1 mile	Geology.
67	Liverpool sheet (West half), Queens and Lunenburg Counties; scale, 1 inch to 1 mile	Geology.

In addition to the foregoing, eighty-six map and other figure drawings were prepared for reproduction by zinc-cut process, for illustrating reports, papers, and memoirs. Other draughting and related work necessary for staff and public use amounted to one hundred and thirty-two items.

NATIONAL MUSEUM OF CANADA

Field work, which was suspended during the depression years, has been actively resumed. During 1936 field parties were engaged in: biological work on the Pacific Coast; ornithological investigations in northern Manitoba; a special biological survey of Thelon Game Sanctuary; a botanical survey in the vicinity of Port Arthur, Ontario, for a beaver habitat group; archaeological excavations in Windsor, Ontario, and in the Arctic regions; a study of early French-Canadian art and handicrafts; and an investigation of the effect of contact with the white man upon Indian culture.

The reports issued are listed in the section on publications.

The rearrangement of cases and regrouping of exhibits were commenced by the Anthropological Division, and similar rearrangement will be effected in other halls of the Museum. The lecture ball was restored to its former size through the removal of offices; and was modernized by the installation of the best available equipment for the projection of sound and silent motion pictures, the introduction of the latest improvements in acoustics, and by up-to-date ventilation, lighting, and decoration.

A renewed interest in the welfare of the Museum is being manifested by the public. In May 1936, Harry Snyder made a formal presentation of a large wood buffalo habitat group. Other outstanding gifts made to the Museum

were: a fine mounted specimen of bighorn sheep, donated by Alexander Fraser, Pittsburgh, U.S.A.; an excellent ceinture fléchée, donated by Mrs. George Major, Ottawa; and the head of a Pleistocene bison by Fenley Hunter, Flushing, Long Island, U.S.A. Mr. and Mrs. Fenley Hunter spent several weeks during the summer, with the assistance of the noted collector, Albert C. Silberling, collecting mammalian fossil remains in southern Saskatchewan, and generously turned over the complete collection to the National Museum of Canada.

EDUCATIONAL WORK

Educational work is one of the most important activities of the National Museum, and it is through the extension services of this work that the Museum is able to reach out to all sections of the country, and to assist in the diffusion of accurate and specialized knowledge on natural history and related subjects.

Additions were made to the motion picture library by the purchase of a number of films on biological subjects, and sets of lantern slides, mostly coloured, are being added regularly. These films and slides are lent to schools, scientific societies, and other organizations, and catalogues may be had on application. The Museum is able to supply photographs to teachers, scientists, and authors at about the cost of printing, and collections and separate specimens of minerals and rocks can be had from the Bureau of Geology and Topography at moderate prices.

More detailed information on the educational work, and particularly on the series of lectures given in Ottawa during the winter months, will be found in the Annual Report of the National Museum.

ANTHROPOLOGICAL DIVISION

D. Jenness assembled and arranged the field notes he gathered in British Columbia during the winter of 1935 - 36, and completed a report on the Sarcee Indians of Alberta.

W.J. Wintemberg completed the excavation of the Indian burial ground near Windsor, Ontario. He completed two reports on earlier explorations, one at Tadoussac, Quebec, and the other along the northwest coast of Newfoundland, and is engaged on a third report, describing the Sidey-Mackay Indian site in Simcoe County, Ontario.

Harlan I. Smith, archaeologist, was retired on superannuation in February 1937.

Douglas Leechman partly excavated an old Eskimo village site near Cape Wolstenholme, at the southwest entrance to Hudson Strait. Afterwards he proceeded north on the R.M.S. Nascopie and examined two other Eskimo sites, one at Dundas Harbour, Devon Island, and the other in Arctic Bay, Baffin Island.

C.M. Barbeau spent from June to December in a field study of the early arts and handicrafts of Quebec. The Macmillan Company published two of his books on this subject, Quebec Where Ancient France Lingers and The Kingdom of Saguenay.

BIOLOGICAL DIVISION

C.H. Douglas Clarke, University of Toronto, made a preliminary biological survey of the Thelon Game Sanctuary, Northwest Territories. The principal object was to obtain detailed information as to the number and distribution of, and other pertinent data on, the musk-oxen, caribou, and other game and fur. bearing mammals. Small collections of mammals, birds, animal parasites, and plants were made in connection with the immediate purposes of the survey.

Thomas M.C. Taylor, University of Toronto, established a base camp at Silver Islet, Ontario, and made extensive and important botanical and zoological collections.

Hamilton M. Laing, Comox, B.C., collected mammals, birds, amphibians, and reptiles on the west coast of British Columbia, starting at Powell River, working inland to Horseshoe Lake and Gordon Pasha Lake, and then proceeding northward into Bute, Loughborough, and Kingcome Inlets. These collections are from a region in which very little systematic work has been done on the land vertebrate fauna, and form a desirable connecting link with work previously done for the National Museum on Vancouver Island.

C.L. Patch, with the co-operation and permission of the Ontario Government, collected several specimens of beaver from Algonquin Park, together with a large quantity of beaver cuttings and other accessory material, for the construction of a beaver habitat group, including a beaver house and part of a beaver dam.

R.M. Anderson continued work on the Mammals of Canada, and on revising "Check-list of Canadian Mammals." He also completed shorter papers on wild life and faunal resources, including an illustrated chapter on "Faunas of Canada" for the Canada Year Book, 1937, and a chapter on "Mammals and Birds of Mackenzie District, Northwest Territories, Canada", for "Canada's Western Northland". On March 31, 1937, the catalogued specimens of mammals in the National Museum of Canada numbered 14,287, and amphibians and reptiles 4,734.

A.E. Porsild, National Herbarium, was engaged chiefly on the extensive collection of Arctic and sub-Arctic plants that he made during his work in the north for the former Department of the Interior, and in preparing a scientific report on the flora of the western Arctic region. During the year, 6,534 sheets were labelled and mounted and 741 sheets of plants were named; 9,773 sheets,were received as donations and on account of exchange, and 9,558 sheets were distributed. Sheets officially registered and numbered in the National Herbarium totalled 138,634 on March 31, 1937.

P.A. Taverner conducted researches along the Hudson Bay railway in northern Manitoba, where he collected 484 birds, 50 sets of eggs, 191 mammal specimens, a few amphibians, material for several life-history groups, and moving and still wild-life and flower photographs.

BUREAU OF MINES

The Bureau of Mines comprises the former Mines Branch with the regrouping of its functions and the addition of the former Explosives Division. This Bureau now comprises five divisions, namely, the Metallic Minerals, Industrial Minerals, Fuels, Economics, and Explosives. The former Mineral Resources Division contributed to the formation of the three last-named; and the former Chemistry Division has been distributed among the first three. The Draughting Division and the Library now form part of the Economics Division.

The Metallic Minerals Division comprises the former Ore Dressing and Metallurgical Division, without the Non-Metallics laboratory, and most of the former Chemical Division. The Industrial Minerals Division comprises that part of the former Mineral Resources Division concerned with industrial minerals, their resources, recovery, marketing, and uses; the Industrial Waters Investigation Section of the former Chemical Division; the Non-Metallics laboratory, and the former Ceramics Division. The Fuels Division comprises the old Fuels and Fuel Testing Division, and handles the work on bituminous sand and mine gases, formerly carried out by the Mineral Resources and 47398 - 3 1/2

Chemical Divisions. The Economics Division comprises the Records and Research Information Section of the former Mineral Resources Division, the Library, and the Draughting Division.

The facilities of the Ore Dressing and Metallurgical laboratories were pressed to the limit to meet requests from the industry for assistance.

The Industrial Minerals Division continued to assist the development of Canada's industrial minerals, through the publication of reports, the preparation of many memoranda in reply to inquiries, and by personal conferences with engineers and representatives of capital seeking opportunities for investment.

The Fuels Division continued its laboratory studies and researches on Canadian coals and cokes, and natural gas and petroleum products, as a means of assistance in extending the home market for Canadian fuels.

DISTRIBUTION OF PUBLICATIONS

During the fiscal year, 35,607 copies of the Bureau of Mines' reports, memorandum series, lists of mines, metallurgical works, etc., were distributed; 60,330 pages were mimeographed, and 22,000 notification cards were sent out.

ECONOMICS DIVISION

Brief reviews for 1935 of some sixty-one mineral products were compiled and printed for distribution, both as separates, and in book form. The following reports and lists were also published: Petroleum Fuels in Canada (Deliveries for Consumption Calendar Year 1934); L'Or au Canada, 1935; List of Milling Plants in Canada: Part I, Metallic Ores; List of Metallurgical Works in Canada: Part I, Iron and Steel; and List of Metallurgical Works in Canada: Part II, Non-Ferrous and Precious Metals. Manuscripts for a number of newsletters and articles were prepared for publication in the technical press of Canada, Mexico, and Great Britain.

During the latter part of the year, in particular, there was a notable increase in requests for information on specific mining companies and mining, properties, many of them being from the United States.

A.H.A. Robinson was occupied mostly in the preparation of articles, and memoranda, and in answering correspondence. He held a number of conferences with officers of the Income Tax Branch of the Department of National Revenue, and assisted in draughting regulations.for an amendment to the Income War Tax Act which provides for the exemption of certain metalliferous mines from the operation of the Act. He spent about two months in an inspection of gold developments in British Columbia.

John Casey continued the annual survey of fuel oil used for all purposes in Canada. He made a similar survey of bunker fuels used in Quebec, Ontario, and Manitoba, and prepared a tabular statement for 1935. He visited all peat and moss bogs being worked in Ontario and Quebec, and newly erected oil refineries in the Prairie Provinces. He revised the "List of Coal Mines in Canada," and prepared a number of analytical tables for special purposes. Tabulations and charts dealing with the Trade of Canada from 1920 to 1936 are being prepared for the coming Economic Conference.

A. Buisson was engaged chiefly in office work in the Records Section, which included the preparing of reviews for the press; the compiling of lists of milling plants and metallurgical works; and the preparing of special memoranda and tabulations on various mining subjects. He made an inspection of mineral developments in western Ontario and southeastern Manitoba.

E.H. Wait was engaged in compiling records of mining companies, and in answering inquiries. Along with G.S. Hume, of the Geological Survey, and P.V. Rosewarne, of the Division of Fuels, he prepared a paper on "Petroleum and Natural Gas in Canada, 1933 to 1936", to be presented at the World's Petroleum Congress in Paris in 1937.

The Draughting Section completed the following work:

Fourteen maps for reproduction, and 131 charts, graphs, and drawings. Thirty-six special type headings were drawn in colour for new departmental stationery.

Prepared twelve charts, including 85 hand-coloured copies, and brought up to date 20 other charts for the Dominion Fuel Board.

Made 2,380 prints on the Rectigraph machine.

Made 328 negatives, black and white, and blueprints on the blueprint machine.

Filed 215 halftone blocks and zinc cuts.

Accessions to the Library	
Books (by purchase)	248
Books (by gift)	58
Books and bulletins added to the circulating division	68
Canadian Government documents (by exchange and gift)	1,615
British and Foreign Government documents (by exchange and gift)	1,027
Scientific societies' bulletins, proceedings, and transactions (by exchange and gift)	1,560
Trade catalogues (by gift)	298
Periodicals and continuations subscribed for	233
Annuals, continuations, and periodicals (by gift)	517
Volumes bound	217
Recorded loans	3,311

METALLIC MINERALS DIVISION

The rise in the prices of base metals resulted in renewed interest in the reopening of several base metal properties throughout the Dominion that have been idle for years. Many requests were received from the owners of promising base metal properties for test work on their ores.

Ninety-nine investigations were completed in the Ore Dressing and Metallurgical laboratories, 66 of them being on gold ores or their products, 18 on problems in ferrous metallurgy, and the remainder on silver, gold, copper, nickel, lead, zinc, titanium, barium, uranium, molybdenum, and other metals.

Ninety-nine reports of investigations were issued, 39 of which were prepared for publication, and the remainder were submitted to those interested. Tests were made on ores and minerals from every mining province in the Dominion.

Members of the staff visited mining areas in Quebec, Ontario, and British Columbia, where they investigated various problems of plant, operation.

LABORATORY INVESTIGATIONS

Metallic Ores. - Investigations were carried out on the concentration and recovery of metals from the following ores:

Gold ore from Bankfield Gold Mines, Limited, Geraldton. Ont. (665).
Gold ore from Sturgeon River Gold Mines, Limited, Thunder Bay District, Ont. (666).
Gold ore from Leitch Gold Mines, Limited, Thunder Bay District, Ont. (667).
Gold ore from Darwin Gold Mines, Limited, Michipicoten, Ont. (668).
Gold ore from the A-X Syndicate, Yellowknife River, N.W.T. (669).
Gold-silver-bearing lead-zinc ore from Ymir Dundee Cold Mining Company, Limited, Ymir, B.C. (670).
Arsenical-gold ore from the Whitewater mine, Taku River District, Atlin Mining Division, B.C. (671).

Gold ore from Erie Canadian Mines, Limited. Hedlund property, Matachewan, Ont. (672).
Barite tailing from Kamloops Homestake Mines, Limited, Jamieson Creek, Kamloops Mining Division, B.C. (673).
Lead ore from Consolidated Lead Mines, Limited, Summerville Township, Victoria County, Ont. (674).
Arsenical-gold ore from Flin Flon Mining Syndicate, Flinflon, Man. (675).
Gold ore from Granada Gold Mines, Limited, Rouyn, P.Q. (676).
Gold ore from Bidgood Kirkland Gold Mines, Limited, Lebel Township, Kirkland Lake, Ont. (677).
Gold ore from Delnite Mines, Limited, Deloro Township, Porcupine, Ont. (678).
Gold ore from Morris Kirkland Gold,Mines, Lebel Township, Kirkland Lake, Ont. (679).
Gold ore from Jowsey Island Gold Mines, Limited, Gods Lake area, Man. (680).
Gold tailing from Lebel Oro Mines, Limited, Long Lake, Sudbury area, Ont. (681).
Gold ore from Bilmac Gold Mines, Limited, MacMurchy Township, West Shiningtree, Ont. (682).
Silver mill tailing and concentrate from Eldorado Gold Mines, Limited, Echo Bay, N.W.T. (683).
Gold ore from Knee Lake Gold Mines, Limited, Gods Lake area, Man. (684).
Gold ore from Michipicoten Gold Mines, Limited, Michipicoten area, District of Algoma, Ont. (685).
Gold ore from Granite Poorman gold mine (Livingstone Mining Company, Inc.), Taghum. B.C. (686).
Gold ore from the Pugsley mine (Surf Inlet Consolidated Gold Mines, Limited), Princess Royal Island, B.C. (687).
Copper-nickel ore from B.C. Nickel Mines, Limited, Choate, B.C. (688).
Arsenical-gold ore from Spirit Lake Gold Mines, Limited, Spirit Lake, Patricia District, Ont. (689).
Gold-bearing mill tailing, Bralorne Mines, Limited, Bridge River District, Bralorne, B.C. (690).
Gold ore from Dwyer Elbow Lake Mining Syndicate, Limited, Elbow Lake, Man. (691).
Gold-silver ore from Berens River Mines, Limited, Favourable Lake, Patricia District, Ont. (692).
Gold ore from Leitch Cold Mines, Limited, Sturgeon River area, Thunder Bay District, Ont. (693).
Gold ore from Sigma Mines, Limited, Bourlamaque Township, Abitibi County, P.Q. (694).
Flotation concentrate from Beattie Gold Mines, Limited, Duparquet, P.Q. (695).
Flotation concentrate from Beattie Gold Mines, Limited, Duparquet, P.Q. (696).
Gold ore from the Sunbeam property, near West Hawk Lake, southeast Man. (697).
Gold ore from Madsen-Red Lake Gold Mines, Limited, Red Lake area, Ont. (698).
Gold ore from Gold Eagle Gold Mines, Limited, Red Lake area, Patricia District, Ont. (699).
Gold ore from Elora Gold Mines, Limited, Goldrock, Kenora Mining Division, Ont. (700).
Gold ore from Nugold Mining Corporation, Limited, Blockhouse, N.S. (701).
Gold ore from Young-Shannon Gold Mines, Limited, Gogama, Ont. (702).
Gold ore from Federal Gold Mines, Limited, Bridge River, B.C. (703).

Experimental tests were made also on the following, and reports were issued to those directly interested:

Gold ore from the Dominion mine (Lake Thomas Syndicate, Limited), Waverley, N.S.
Silver-bearing lead-zinc ore from Invermay Annex Mining Company, Limited, Skagit River area, near Hope, B.C.
Gold-bearing concentrate from Gillies Lake Porcupine Gold Mines, Limited, Tisdale Township, Porcupine, Ont.
Gold ore from mining claim E-237, Little Turtle Lake, Fort Francis Mining District, Ont.
Zinc ore from the Enterprise mine, Lennox-Addington County, Ont.
Placer gold from Winfield Placers, Kelowna, B.C.
Gold ore from Babine Gold Mines, Limited, Dome Mountain, Smithers, B.C.
Gold pulp from Macassa Mines, Limited, Kirkland Lake, Ont.
Uranium product, Eldorado Gold Mines, Limited, Port Hope, Ont.
Gold ore from Sachigo River Exploration Company, Limited, Sachigo River area, Patricia District, Ont.
Gold ore from Nerwaba Gold Syndicate, Walls Township, Oba District, Ont.
Gold concentrate from Wendigo Gold Mines, Limited, Lake of the Woods District, Ont.
Gold ore from Salmon River District, Halifax County, N.S.
Gold ore from Diana Gold Mines, Limited, Rice Lake District, Man.
Titaniferous iron sand from Thunder Bay District, Fort William, Ont.
Gold ore from Darwin Gold Mines, Limited, Michipicoten District, Ont.

Arsenical-gold ore from the Wisconsin claims, Hennessey Mountain, Nelson Mining Division, B.C.

Gold concentrate from Perron Gold Mines, Limited, Abitibi County, P.Q.
Tungsten gold-bearing ore from Indian Path Mines, Limited, Lunenburg County, NB.
Gold ore from claim No. 2230, south shore Vermilion Lake, Kenora District, Ont.
Gold-silver tailing from Kamloops District, B.C.
Gold ore from Bayonne Consolidated Mines, Limited, Bayonne, B.C.
Gold ore from Holdsworth Mining Company, Limited, Township 28, Range 24, Algoma West, Ont.
Gold-bearing flotation concentrate from Minto Gold Mines, Limited, Bridge River District, B.C.
Arsenical-gold ore from the Cameron Island mine (Duport Mining Company, Limited), Lake of the Woods District, Ont. (Shoal Lake).
Gold-silver-lead-zinc ore from Welldun Mining, Milling, and Power Company, Limited, Stewart, B.C.
Gold ore from McLeod-Cockshutt Gold Mines, Limited, Little Long Lac area, Thunder Bay District, Ont.
Gold ore from Old Diamond Syndicate, Madoc Township, Hastings County, Ont.
Gold ore from Craig Gold Mines, Limited, Tudor Township, Hastings County, Ont.
Gold ore from Argosy Gold Mines, Limited, Casummit Lake, Patricia District, Ont.
Arsenical-gold ore from the "Wisconsin Group" mineral claims, Hennessey Mountain, Nelson Mining Division, B.C.
Gold ore from Amca Mines, Limited, Matheson, Garrison Township, Timiskaming County, Ont.
Copper-nickel ore from Coniagas Mines, Limited, Empire Lake, Lake of the Woods District, Ont.
Molybdenite-bearing rock from Meach Lake, Hull County, P.Q.
Gold ore from Proprietary Mines, Limited, Larder Lake, Ont.
Gold ore from B.P. Exploration Company, Limited, Thurlow Island, B.C.
Lead ore from Delhi Temagami Gold Mines, Limited, Timagami, Ont.
Mill tailing from Ensign Gold Mines, Limited, Webbwood, Ont.
Flotation tailing from Hedley Mascot mine, Hedley, B.C.
Silver ore from Eldorado Gold Mines, Limited, Port Hope, Ont.
Gold ore from Central Patricia Gold Mines, Limited, Pickle Crow, Ont.
Gold ore from the old Bathurst mine, Red Lake District, Ont.

A report was issued on the Harrison Chemical process for the extraction and recovery of gold from ores, and another on the Vandercook Metal Separation process for the regeneration of cyanide solutions.

Ferrous Metallurgy. - This work included the following investigations:

The examination and testing of steel bars from the Naval Service, Department of National Defence, Ottawa, Ont.
The low-temperature reduction of the nickel-chrome magnetite contained in the asbestos ore of Canadian Johns-Manville Company, Limited, Asbestos, P.Q.
The low-temperature reduction of nickel-chrome magnetite containing the asbestos tailing from Canadian Johns-Manville Company, Limited, Asbestos, P.Q.
The composition and microstructure of a manganese steel ball mill liner.
An examination of a broken eye bar head in the anchorage link of leaf No. 4, Lock No. 1, Welland ship canal.
An examination of some galvanized bolts for the Canadian Broadcasting Corporation, Ottawa, Ont.

Tests or metallographic studies were made also on screens from a Foudrinier machine, on an automotive thrust bearing, on several types of galvanized sheeting, and on tool, and other steels.

The officer in charge acted in an advisory capacity for the Department of National Defence, and much of his time was given to special works for that Department.

Research Chemical Laboratory. - Special investigations were made on the treatment of refractory ores and concentrates, and further work was carried out on the treatment of the plant residue, containing refractory silver, from Eldorado Gold Mines radium extraction plant, Port Hope, Ont.

A number of ores from Great Bear Lake area, Northwest Territories, and samples from many other parts of Canada

were measured for radioactivity.

In the mineragraphic laboratory, 915 polished sections of ores and mill products, and 14 thin sections of nonmetallic minerals were prepared for microscopic examination.

Work was completed and reports were made on 71 investigations on the microscopic examination of ores and mill products, 67 of which were in connection with the test treatment. The results were included in the reports of investigations. Four special studies of ores and mill products submitted for microscopic examination were completed and reported on, along with 46 spectrographic analyses, 3 of which had reference to the work of the Department.

Chemical Laboratories. - The Booth Street chemical laboratories received 5,700 samples, on which 25,859 separate determinations were made, an increase of 76.5 per cent over the previous year. The Sussex Street chemical laboratories received 1,720 samples, including 395 mine air samples.

INDUSTRIAL MINERALS DIVISION

The Division has three sections, one dealing with industrial, or non-metallic, minerals, their economic characteristics, mining, marketing, and uses; another with the crushing, grinding, and purification (milling) of the minerals; and the third with problems of processing in the manufacture of mineral products, particularly ceramic products.

Many tests were carried out on mineral products, particularly on refractories, as a service to Government departments in the purchase of supplies. It may be noted that other Government departments and commissions have been seeking advice on minerals and mineral products to an increasing extent.

H.S. Spence investigated various industrial and rare-element minerals. He made a field study of mica, feldspar, beryl, talc and soapstone, fluorspar, phosphate, graphite, nepheline, and radioactive mineral developments in Ontario and Quebec. He visited talc mines and mills in New York and Vermont, to obtain information on current mining and milling practice; and made a trade survey of industries using bentonite and similar clays for bleaching, banding, and emulsifying, to obtain data on the use of such clays by Canadian plants.

L.H. Cole continued his work on granites and related crystalline rocks as used in structural work, or for monuments. He made a survey of current developments in industries producing granite, gypsum, salt, and silica in Nova Scotia, New Brunswick, and parts of Quebec.

R.H. Picher prepared for publication a detailed report on road materials of the Maritime Provinces. He consulted highway officials in Quebec, Ontario, and three states of the United States on the stabilization of road sub-grades, base courses, and surfaces, and noted methods employed and examined results obtained. with particular reference to the use of sodium or calcium chloride for stabilizing road surfaces in Canada. He supervised the mechanical testing of building brick, and assembled the test results for a report.

H.A. Leverin was employed chiefly on the Industrial Waters investigation. His field work covered the Maritime Provinces, the area east of Rivière du Loup in Quebec, and between Georgian Bay -and Sault Ste. Marie in Ontario. He collected and analysed 77 samples of municipal waters and 26 samples of surface waters of industrial importance, and obtained information from industrial plants as to the quality of water in its relation to manufacturing processes; and also analysed a number of waters and brines sent to the Department.

M.F. Goudge continued his work on limestone, lime, marble, magnesite, rock wool, and whiting substitute. He made a field survey of recent developments in the limestone industries in southern and eastern Ontario, the results of which are included in the report on the limestones of Ontario. He made laboratory investigations on rock and slag wool, to obtain technical information for the use of Canadian manufacturers of these products. Subsequent to his participation in the Vimy Pilgrimage, he spent four weeks studying the lime, marble, whiting, slag wool, and glass wool industries in Great Britain, France, Belgium, and Germany.

V.L. Eardley-Wilmot continued his investigations of roofing granules and slate, sand-blasting materials and other abrasives, mineral fillers, and diatomite and molybdenite, which included tests on the sand-blasting qualities of garnet and quartz sand samples, and crushing tests on Canadian slates for roofing granule use. He also supervised. the production of a series of motion picture films.

C.H. Freeman tested samples of moulding sands, submitted by the public; studied the possibility of producing synthetic moulding sands with the use of domestic clays; and made a survey of the industrial mineral resources of the Ottawa area.

INDUSTRIAL MINERALS MILLING LABORATORIES

R.K. Camochan and R.A. Rogers were engaged on the following investigations:

Grindability of samples from Consolidated Sand and Gravel, Limited, Toronto, Ont.
Crushing tests of slate from Kingsbury, and Ste. Hénédine, P.Q., for making roofing granules.
Concentration tests on asbestos tailing from Canadian Johns-Manville Company, Limited, Asbestos, P.Q.
Gypsum from Island Point, Boularderie Island, Cape Breton, N.S.
Gypsum from White Elephant quarry of Gypsum, Lime, and Alabastine, Canada, Limited, Gypsumville, Man.

They also carried out minor tests on sandstone, quartz, silica sand, blasting sand, clay, graphite, mica, talc, garnet, spodumene, nepheline, syenite, beryl, calcite, diatomite, shale, andalusite, gypsum, etc., and prepared several lots of silica sand from sandstone for experiments at the Central Experimental Farm, and special blasting sand for the Weights and Measures Branch, Department of Trade and Commerce.

CERAMICS LABORATORIES

Physical Properties of Canadian Bricks. - Determinations of the dimensional variations, volumes, absorption properties, transverse and compressive strengths, hardness and toughness, change in strength due to ten cycles of freezing and thawing, and freezing tests to destruction, have been completed on all bricks collected prior to 1936, and two interim reports were issued to the manufacturers concerned. Samples from the remaining plants in western Ontario and from the western provinces were collected.

Sodium Uranate. - Samples of sodium uranate were tested for Eldorado Gold Mines, Limited, to assist the company in standardizing this product to yield uniformly acceptable material for ceramic glazes.

Other Investigations. - The laboratory work on clay as a plasticizer in masonry mortars was completed.

Thirty samples of plastic refractories and high-temperature cements were tested; and the testing of commercial firebricks was continued. This work was intended primarily as an aid to other departments, and as a guide in framing purchasing specifications.

Means of improving the quality of firebrick for a large Canadian producer were investigated.

The preparation of a report "Altering the Properties of Clays and Shales," which will include, also, data obtained from previous allied investigations, was completed.

Petrographic work for the National Research Council was carried out on a phase of the investigation of magnesian products. Other petrographic examinations and determinations of various ceramic materials were made also.

Experiments and trial-runs were made for three brick and tile manufacturers with the large de-airing auger machine, to determine the advantages that might be expected by the adoption of the de-airing process.

Pilot tests on the production of dry-press brick for one manufacturer resulted in the installation of this process by the manufacturer.

Tests were made on a large number of samples of clay, shale, mineral pigments, various ceramic raw materials, and finished ceramic products.

DIVISION OF FUELS

B.F. Haanel visited Western Canada, Montreal, the Bureau of Mines in Washington, and other places to discuss problems under investigation by the Department in the treatment and utilization of Canadian coal. He presented a paper to the World Power Conference in Washington, and prepared another, in co-operation with R.E. Gilmore, for the 1037 meeting of the Engineering Institute of Canada.

R.E. Gilmore supervised and correlated the work of the different sections. He represented the division at meetings of the Coal Classification committees of both Canada and United States. He acted as chairman of the sub-committee of the American Society for Testing Materials dealing with the development of standard laboratory methods for testing the friability of coal, and also participated in the work of the "Grindability" committee, which is interested in the comparative pulverizing characteristics of coal.

COAL CLASSIFICATION AND SPECIFICATIONS

Specifications submitted by the American Sectional Committee on Classification of Coal, for the boundary lines between the common banded and canneloid types of coals were found to be generally acceptable for Canadian coals. Tentative specifications for "Drop shatter" and "Tumbler" test methods for testing the friability of coals, developed in the Fuel Research laboratories, were submitted to the American Society for Testing Materials for tentative adoption. Proposed specifications of the A.S.T.M. sub-committee on coal sampling were examined, and suggestions for revision were offered.

COAL ANALYSES AND CHEMICAL INVESTIGATIONS

Chemical and physical analyses were made of 1,400 samples of solid fuels, comprising principally coals, cokes, peats, oil-shales, and gases; and low temperature carbonization tests, and determinations were made of the caking, or agglomerating properties of coals.

Laboratory investigations on coals were carried out on: changes in composition, and size of coal and coke samples stored in the open; changes of moisture in stove, and chestnut size anthracite during storage under cover; the respective friabilities of Welsh and German anthracites; agglomerating properties of Welsh semi-anthracite, in co-operation with the Department of National Revenue; variations in the small jar tumbler friability test; accuracy of apparatus used for riffling coal samples; "capacity" moisture of certain Canadian and American coals; moisture changes in powdered, low-rank coal under different storage conditions; determination of volatile matter in coal at temperatures above or below the usual 950°C.; and effects of acids formed in a bomb calorimeter upon the accuracy of determinations.

PURCHASE OF COAL BY SPECIFICATION

Samples submitted by the Department of Pensions and National Health were analysed, and the results were used by that Department in its purchase of coal.

COMBUSTION ENGINEERING INVESTIGATION

Three series of domestic furnace tests on Canadian and imported fuels used in Canada were under way. The first, a continuation of work from the previous year, consisted of twenty-seven tests on various fuels and fuel mixtures in a domestic hot-water boiler installation fitted with automatic "blower" equipment; and the second of four tests specially made on Nova Scotia bituminous coals in the same installation, fitted with automatic underfeed stoker equipment. The third, which is still in progress, has so far comprised ten tests on various coal and coke samples, hand-fired in the hot-water boiler installation. Reports on the first and second series of tests have been completed. The collecting of data in respect to the degree-day heating load for Ottawa, and the gas consumption for the heating of five residences was continued. A survey was made also of peat activities in Canada.

COAL BENEFICIATION, CARBONIZATION, AND BRIQUETTING

In the Carbonization Section, tests were made on the washing, carbonizing, and briquetting characteristics of coals, the physical and chemical survey of screened sizes of coal from eight operating collieries, including two in the United States, owned and operated by the Canadian National Railways.

The two small coke oven units were used in determining the coking characteristics of Canadian coals. This work included tests at mid-temperature on certain coals not readily acceptable to the high-temperature industry, to determine the possibility of the production of an acceptable domestic coke. The results indicated that certain coals from New Brunswick were highly suitable. During the operation of these ovens the Lehmann mill was used to determine the possibility of its being used to separate coals into their petrographic constituents. A large-scale test made at the plant of the Hamilton By-Product Coke Ovens, Limited, to determine the possibility of using Canadian coal as a blend with the imported coals used at the plant, indicated that Canadian coal can be employed to an extent of about 35 per cent.

An investigation was started early in 1937 of difficulties experienced by the Winnipeg Electric Company in the coking of Michel (British Columbia) coal. Large-scale tests were made at the plant, conditions at the Michel collieries were studied, and representative samples from the collieries were collected for laboratory investigation.

Briquetting studies on briquetting coal by impact were continued; and an investigation on the changing of the fusion temperature of the ash of certain low fusion ash coals by the addition of molybdenum sulphide, was made. Thirteen reports, and a bulletin on briquetting, were issued.

PETROLEUM OILS, BITUMEN, NATURAL GAS, AND EXPLOSIVES

Petroleum and natural gas developments in Alberta were studied; and thirty samples of natural gas were obtained from southwestern Ontario, in continuation of a survey of natural gas in Canada. An improved apparatus was designed for the determination of helium, and another for estimating the oxidation of lubricating oils was tested. A report was published on the analyses of some fuel oils sold in Canada; the annual gasoline survey for Canada was made; and progress in the commercial development of bituminous sand deposits in northern Alberta was investigated. Two technical papers were prepared on petroleum in Canada, one for the Third World Power Conference, and the other for the Second World Petroleum Congress. The United States Bureau of Mines'

experiment station at Pittsburgh, Pa., was visited, with special reference to the work of its explosives division. Particular mention may be made of the contribution of the section to the work of the Canadian Government Purchasing Standards Committee, and to the National Conference on the Regulation and Control of Flammable Petroleum Products. Information was supplied a special committee appointed to investigate the claims put forward for a certain explosive. The chief of the section acted as referee in the matter of the sulphur content of natural gas after purification. Routine analyses were made as required on natural and manufactured gases, motor fuel oils, lubricating oils, crude petroleums, bitumen, hydrogenation oils, and explosives.

Oxidation tests were made on lubricating oils in continuation of a study of the reclamation of used motor oils. Flotation tests were made on oil-shale.

HYDROGENATION

The experimental investigation of hydrogenation as applied to Canadian raw materials was continued, the results of which, using the semi - Continuous apparatus, indicate that coals closely associated in rank may yield widely differing results under the same conditions of hydrogenation. The investigation in which the large laboratory-scale continuous apparatus was used to determine the effect of changing conditions of operation was completed. A series of tests was made later in the same apparatus on a coal from Crowsnest Pass area, British Columbia.

ROUTINE CHEMICAL LABORATORY WORK

As is shown below, 1,937 samples of solid liquid, and gaseous fuels, and explosives were examined.

...		Number of Samples	Per Cent of Total	1
Samples pertaining to:	...	...	...	...
Fuel testing investigations	...	...	...	...
Solid fuels	...	1,200	62.0	...
Coals	1,020	...	...	...
Cokes, chars, and other solid fuels	180	...	...	...
Liquid fuels	...	234	12.1	...
Gasolines, and other motor fuels	192	...	...	...
Lubricating oils	18	...	...	...
Crude and miscellaneous oils	24	...	...	...
Gases resulting from investigations	...	57	2.9	...
Natural gas	...	30	1.5	2
Samples from other divisions of the Department:	...	...	...	...
Explosives Division	...	153	7.9	...
Other Bureau of Mines' divisions	...	15	0.8	...
Bureau of Geology and Topography	...	5	0.2	3
Samples from outside the Department:	...	...	...	...
Department of Pensions and National Health - coals	...	67	3.5	...
Departments of National Defence and Marine - coals, fuel oils, and lubricating oils	...	37	1.9	...
Other Government departments - coals and oils	...	38	2.0	...
Provincial Governments - coals and oils	...	5	0.2	...

Commercial firms - coals, cokes, gasolines, oils, and natural gas	...	65	3.4	...
Private individuals - coals, peats, and oils	...	31	1.6	...
Total	...	1,937	100.0	

EXPLOSIVES DIVISION

FACTORIES

Nine licensed explosive factories are in operation, the same as in 1935. The manufacturers of fireworks and explosives have continued to co-operate with the Division. No accidents occurred in the factories that involved injury to personnel, or material damage to property.

The management of the high explosives factories has decided to install a new, and efficient ventilating system in all buildings where nitroglycerine is made, or is combined with other materials.

Output of high explosives showed an increase of 15 per cent over the previous year, but a decrease was reported in the quantity of gunpowder manufactured. Output of fireworks, and goods of a similar nature showed a slight increase. Twenty visits of inspection were made by the Division.

MAGAZINES

Regulations covering the storage of ammunition and small quantities of explosives have been well observed.

IMPORTATIONS

Imports of explosives, particularly of nitro cotton, used in the manufacture of lacquers, and of nitro compounds used in making explosives, showed an increase over the previous year, but there was a further decline in the imports of liquid nitro compounds used in the oil fields. Importation permits totalled 475, and special importation permits 34, or a total increase of 34 over the previous year.

ACCIDENTS

The Explosives Act does not cover the use of explosives, but statistics of the accidents arising from their use,are collected. Investigations are made of the causes of accidents, and the results are published, with the object of preventing their recurrence.

A total of 129 accidents occurred in the handling of explosives in mines, quarries, and elsewhere, resulting in the death of 29 persons and in injuries to 133 others. No accidents occurred in the manufacture, storage, and conveyance of explosives.

Playing with detonators and other explosives resulted in 2 deaths, and injuries to 44, nearly all children of school age. Further details of these accidents, and an analysis of their probable causes, appear in the Annual Report of the Division.

DOMINION FUEL BOARD

The Dominion Fuel Board is a division of the Mines and Geology Branch. The changes that have taken place in the work of the Board since its inception are indicated in the brief review that follows.

As originally constituted by Order in Council in 1922, the Board consisted of six officers, from various Government departments, having a knowledge of Canada's fuel problems. The Board's duties were to investigate the fuel supply problems of the country, and to advise the Government thereon; and particularly to extend and correlate the various investigations then in progress so that effective solutions might be arrived at quickly.

The introduction of coal subventions marked an important change in the functions of the Board. Prior to the adoption of this policy, which has been extended by subsequent Governments to include all coal-producing provinces, the work of the Board had been mainly of an investigative and advisory nature. With the administration of the subventions added to its duties it became immediately necessary for the Board to increase its permanent staff. The effect of the coal subvention policy upon employment is shown in the following table:

Fiscal years	Net Tons of Coal Moved under Assisted Rates	Cost of Assistance		Man-days Work Represented by Assisted Tonnages
...	...	Total	Per Ton	...
...	...	$	$	...
1928 - 99	251,072	463,664	1.85	111,200
1929 - 30	347,947	382,342	1.10	161,600
1930 - 31	560,939	510,308	0.91	249,800
1931 - 32	795,302	631,169	0.80	331,000
1932 - 33	1,155,642	994,854	0.86	493,000
1933 - 34	2,101,124	2,330,435	1.11	860,000
1934 - 35	2,255,428	2,008,359	0.89	925,000
1935 - 36	2,241,865	2,005,084	0.89	967,000
1936 - 37	2,356,679	2,214,408	0.96	971,000

The amount of assistance payable is authorized by Order in Council, and changes are made from time to time to meet changing competitive conditions. In general, it may be assumed that the coal moved under assistance has largely displaced equivalent tonnages of coal formerly imported.

In addition to subvention administration, the Board is responsible for the supervision and inspection of coke plants operating under the Domestic Fuel Act, which assistance is designed to encourage the use of Canadian coal for the manufacture of coke. By-product recovery coke plants in Halifax, Quebec, and Vancouver, which operate under the Act, were inspected as required.

The annual survey of operating costs and revenues of Canadian coal mines was continued, and the results were published in a chart showing, in comparative form, the data collected during the past five years. These surveys have proved of steadily increasing value to the Government in its consideration of assistance policies, and to operators in maintaining a check on their operating costs.

Surveys were made of the fuel consumption of the pulp and paper industry, and also of the coke and gas industry. The summaries now available clearly indicate the changing fuel requirements of these large coal consumers.

Many tabulations and reports were prepared for the use of the Royal Commission appointed on June 3, 1936, to investigate conditions relating to the importation and distribution of anthracite coal in Canada. A survey was made of the domestic fuel consumption in Eastern Canada, the results of which Were reported to the Commission. With the co-operation of the anthracite producers in the United States, much information was obtained on sources of supply and regional distribution.

As in previous years, a close study was maintained of the general situation in the Canadian coal industry; and it may be noted that the proportion of the total coal consumption of Canada supplied by our own mines has increased from 42 per cent in 1925 to 52 per cent in 1936. This diversity of supply in the domestic fuel market has reduced our dependence upon any one fuel, and at the same time gives assurance of a fair price and a stable market. Anthracite is now imported in quantity from Wales, Scotland, Germany, Belgium, Netherlands, China, and Indo-China, as well as from the United States.

PUBLICATIONS

MINES AND GEOLOGY BRANCH

English Publications	
Report No.	...
...	The Future of Canadian Mining.
2423	Annual Report for the Fiscal Year ending March 31, 1986.
French Translations	
...	L'Avenir de l'industrie minière au Canada.
2431	Rapport annuel pour l'année financière se terminant le 31 mars 1936.
...	List des francaises publications de la Commission géologique et du Musée national du Canada.
BUREAU OF GEOLOGY AND TOPOGRAPHY	
English Publications	
2410	Memoir 187. Rae to Great Bear Lake, Mackenzie District, N.W.T. - by D.F. Kidd.
2413	Memoir 189. Carmacks District, Yukon - by H.S. Bostock.
2414	Memoir 190. Geology and Mineral Deposits at the Mine of B.C. Nickel Mines, Limited, Yale District, B.C. - by H.C. Horwood.
2415	Memoir 191. Lode Gold Deposits of Ymir, Nelson Area, B.C. - by W.E. Cockfield.
2416	Memoir 192. Gold Occurrences of Ontario East of Lake Superior - by E.D. Kindle.
2417	Memoir 193. Mining Industry of Yukon, 1935 - by H.S. Bostock.
2418	Memoir 194. Eagle-McDame Area, Cassiar District, B.C. - by G. Hanson and D.A. McNaughton.
2419	Memoir 195. Mineral Deposits in Renfrew County and Vicinity - by B.C. Freeman.
242O	Memoir 196. Geology of Lake Athabaska Region, Saskby F.J. Alcock.
2421	Memoir 197. Little Southwest Miramichi-Sevogle Rivers Area, N.B. - by E.W. Shaw.
2422	Memoir 198. Geology of Woodstock Area, Carleton and York Counties, N.B. - by J.F. Caley.
2424	Memoir 199. Lake Etchemin Map-Area, Que. - by Carl Tolman.
2425	Memoir 200. A Reconnaissance of Pelly River Between McMillan River and Hoole Canyon, Yukon - by J.R. Johnston.
2426	Memoir 201. Geology and Mineral Deposits of Ville Marie and Guillet (Mud) Lake Map-Areas, Que. - by J.F. Henderson.
2427	Memoir 202. Contributions to the Study of the Ordovician of Ontario and Quebec - by A.E. Wilson, J.F. Caley, J.C. Sproule, V. J. Okulitch.
2429	Memoir 203. Geology of Teslin - Quiet Lake Area, Yukort, - by E.J. Lees.
2432	Memoir 204. Gold-bearing Deposits on the West Coast of Vancouver Island Between Esperanza Inlet and Alberni Canal - by M. F. Bancroft.
2433	Memoir 205. Mineral Resources of Terrace Area, Coast District, B.C. - by E.D. Kindle.
2435	Memoir 207. Cranbrook Map-Area, B.C. - by H.M.A. Rice.
...	List of Publications of the Geological Survey and National Museum of Canada.
...	List of Published Maps (1917 - 1935 inclusive).
French Translations	

2411	Mémoire 185. L'étendue de la carte du lac Chibougamau, Qué. - par J.B. Mawdsley et G.W.H. Norman.
Mimeographed Reports	
36 - 11	Guillet (Mud) Lake Area, Témiscamingue County, Que. - by J.F. Henderson.
36 - 12	Oil and Gas Possibilities Along Milk River, Southeastern Alberta - by L.S. Russell.
36 - 14	Ogilvie Sheet, Yukon - by Topographical Division.
36 - 15	Keithley Creek Map-area, Cariboo District, B.C. - by A.H. Lang.
36 - 16	Geological Map of Great Slave Lake, East Arm (East and West sheets), N.W.T. - by C.H. Stockwell.
36 - 17	Mineral Resources of Terrace Area, Coast District, B.C. -by E.D. Kindle.
36 - 18	Steveville Sheet, Alberta - by Topographical Division.
36 - 19	Plaster Rock Area, N.B. - by Bruce Rose.

Report No.	...
36 - 20	Mineral Resources Along the Canadian National Railway, between Prince Rupert and Prince George, B.C. - by F.A. Kerr.
36 - 21	Manitoulin Island, Manitoulin District, Ont. - by M.Y. Williams.
36 - 22	Some Gravels and Sands in the Edmonton. District, Alta.-by R.L. Rutherford.
37 - 1	Pekisko Hills Area - by G.S. Hume.
37 - 3	Goldfields Area, Sask. - by H.C. Cooke.
37 - 4	Malartic Area, Abitibi County, Que. - by H.C. Gunning and J.W. Ambrose.
French Translations	
36 - 3	L'étendue de la carte de Waswanipi (Qué.) - par G.W.H. Norman.
36 - 6	L'étendue de la carte d'Opawica-Chibougamau (Qué.) - par G.W.H. Norman.
36 - 9	Zone de Cadillac, de Pandora à Pan-Canadian (Qué.) - par H.C. Gunning et J.W. Ambrose.
36 - 11	Etendue du lac Guillet (Mud) comté de Témiscamingue (Qué.) - par J.F. Henderson.
NATIONAL MUSEUM OF CANADA	
English Publications	
...	Bulletin 80. Revision of the Genus Calapoecia Billings - by Ian Cox.
...	Bulletin 81. Anthropometry of the Beaver, Sekani, and Carrier Indians - by J.C. Boileau Grant.
...	Bulletin 82. Annual Report of the National Museum of Canada for the Fiscal Year 1935 - 36.
...	Bulletin 83. Roebuck Prehistoric Village Site, Grenville County, Ont. - by W.J. Wintemberg.
...	Bulletin 84. The Sekani Indians of British Columbia - by Diamond Jenness.
...	Motion Picture Films, Catalogue.
...	List of Reports of the National Museum.
BUREAU OF MINES	
English Publications	
...	Canadian Mineral Industry, 1935.
...	Petroleum Fuels in Canada, 1934 - by J.M. Casey.
...	Separates 640, 648 - 651, 653, 654 (Investigations in Ore Dressing and Metallurgy, July - December, 1935).
...	Separates 655 - 660 (Investigations in Ore Dressing and Metallurgy, July - December, 1935).
...	Separates 652, 661, 662 (Investigations in Ore Dressing and Metallurgy, July - December, 1935).
...	Separate 663 (Investigations in Ore Dressing and Metallurgy, July - December, 1935).
...	Separates 665, 666, 667, 668 (Investigations in Ore Dressing and Metallurgy, January - June, 1936).
...	Separates 669 - 673 (Investigations in Ore Dressing and Metallurgy, January - June, 1936).
...	Separates 674 - 683 (Investigations in Ore Dressing and Metallurgy, January - June, 1936).
...	Separates 684 - 698 (Investigations in Ore Dressing and Metallurgy, July - December, 1936).
...	Separates 699 and 700 (Investigations in Ore Dressing and Metallurgy, July - December, 1936).
...	Catalogue of Mines Branch Publications with Index to separate reports (1936).
763	Combined Report of Investigations in Ore Dressing and Metallurgy (January - June, 1935).
767	Natural Bonded Moulding Sands of Canada - by C.H. Freeman.
773	Canadian Mineral Industry, 1935.

775	Fuel Briquetting - by R.A. Strong, E. Swartzman, and E.J. Burrough.
French Translations	
770	L'Or au Canada - by A.H.A. Robinson.
770	L'Or au Canada - by A.H.A. Robinson (Reprint).
768	Les sables naturels de moulage au Canada - by C.H. Freeman.

Report No.	...
Mimeographed Reports	
64	Industrial Waters in Canada (Interim report No. 1) - by H.A. Leverin.
65	The Analyses of Some Fuel Oils Sold in Canada - by P.V. Rosewarne and H. McD. Chantler.
EXPLOSIVES DIVISION	
English Publication	
39	Annual Report for the Calendar Year, 1935.
French Translation	
40	Rapport annuel de la Division des Explosifs pour l'année civile, 1935.
LIST OF MINES AND MINE OPERATORS	
...	List No. 1 - 2, Milling Plants.
...	List No. 1 - 2, Milling Plants in Canada, Part I.
...	List No. 1 - 1, Metallurgical Works, Part I - Iron and Steel.
...	List No. 1 - 1, Metallurgical Works, Part II.

Organization Chart, Lands, Parks, and Forests Branch.

LANDS, PARKS, AND FORESTS BRANCH

ROY A. GIBSON, DIRECTOR

The Lands, Parks, and Forests Branch administers the mineral, fur, and other natural resources of the Northwest and Yukon Territories, which Territories comprise approximately 40 per cent of the total area of the Dominion. The Branch deals also with any business arising from the local government of the two Territories. It administers the National Parks of Canada, gives a lead in the conservation of wild life, marks historic sites of national importance, and assists in the encouragement of tourist travel. It conducts scientific investigations relating to the safeguarding, management, and maximum utilization of the Dominion's forest resources, for which work it maintains forest experimental stations and forest products laboratories. The Branch also maintains a Federal Land Registry Office.

As is shown on the accompanying chart the Branch consists of four main divisions, viz.: Bureau of Northwest Territories and Yukon Affairs, Bureau of National Parks, Dominion Forest Service, and Federal Land Registry.

BUREAU OF NORTHWEST TERRITORIES AND YUKON AFFAIRS

NORTHWEST TERRITORIES

The Northwest Territories may be concisely defined as that portion of the mainland of Canada lying north of the Provinces of Manitoba, Saskatchewan, and Alberta, and east of Yukon Territory, all of the islands in Hudson and James Bays and in Hudson Strait, including Ungava Bay, and the vast Arctic Archipelago. The estimated total of land and freshwater areas of the Northwest Territories is 1,309,682 square miles. According to the official census of 1931 the population of the Northwest Territories totalled 9,723, classified as follows: Indians, 4,046; Eskimos, 4,670; and white inhabitants, 1,007.

The Northwest Territories Act (Chapter 142 R.S.C. 1927) provides for a Territorial Government composed of the Commissioner of the Northwest Territories, the Deputy Commissioner, and five Councillors, all appointed by the Governor General in Council. The Commissioner in Council has power to, make ordinances for the Government of the Territories under instructions from the Governor General in Council or the Minister of Mines and Resources, respecting direct taxation within the Territories in order to raise revenue, etc., establishment and tenure of territorial offices and the appointment and payment of officers, maintenance of prisons, municipal institutions, licences, solemnization of marriages, property and civil rights, administration of justice, and generally all matters of a local or private nature in the Territories. The seat of Government is at Ottawa.

Council

Commissioner - Charles Camsell, C.M.G.

Deputy Commissioner - Roy Alexander Gibson.

Members of Council - Sir James MacBrien, K.C.B., C.M.G.; Austin Louis Cumming; Kenneth Robinson Daly; Dr. Harold Wigmore McGill, M.C.

Secretary - David Livingstone McKeand, M.C. 47398 - 4 1/2

WORK OF COUNCIL

Five regular sessions of Council were held during the year and the more important matters dealt with were the following:

The Companies Repeal Ordinance and The Foreign Companies Repeal Ordinance were enacted to repeal The Companies Ordinance and The Foreign Companies Ordinance passed prior to 1898 and not workable under present-day conditions. The Small Debts Ordinance was enacted to provide legal means for the collection of a small debt at a reasonable cost. The Miners' Lien Ordinance was enacted so that persons performing work or supplying material in connection with a mineral claim or mine might be enabled to place a lien for the price of such work or material upon the product of the claim or mine and the interest of the owner.

The composition and itinerary of the annual Eastern Arctic Patrol were arranged.

Several applications for permits to make exploratory and scientific investigations in the Northwest Territories under the terms of the Scientists and Explorers Ordinance were considered.

In connection with medical services, Council recommended that a grant be made towards the rebuilding of a hospital at Aklavik which was destroyed by fire, also that a fixed revenue be granted the hospital at Chesterfield for one year.

Consideration was given to changes in the Northwest Territories Game Regulations, Council recommending the restoration of the bounty on wolves at a reduced rate; an amendment to the regulations to restrict the use of aircraft in connection with hunting and trapping; and the restriction of the use of snares for taking fur-bearing animals.

The following matters also received the consideration of Council and recommendations were made:

Improvements to Mackenzie River - Great Bear Lake transportation route; public welfare; education; old age pensions; waterpower development; the reindeer project.

A Public Administrator and a Stipendiary Magistrate were appointed for Keewatin and Mackenzie Districts, respectively; and appointments made from time to time of Notaries Public, Justices of the Peace, and Issuers of Marriage Licences were confirmed.

The Council adopted the following resolution:

"Resolved that a Humble Address be presented to His Majesty King George VI and to Her Majesty Queen Elizabeth to express the loyalty and devotion of the people of the Northwest Territories, on the accession of Their Majesties to the Throne."

ADMINISTRATION

The administration of the various Acts, Ordinances, and Regulations pertaining to the Northwest Territories is supervised by the Director of Lands, Parks, and Forests Branch, who is also Deputy Commissioner. For purposes of departmental administration a Superintendent has been appointed for the Eastern Arctic and one for Mackenzie District. A Departmental Agent is stationed at Fort Smith, the first settlement reached by those entering the Mackenzie District from the south. This officer is also Superintendent of Wood Buffalo National Park, Dominion Lands Agent, and Mining Recorder, as well as Stipendiary Magistrate. A member of the Royal Canadian Mounted Police at Cameron Bay is Dominion Lands Agent, Mining Recorder, and Crown Timber Agent.

LANDS, PARKS, AND FORESTS BRANCH

Medical Officers employed by the Department are stationed at Forth Smith, Resolution, Simpson, Good Hope, Aklavik, Cameron Bay (part time), Chesterfield, and Pangnirtung (Baffin Island). The Medical Officers make extensive patrols from time to time in their respective districts. The Medical Officer at Aklavik acts as Departmental Agent for the Lower Mackenzie and Western Arctic and also supervises the reindeer industry in Mackenzie River Delta.

HOSPITALS

Hospitals are maintained at principal centres throughout the Territories by the Anglican and Roman Catholic Missions with the assistance of the Dominion Government. During the year payments to these hospitals amounted to $16,275 representing the maintenance and treatment of indigent whites, Eskimos, and half-breeds for a total of 6,510 days at the rate of $2.50 per diem. In addition payment was made of the sum of $1,889.50 for the maintenance of mental and other patients at points outside the Territories.

SCHOOLS

The Anglican and Roman Catholic Missions, assisted by grants from the Dominion Government, maintain day and boarding schools for native and white, children in connection with their general mission work. Schools are conducted at all the principal mission centres in the Mackenzie Valley, and at all points, where there are branches of the missions provision is made for the education of children of the district. The number of indigent children in the residential schools was 132, and 314 pupils attended the day schools. The sum of $21,484.2 was expended for the assistance of schools during the year.

TRANSPORTATION

Access to the Northwest Territories may now be had by ocean steamer, by inland water navigation, and by aircraft. Flying is, of course, restricted during the break-up season in the spring, and the freeze-up in the autumn. The utilization of air transportation has been varied and widespread, and to its influence may be attributed a speeding-up of the administrative, industrial, and social. activities of the Territories. Regular air-mail services to many northern points are maintained, wide areas have been explored for minerals, and lines of rapid transport of passengers and freight into many parts of the Territories established. By arrangement with the aerial transportation companies, practically any point in the Territories, may be reached.

In view of the increase in the use of aircraft in the Territories in recent years the development of suitable landing facilities has received considerable attention. During the past year winter landing fields were improved at Resolution, Norman, Fort Smith, and Simpson, and seaplane bases at Fort Smith and Rae.

COMMUNICATION

The Northwest Territories and Yukon radio system is operated by the Department of National Defence through the Royal Canadian Corps of Signals (Permanent Force). The stations on this system are Edmonton, McMurray, and Chipewyan in Alberta; Fort Smith, Resolution, Outpost Island, Rae, Simpson, Norman, Cameron Bay, and Aklavik in the Northwest Territories; and Herschel Island, Dawson, Mavo, Whitehorse, and Burwash Landing in Yukon Territory. The Department of Transport operates wireless stations at Copper-mine on Coronation Gulf; Chesterfield on Hudson Bay; and at Nottingham Island, Cape Hopes Advance, and Resolution Island in the Eastern Arctic.

Formerly mail was conveyed from Edmonton to Waterways, at the end of steel in Alberta, thence to nearby McMurray, and northerly from there by water during the season of navigation. Since November 1929 however, air mail service has been in operation during summer and winter, illustrative of the extent of this service is the schedule which calls for eighty trips to serve Fort Smith; forty trips to Resolution; twelve trips to Hay River, Providence, Simpson, Wrigley, and Norman; six trips to Good Hope, Axotic, Red River, McPherson, and Aklavik; and a regular monthly trip to Cameron Bay and Rae. Mail goes in more frequently than this, as additional commercial flights are utilized as well as police patrols. The latter serve, particularly, out-of-the-way points. Mail for most points in the Eastern Arctic is delivered once a year, by the vessel that carries the Eastern Arctic Patrol of the Department.

LAW AND ORDER

The enforcement of law and order in the Territories is the responsibility of the Royal Canadian Mounted Police and detachments have been established at strategic points throughout the Territories. By means of extensive patrols a reasonably close check is kept on this vast region by a comparatively small body of men. As might be expected their duties are multifarious. The Commissioner of the Royal Canadian Mounted Police is Sheriff of the Northwest Territories.

VITAL STATISTICS

The Director of the Branch is Registrar-General for the Northwest Territories and the method.of recording vital statistics of whites, Eskimos, Indians, and half-breeds is in accordance with that adopted by the provinces. The information obtained is supplied to the Dominion Bureau of Statistics for inclusion in the vital statistics of the Dominion.

LIQUOR PERMITS

Under the Northwest Territories Act, Chapter 142, R.S., 1927, the importation of intoxicating liquor for medicinal purposes is authorized under permit to eligible persons. During the past year six hundred and thirty-nine, such permits were issued.

LANDS AND TIMBER

Lots are disposed of by sale in the various settlements in the Northwest Territories to transportation companies, mining companies, traders, and missions, in connection with their several undertakings, and to settlers for residential purposes. There are no regulations for the acquiring of homesteads, but small parcels of land suitable for agricultural and fur-farming purposes are leased under the provisions of Chapter 113, R.S.C., 1927. Two lots were sold and patented; one lease for agricultural and fur-farming purposes was issued, and two were cancelled, leaving twenty such leases in force. Three grazing leases and thirty-three surface leases covering lots in Cameron Bay Settlement are in good standing. Six hay permits were issued under which 60 tons of hay was cut.

The number of timber permits issued, exclusive of those granted in connection with timber berths, was 101, authorizing the cutting of 66,940 linear feet of timber, 130,800 feet board measure of saw-timber, 493 fence posts, roof poles, and fence rails, and 5,282 cords of wood. Fifty of these permits were issued free of due to educational, religious, and charitable institutions, to settlers for domestic use, and to Government departments. Three timber permit berths were granted and two were cancelled, leaving five in operation. The revenue derived from land, timber, hay, and grazing was $4,653.99, a slight increase over the previous year.

MINING

Mining developments continued during the year at Echo Bay, Great Bear Lake, where pitchblende and native silver were discovered in 1930. From this area concentrates are shipped to a refinery at Port Hope, Ontario, for treatment. Radium, silver, and uranium by-products result from such treatment. Since the discovery some years ago of lead-zinc near Pine Point, and the finding of gold-bearing quartz on Wilson Island, Great Slave Lake, prospecting in these areas continued until 1935, when gold discoveries were made on Outpost Islands and at Yellowknife Bay. In August 1936, an important gold discovery was made at Gordon Lake, about 50 miles northeast of Yellowknife Bay, and this area has been the scene of much activity, resulting in the staking of hundreds of mineral claims. Active development is proceeding on several properties.

Miner's licences issued during the year numbered 440, and 418 such licences were renewed. Entries were granted for 1,364 quartz mining claims and a large number of claims were renewed by the owners obtaining certificates of work. Final leases have been issued comprising an area of 3,840.25 acres. The total revenue obtained from fees payable under the Quartz Mining Regulations amounted to $21,117.95, including $7,173.45 collected as licence fees.

Placer Mining. - There was only slight activity in placer mining, a few claims in the South Nahanni and Liard River districts being staked and recorded. Approximately 300 claims have been staked in these areas since 1934 when placer gold was reported to have been discovered in the South Nahanni River region, 26 of which have been renewed to October 1, 1937. The suspension of the representation requirements of the Placer Mining Regulations authorized by Orders in Council dated August 30, 1934, and September 26, 1935, terminated October 1, 1936. Placer mining fees amounted to $296.

Coal. - Six coal mining leases are in force, comprising an area of 687.66 acres. The total revenue derived from fees, rentals, and royalties in connection with coal mining rights during the year amounted to $619.68.

Petroleum and Natural Gas. - Petroleum and natural gas leases affecting lands in the Northwest Territories comprise a total area of 4,293.33 acres. Petroleum produced from the wells of Northwest Company, Limited, below Norman on Mackenzie River, amounted to 5,399 barrels during the year. Most of the oil was shipped to the Great Bear Lake mining field. Rental from petroleum and natural gas leases totalled $1,733.33 and the sum of $1,343 was collected on account of royalty.

Dredging. - One dredging lease is in force in the Northwest Territories, comprising a stretch of an unnamed river lying about 70 miles west of the point where Gossage River joins Mackenzie River.

NORTHWEST GAME ACT

The fur industry of the Northwest Territories is of great importance, but as the native population depends to a large extent on the game and fur-bearing animals for a livelihood, conservation measures are most necessary. Game preserves totalling 514,000 square miles have been set aside in which only natives may hunt and trap. The Wood Buffalo Park containing 17,300 square miles and the Thelon Game Sanctuary comprising some 15,000 square miles have also been established for the preservation of wild life. Licences for hunting and trapping are issued only to British subjects who have completed four years' residence in the Territory or who have carried on the business of trading and trafficking in game for a period of four years.

Due to difficulties of communication it is not possible to furnish a complete report upon the fur yield of the Northwest Territories for the fiscal year ended March 31, 1937. The following statement has been prepared from the returns that have reached the Department covering trapping operations during the licence year ended June 30, 1936:

Preliminary statement of pelts of fur-bearing animals taken during the licence year ended June 30, 1936:

Bear, black	36	Fox, red	9,556
Bear, brown	11	Fox, silver	510
Bear, grizzly	9	Fox, white	25,897
Bear, white	44	Lynx	4,391
Beaver	13,288	Marten	5,692
Coyote	165	Mink	5,466
Ermine	4,467	Muskrat	136,257
Fisher	2	Otter	322
Fox, blue	167	Skunk	31
Fox, black	18	Wolverine	138
Fox, cross	4,074	Wolf	1,010

Preliminary statement of big game mammals and birds taken during the licence year ended June 30, 1936.

Caribou	10,512	Prairie chicken	680
Moose	2,634	Ptarmigan	6,471
Sheep	81	Wild duck	6,846
Partridge	6,56	Wild goose	892

Buffalo. - Conditions were favourable for the buffalo in the Wood Buffalo Park during the past winter and no reports of losses to the herds on account of climatic conditions were received. Twenty-one surplus buffalo were slaughtered and the meat was distributed to missions and hospitals and to needy native families in districts adjacent to the park. The measures for the control of wolves that harass the, buffalo were continued.

Caribou. - There was considerable variation in the migrational routes of the barren ground caribou as compared with previous years. They were reported to be scarce in the easterly portion of the Mackenzie District and a large part of the Keewatin District, but quite plentiful in the Great Slave Lake area and farther south.

Musk-ox. - An extensive aerial reconnaissance of the Thelon Game Sanctuary combined with a general biological ground survey was carried out in 1936 by C.H.D. Clarke, assisted by W.H.B. Hoare, who did considerable field work in that district a few years ago. Mr. Clarke's estimate of the number of musk-oxen in the Thelon area is as follows:

Thelon Game Sanctuary	200
Just outside sanctuary	40
Aylmer Lake and Musk-ox	15
Total	255

During the course of an aerial survey made in 1935, 171 musk-oxen were observed in this district. These animals are fully protected under the Northwest Game Regulations.

Moose. - No scarcity of these animals was reported in 1935 - 36 when 2,634 were taken as compared with 1,174 in

1934 - 35.

Beaver. - The current regulation allowing each male resident over the age of eighteen years to take a limit of fifteen beaver during the open season appears to serve the needs of the natives, and in a number of areas there is no indication that the beaver supply is being depleted. An increase in the number of beaver is reported in one or two areas, but the animals are comparatively scarce in the northern part of their range. Investigations made during the past winter indicate that it may be advisable to revise the dates of open season for this animal in the interests of conservation.

Fox. - The normal cyclic decline in the yield of fox pelts was apparent in 1935 - 36. The returns for the past five years were:

Year ended June 30	White Fox	Red Fox	Cross Fox
1932	27,770	2,743	1,291
1933	25,687	6,256	2,586
1934	52,467	S,763	3,668
1935	52,615	11,789	4,875
1936 (preliminary report)	25,897	9,556	4,074

In addition, the returns for 1935 - 36 showed 18 black, 167 blue, and 510 silver foxes. Reports upon conditions, during the past winter indicate a low yield of fox pelts for 1936 - 37.

Marten. - The yield of marten pelts has declined each year since 1924 - 25 when 13,314 pelts were taken. For the past four years the average annual take has been about 6,000 pelts. The marten is one of the principal fur-bearers in the territory between Simpson and Good Hope where the natives are to a large extent dependent upon the sale of these furs for their livelihood. As a conservation measure the open season for this animal was reduced from five to four months in August 1936.

Mink. - A total of 5,466 mink pelts was secured as compared with 11,134 for the previous year. Apparently a scarcity of mink may be expected for a few years. These animals are subject to periods, of abundance and of scarcity and the present cycle reached its maximum in 1932 - 33 when 18,750 pelts were taken.

Muskrat. - The yield of muskrat pelts was 136,257 compared with 101,044 pelts during the previous year. These animals seem to be plentiful when other fur-bearers are scarce.

Wolf. - Reports were received from many districts indicating that wolves were more numerous than in previous years. The number of these animals fluctuates greatly and this is reflected in the returns which show 1,010 wolves were taken during the year ended June 30, 1936, compared with 701 for the previous year.

Fur Export Ordinance. - The revenue under this ordinance for the year ended March 31, 1937, was $69,810.02, compared with $103,859.54 for the previous year. The decline in the yield of fox and mink pelts was largely responsible for the decrease in revenue.

Licences. - Licences were issued during the fiscal year 1936 - 37 as follows:

Hunting -	...
Resident	446
Non-resident British	19
Non-resident non-British	4
Non-resident bird licence	1
Trading -	...
Resident	131

Non-resident British	5

Infractions of Game Laws. - There were eight prosecutions and six convictions for infractions of game laws.

Permits. - Permits were issued or dealt with as indicated below:

To establish trading posts	35
To take mammals for propagation purposes	2
To hunt and trap in Wood Buffalo Park	395
To render Migratory Birds permits operative in the N.W.T. (Countersigned)	19
To take specimens of mammals and non-migratory birds for scientific purposes	12
To take fifteen beaver	1,628
To export caribou skins	3

Revenue. - The revenue collected under the Northwest Game Act and the Fur Export Ordinance for the fiscal year 1936 - 37 was as follows:

Hunting licences	$2,006 77
Trading licences	2,070 00
Bird licences	5 00
Fur-farm licences	16 00
Trading post permits	53 00
Sale of furs	228 17
Fur export tax	69,810 02
Fines and forfeitures	113 25
...	$74,302 21

General. - Reports of scarcity of the more important fur-bearing animals were received from many points during the winter of 1936 - 37. The residents of the eastern part of Mackenzie District and northern Keewatin District have reported a shortage of caribou as compared with former years.

REINDEER

The herd of reindeer brought from Alaska and placed in 1935 on the reservation lying east of the Mackenzie Delta has continued to thrive. Prior to the fawning season, April - June 1936, the deer were herded across the ice to Richards Island, a short distance off the coast, where, notwithstanding two severe storms in April, the surviving fawn increase was 936 head. Grazing conditions on the island proved very satisfactory. The deer were not molested to any extent by predatory animals; the winds from the Arctic Ocean afforded protection from insect pests; and, the frequent changes of grazing areas under the guidance of the Lapp and native herders maintained the herd in excellent condition and also preserved the range.

A new corral, with lead fences and holding pens, which was constructed during this period, was used at the annual round-up in August. The returns showed the herd to number 3,750 head, a substantial increase over the 2,370 animals delivered in March 1935. Following the round-up the deer were moved gradually toward the southern tip of the island where the early slaughtering of surplus animals took place at the end of September, the meat being transported to Aklavik by water. About 100 aged females and surplus steers were slaughtered at that time. The deer were held in this locality until December when the crossing on the ice to the winter range was made. This range is some 60 miles inland on the east branch of Mackenzie River.

While the herders were taking care of the deer during the autumn period, the remaining members of the staff at the Reindeer Station were occupied in transporting some 65 tons of freight from Aklavik; catching and storing 8,000 fish for dog-feed; building and stocking a cabin at the fawning grounds; hauling up boats; and commencing the construction of a new residence for the officer in charge.

During the winter season, the herders, working in shifts, kept the deer under control and warded off to a large extent the attacks of wolves. The losses caused by these predatory animals were reported to have been very light.

The total number of deer slaughtered for food purposes was 268 head, and, as in the previous winter, a large proportion of the meat was distributed to religious organizations operating schools and hospitals in the district. The remainder was used for relief purposes, sale, or to meet the requirements of the reindeer staff. The proceeds from meat sold to residents (other than natives) amounted to $895.20.

During the last week in March the herd, which was reported to be in good condition, was moved again to Richards Island for the fawning season and summer grazing.

As the reindeer herd becomes larger, increasing opportunities are afforded to the natives to take part in the enterprise, the training of young Eskimos in the handling of the deer being recognized as an important feature of the experiment.

The progress of reindeer affairs was reviewed by the Interdepartmental Reindeer Committee at meetings held on April 8, and July 29, 1936, and February 23, 1937, and reports with regard to the herd were placed before the Northwest Territories Council.

EASTERN ARCTIC PATROL

As in former years, the 1936 Eastern Arctic Patrol was made in the R.M.S. Nascopie, owned by the Hudson's Bay Company. The vessel sailed from Montreal on July 14, and after a voyage of over 10,000 miles returned to Halifax on October 1. The itinerary was practically the same as that of the previous year with the addition of a call to Arctic Bay on the northerly end of Baffin Island.

The officer in charge and Government representative in the northern archipelago was D.L. McKeand, Superintendent of the Eastern Arctic. The Government party consisted of the following: G.H. Lawrence, Post Office Department; Douglas Leechman, Division of Anthropology, National Museum; D.A. Nichols, Bureau of Mines and Geology; C.H. Ney and Joseph Courtright, Geodetic Service of Canada; Lloyd Roberts and Thomas Wayling, members of the Parliamentary Press Gallery, historians; Dr. Nicholas Polunin and Reverend Father Arthème Dutilly, botanists; Inspector Keith Duncan, officer in charge, Royal Canadian Mounted Police party; and Dr. N.A. MacArthur, Ottawa, medical officer and ship's doctor.

Dr. MacArthur left the vessel at Churchill and the duties of medical officer and ship's doctor were taken over by Dr. T.J. Orford, who embarked at this point with his wife and two children. Later, at Pangnirtung, Dr. Orford relieved Dr. A.G. MacKinnon, who had completed two years' service at that post. Dr. R.G.M. Keeling, who spent some time with the British-Canadian Arctic Expedition, was taken on board at Southampton Island and acted as assistant medical officer and ship's doctor. While these physicians were with the expedition they made examinations of the natives at the various ports of call and the consensus was that the general health of the Eskimos was good, the vigour of the children being

particularly noticeable. This encouraging condition was ascribed to the work of the resident medical officers and the mission hospitals at Chesterfield and Pangnirtung.

During the call at Pangnirtung the Medical Officer's residence was wired and equipped for electric light. The successful experiments in wireless telephony conducted by the ship's wireless operators were a novel feature of the voyage. Opportunities were afforded members of the Government party to carry on conversations with officials and others at widely separated points.

The Officer in Charge made inspections at each port of call to determine the economic condition of the native population. It was found that a slight increase had been necessary in the amount of food and clothing issued as relief during the past year, owing to the decrease in the number of certain species of animals caused by cyclic fluctuations. However, conditions were generally satisfactory and indications of an increase in the Eskimo population of the northern islands were observed.

The members of the party were afforded every opportunity to pursue their respective lines of scientific investigation, with the result that a large collection of botanical, archaeological, and other specimens, and much scientific data were obtained.

G.H. Lawrence, of the Post Office Department, handled 19,000 pieces of philatelic mail in addition to a large volume of other postal matter. Certain of the natives made use of the postal facilities afforded to send communications to their friends and relatives at various points.

D.A. Nichols, of the Geological Survey, disembarked at Wolstenholme, on Hudson Strait, and later rejoined the expedition on its return from Churchill. He continued the study of the physiography of the Eastern Arctic with special reference to the nature of the uplift as shown by ancient strand lines and raised beaches. Mr. Nichols made a large collection of post-glacial fossils, rock types, and minerals, for the National Museum.

Douglas Leechman of the National Museum also disembarked at Wolstenholme and spent three weeks on archeological work in that area and on Mansel Island. Later he continued his investigations at points farther north. The ruins of many Eskimo villages were excavated and examined, with the result that a number of specimens and additional information were obtained which will assist in tracing the early history of Eskimo migrations.

C.H. Ney of the Geodetic Service of Canada, and his assistant Joseph Courtright, continued the work of establishing astronomical stations at various points of call. Mr. Ney left the ship at Port Burwell to carry on a survey along the coast of Ungava Bay. The information secured will be of value in the correction of maps and charts of this area.

Dr. Nicholas Polunin and Reverend Father Arthème Dutilly collected botanical specimens and will make contributions in this connection to the National Museum.

YUKON TERRITORY

Yukon Territory has an area of 207,076 square miles. It is bounded on the south by British Columbia and Alaska; on the west by Alaska (longitude 141 degrees west); on the north by the Arctic Ocean; and on the east by the Northwest Territories. Most of the Yukon's present population is found in three areas, the northern or Dawson District, the southern or Whitehorse District, and the Upper Stewart River or Mayo District. According to the census of 1931 the total population was 4,230 (2,593 whites, 1,543 Indians, 85 Eskimos, and 9 unspecified).

The Yukon was created a separate Territory in June 1898. Provision is made for a local Government composed of a Chief Executive, called the Controller, also an Elective Legislative Council of three members, with a 3 - year

tenure of office. The Controller administers the Government under instructions from the Governor General in Council or the Minister of Mines and Resources. The Controller in Council has power to make ordinances dealing with the imposition of local taxes, sale of liquor, preservation of game, establishment of territorial offices, maintenance of prisons and municipal institutions, issue of licences, in-corporation of companies, solemnization of marriages, property and civil rights, administration of justice, and generally all matters of a local and private nature in the Territory.
Present Territorial Council
Controller, Yukon Territory - G.A. Jeckell, Dawson.
Councillors Elected 1934
Dawson District - Andrew T. Taddie, Granville.
Whitehorse District - Charles T. Atherton, Whitehorse.
Mayo District - Ernest J. Corp, Keno.
Seat of Government, Dawson, Y.T.

WORK OF COUNCIL

The Yukon Council met on April 23, 1936, and continued in session until April 29. Ordinances were passed amending the Companies Ordinance, an Ordinance respecting the Office of the Public Administrator, and the Government Liquor Ordinance.

ADMINISTRATION

The Lands, Parks, and Forests Branch is responsible for business arising from the general administration of the Territory under the Yukon Act and ordinances passed by the Territorial Council; for the disposal of lands under the Dominion Lands Act; the administration of the Yukon Placer and Quartz Mining Acts; and for the collection of revenue.

The activities of Dominion Government Departments in the Territory involved an expenditure of $576,458.13 during the past fiscal year and the revenue collected in the Yukon amounted to $240,365.72. For local purposes the Territorial Government raised $127,795.38, of which amount $70,000 represented the profit on the operation of Government liquor stores.

LANDS AND TIMBER

Lands. - Two sales were made, three homestead entries were granted, and six hay permits were issued. There are now in force twenty-seven homestead entries, eight agricultural leases, twenty-four waterfront leases, two miscellaneous leases, and fourteen permits to occupy. The revenue derived from lands amounted to $5,948.07.

Timber. - There was a marked increase this year in the quantity of lumber and fuelwood cut under permit. One hundred and forty-seven permits were issued authorizing the cutting of 4,000 linear feet of timber, 483,760 feet board measure of saw-timber, and 16,401 cords of wood. Six permits to cut wood for mining purposes were issued free of dues. Eight licence timber berths were cancelled leaving thirty-nine in force. Nine timber seizures were made. The total revenue collected from timber was $7,203.73.

MINING

Mining is the principal activity and a marked increase in both placer and lode silver-lead mining was noticeable during the past year. Placer mining operations produced 62,635.75 ounces of gold and the total value of the gold production for the year is estimated at $1,252,715. For this purpose placer gold was valued at $20 an ounce. The value of lead-silver production was $489,271. The total revenue derived from mining rights in Yukon Territory, including the export tax on gold, amounted to $61,286.68.

Entries were granted for 145 placer and 139 quartz mining claims staked and applied for during the year, and 3,325 such claims were renewed for another year. Five leases of quartz mining claims were granted, comprising an area of 177.27 acres, making a total of 4,927.37 acres held under lease.

Gold Royalty. - The total amount collected for royalty on gold obtained from placer deposits up to March 31, 1937, was $5,100,699.87, of which amount $23,488.53 was collected during the fiscal year. For the purpose of estimating royalty, the gold was valued at $15 an ounce.

Dredging. - Five leases to dredge for minerals in the beds of rivers in the Territory are now in force, comprising a total river stretch of about 461 miles. The total revenue that has been derived from this source up to March 31, 1937, amounts to $209,914.56. These leases comprise portions of the beds of the Klondike, Finlayson, and Fortymile Rivers. For the purpose of gold recovery there are eight dredges engaged in mining in Yukon Territory, all but one of which are being operated by hydroelectric power.

Hydraulic Mining. - The regulations for the disposal of hydraulic mining locations were withdrawn by Order in Council dated February 4, 1904, but the leases then in force were not affected by such withdrawal. There are still seven hydraulic mining locations held under lease, comprising a total area of approximately 18 square miles. Rentals amounting to $198,419.93 have been collected on account of such locations, the amount received during, the fiscal year being $2,765.

Water Rights. - There are now in force 41 grants to divert water for mining purposes, under the provisions of the Yukon Placer Mining Act, which grants aggregate a total of 19,300 miners' inches.

Coal. - One coal mining lease is in force comprising an area of forty acres on the south fork of Coal Creek.

ROADS AND BRIDGES

There are 467 miles of wagon and secondary roads and 835 miles of sled roads and trails in the Territory. Practically the whole of the mining areas can be reached by motor transport. Expenditures on the road system out of Territorial funds amounted to $62,496.20, an increase of $22,295.42 over the previous year. Operations were confined to general repairs and the maintenance of the roads most used. Owing to damage by spring floods, an emergency expenditure was incurred in reconstructing portions of the Overland road, including the renewal and repair of bridges. With the special grants received from the Dominion, work was continued on the extension of the road from Dawson westward to the Alaska boundary; the construction of a new route around the Swede Creek Dome; improvements to the roads on Sulphur Creek and on Hunker and Dominion Creeks; continuation of the construction to summer standard of the Silver King road in the Mayo District; and the completion of the Mayo River bridge. All these roads are of importance to mining for the transportation of equipment, supplies, and concentrates.

DEVELOPMENT OF AIRCRAFT LANDING FACILITIES

Two emergency landing fields were constructed, one at Carmacks on Yukon River, on the Whitehorse-Dawson-Mayo air route, and the other at McQuesten on Stewart River, midway between Mayo and Dawson. The field at Mayo was lengthened and cleared to a uniform width of about 600 feet. The runway on the Carcross field was improved and the field lengthened.

Some clearing was done with a view to making a cross-run-way at the Whitehorse field to permit safer landings in the cross winds that sometimes prevail. Permission was obtained from the White Pass and Yukon Route, which operates the railway from Skagway, Alaska, to Whitehorse, to use their property adjoining the airport for this additional runway. There is a considerable amount of international traffic through this airport.

A site for a hangar and office building on the Whitehorse landing field was leased to the Pacific Alaska Airways, and this company moved their office building to the Dew site. The White Pass and Yukon Route built a hangar on their property, adjoining the field to the east of the main runway. There was a very marked increase in aeroplane travel in the Territory over that of previous years.

GENERAL

Agriculture. - The summer season was long and warm. Floods at Mayo and Dawson in June caused damage to vegetables planted on the lower lying lands at a time when it was too late to replant crops. Otherwise the season was very favourable, and good crops of hay, grain for fodder, and vegetables were secured.

Fur and Game. - The collections made under the Fur Export Tax Ordinance were slightly lower than, for the previous year. The record of fur-bearers taken showed a decrease in bear, beaver, red and white fox, weasel, and otter. There was an increase in cross and silver fox, lynx, marten, mink, and muskrat. A total of 865 coyote and 513 wolf pelts were presented for payment of export tax, being an increase over the previous year.

Public Welfare. - The hospitals at Whitehorse, Mayo, and Dawson were operated throughout the year, and grants were provided by the Yukon Council towards their maintenance. The number of hospital days of patients for the year were: Dawson 11,561, Mayo 3,612, and Whitehorse 2,675. The number of hospital days for indigents were: Dawson 7,678, Mayo 957, and Whitehorse 652. The indigents treated were practically all aged people. Health conditions throughout the Territory were generally good.

Education. - The same schools were maintained in the Territory as during the previous year, namely, high schools at Dawson and Whitehorse, and elementary schools at Dawson, Whitehorse, Mayo, and Carcross. The enrolment of pupils was slightly less than for the previous year.

Law and Order. - Law and order were maintained throughout the Territory by the Royal Canadian Mounted Police, and the local administration received the co-operation of the force at all times.

REPORT OF G.A. JECKELL, CONTROLLER, REGARDING MINING

The total revenue collected at Dawson on account of mining lands was $55,094.94; at Mayo, $4,345.64; and at Whitehorse $1,846.10; making a total of $61,286.68. This is a decrease of $912.81 in the total revenue as compared with the previous year.

Placer Gold Mining

The amount of placer gold mined during the year in the Territory, on which royalty export tax was paid, was 62,635.75 ounces, produced as follows: Dawson District 61,342.39 ounces; Mayo District 799.39 ounces; and Whitehorse District 493.97 ounces. The royalty collected was $23,488.53. The gold production showed an increase of 18,071.56 ounces over that of the previous year. In the Dawson District 48 new placer location grants, 51 relocation grants, and 2,220 renewal grants were issued. Four dredging leases were renewed covering 31 3/4 miles. Six hydraulic leases were renewed.

Yukon Consolidated Gold Corporation, Limited. - The following is a review of the operations of this company during the year:

Property. - At the end of the year 1,668 placer mining claims, 4 hydraulic leases, 4 dredging leases, 9 water grants, and 2 timber berths were renewed and in good standing.

Power Generation and Transmission. - The hydroelectric power plant on the North Fork of the Klondike River generated a total of 22,015,740 k.w.h., an increase of 66 per cent over the preceding year. Of the total output 83 per cent was used in connection with placer mining operations. The remaining 17 per cent was sold to the Dawson Utility Companies which provide Dawson with light, water, and telephone service.

A total of $80,500 was expended in additions and repairs to the ditch system which conducts water to the power plant. This work will approximately double the capacity of the ditch.

Prospect Drilling. - Two gasoline driven caterpillar drills were operated continuously from March 12 to November 7, for examination of various areas. An estimated total of 11,452,431 cubic yards of dredging ground was added to the company's proved reserves. Data concerning these operations are tabulated below:

Location	Holes Drilled	Total Feet Drilled
Black Hills Creek	327	6,855.0
Middle Dominion Creek	497	12,540.5
Upper Sulphur Creek	226	6,572.0
Gold Run Creek.	18	1,013.0
Upper Dominion Creek	32	9,380.0
Total	1,100	36,360.5

Hydraulic Stripping. - Frozen muck overburden was removed by hydraulic stripping at various locations as follows:

...	Cubic Yards
Arlington	335,910
Granville	666,770
Middle Sulphur Creek	104,840
Quartz Creek	182,700
Total	1,290,220

In addition, hydraulic stripping was carried out for 152 days on Upper Dominion Creek, but no record was kept of the yardage removed.

Cold Water Thawing. - A large Coldwater thawing plant was operated at Granville throughout the season and smaller plants were operated at other locations. A total of 2,046,748 cubic yards of frozen muck was thawed in the Granville

area.

Dredging. - Reconstruction of No. 6 was completed in June at a location in the Granville area. The other Granville Dredge No. 5 was operated for

a full season. At the end of the season dismantling of this latter dredge was begun and work started on the new hull and framing. Part of the old machinery will be reconditioned and used again. A summary of dredging operations is tabulated below:

Dredge No.	Location	Size Buckets Cu. ft.	Starting Time	Shutdown Date	Cu. Yds. Dredged
1	Upper Dominion Creek	7 1/2	May 10	Nov. 7	414,606
2	Middle Klondike River	16	May 9	Dec. 2	2,032,326
3	Lower Klondike River	16	May 4	Nov. 25	1,864,471
4	Upper Klondike River	16	April 24	Nov. 18	1,891,243
5	Granville	71	May 13	Nov. 5	584,113
6	Granville	71	June 22	Nov. 5	682,124
7	Quartz	5	May 8	Nov. 24	488,225
...	Total	...	...	...	7,957,108

Production. - Dredging operations resulted in an output of 41,596.61 fine ounces of gold and 9,146.01 fine ounces of silver during the year; and 56,725 ounces of bullion were sold to the Dominion Mint on which an export tax of $20,864 was paid.

Construction. - A camp to accommodate 90 men was constructed on Claim No. 57 Below on Sulphur Creek. Two-story combined mess and bunk houses with hot-water heating plants were constructed at the camps on Arlington and Bear Creeks. Excavation was commenced on a 16 - mile ditch to convey water from Australia Creek to a point on the right limit of Sulphur Creek, the sum of $56,550 being expended on this world. The construction of a system consisting of a 300 - horsepower pumping plant and a ditch approximately 7,000 feet long to supply water from Indian River to the operations on Upper Quartz Creek was practically completed. A number of other buildings were constructed at various camps, including a large storage warehouse at Bear Creek. The total expenditure for buildings and camp construction was over $86,000.

Employment. - The average number of men employed during the seven months of the operating season was 418, and for the full year, 298. A total of $819,000 was expended for salaries, wages, and board.

General. - Development work was carried on at Laforma mine in the Mount Freegold District during the first four months of the year, but the project was abandoned early in May.

Road conditions in the Dawson Mining District are much better than in former years, due to the improvements carried on by the Government. In addition to the Government's expenditures on roads the company expended $11,300 on main highways, for relocation of roads, opening of roads in the spring, and maintenance work.

Other Placer Operations. - Owing to the failure to thaw the ground in advance, Holbrook Dredging Company did not commence operating their dredge on the Sixtymile River until August 1. It was run intermittently until November 11, a total of 54,276 cubic yards of material being handled. A total of 1,417.64 crude ounces of gold was recovered, the value being $39,682.04 for gold and $97.48 for silver recovered with the gold. The largest number of men employed was 30. It is the intention of the company to replace the steam power on the dredge with Diesel units during 1937.

Prospecting for placer gold continued generally throughout the Territory with very encouraging results. The whole of one old placer creek, namely Clear Creek, has been optioned by Fairbanks Exploration Company, with a

view to ascertaining by drilling whether it will prove to be a dredging area. Aeroplanes are now used in the late winter months to freight summer outfits to miners located on remote creeks.

Prospecting Leases. - Prospecting leases representing a total of sixty-nine miles were issued during the year on the following watercourses: Bullion, Barlow, Moose (Little Atlin Lake), Clear, Famous, Geary, Livingstone, Silver, Moose (Fortymile River), Kirkman, Discovery Pup, All Gold, Duncan, Lapie, Zine, Jacks, Sixtymile, Anderson, and Canadian Creeks, Green and Dublin Gulches, and McQuesten River.

Lode Mining

Dawson District. - Sixty-four quartz grants were issued in the Dawson District during the year, and 406 claims were renewed. An option has been, taken on the Brown-Fairclough group of claims on Mount Freegold by a new company, Mount Free Gold Yukon Mines, Limited. Equipment for a mill is now on the property. Considerable interest is shown in this district, very few claims have been allowed to lapse, and much exploratory work has been done by individual claim owners.

Mayo District. - There are 742 quartz mining claims in good standing in this district. Mining operations were renewed this year on a larger and more important scale than at any time previously.

Treadwell Yukon Company, Limited. - This company owns fifty claims, covering 1,320 acres on Keno Hill and Galena Hill, and holds a lease on seventeen claims on Keno Hill covering 557 acres. The Elsa, Silver King, and Hector groups of claims on Galena Hill were operated during the year. The output for the season was approximately 12,000 tons of high-grade silver or lead ores and mill concentrates, the latter amounting to approximately 10,000 tons. Owing to lack of river transportation the shipment of ore and concentrates was limited to 2,064 tons, consisting of 1,481 tons of concentrates and 583 tons of crude ore. The shipment contained 621,718 ounces of silver and 1,889,916 pounds of lead, having a gross market value of $375,233.86. The average number of men employed was 150.

Other Operations. - Individual claim owners in the district were active in prospecting and developing their ground, some very rich discoveries being made. Individual miners shipped 683 tons of crude ore, the gross value being $114,037.

Assay Office

The Assay Office was maintained as usual at Keno by the Territorial Government. A total of 1,316 samples of rock for assay was received from all parts of the Territory, and 2,098 assays or quantitative analyses were made. In addition, numerous qualitative determinations and chemical tests were made in connection with the identification and classification of various rocks and minerals of which no record was kept.

The assays made were, gold and silver 1,316; lead 772; copper 5; platinum 2; tungsten 1; molybdenum 1; and antimony 1.

LAND REGISTRY

In the Land Registry Division a record is kept of such Public lands as are being held for Federal Government purposes. Lands no longer required for the purpose for which they were reserved or acquired are placed on a revenue producing basis as circumstances permit, usually by the issue of leases at an annual rental based on 6 per cent of the valuation of the properties.

Miscellaneous duties relating to the previous administration by the Dominion of the natural resources of the western provinces are performed by the staff of the Land Registry, which also deals with inquiries relating to any land business for which the Dominion accepts responsibility.

As a measure of economy, the Soldier Settlement of Canada undertakes field inspection work and its supervising officers at Winnipeg, Regina, and Edmonton act on the joint boards which report on all applications for apportionment or adjustment of seed grain, fodder, and relief indebtedness.

ORDNANCE, ADMIRALTY, AND PUBLIC LANDS

Ordnance and Admiralty lands are those areas in the Maritime Provinces, Quebec, Ontario, and British Columbia which, because of their strategic situation or their suitability at some time for naval or military purposes, were reserved or acquired by the Crown. When these are no longer required for such purposes they are transferred to the Department for administration. Lands acquired for other purposes by any Dominion Government department and later not required axe also transferred under the classification of Public lands. The work of administration comprises investigations, appraisals, preliminary and subdivision surveys, the searching of titles, the preparation of plans, leases, and reports, and the collection of rentals.

Investigations. - Investigations were made during the year of properties at Digby, Guysborough, and Halifax Harbour, Nova Scotia; St. Andrews and St. John, New Brunswick; Rapides des Joachims, Blairfindie, Dorval, Farnham, Sorel, and Longueuil, Quebec; London, Point Edward, Owen Sound, Paisley, and the Rideau Canal, Ontario.

Surveys. - Preliminary and boundary surveys were made of properties at Shelburne and Halifax Harbour, N.S.; St. Andrews, N.B.; Rapides des Joachims, Longueuil, St. Joseph de Sorel, P.Q.; Lyons Creek and Point Edward, Ont.

Leases, Sales, and Rentals. - During the year fifty-one leases and licences of occupation were issued and three sales were completed. Cancellations amounted to ten. Two parcels of land at Levis and Rapides des Joachims were placed under the jurisdiction of this Department. The net revenue from Ordnance lands for the year was $15,451.27.

For Public lands during the year six leases were issued and one sale completed. The net revenue from Public lands amounted to $3,550.13.

CENTRAL OFFICE OF RECORD

The Central Office of Record for all lands owned or otherwise controlled by the Dominion of Canada, operated by the Land Registry, is proving to be a useful service to the different departments, as well as to the general public. An inventory of federally owned properties affords a convenient index when a site in some locality is required for a government building or other undertaking. To date some 3,400 titles have been entered in the record. The several departments are continuing their co-operation in supplying information, and data are recorded as received.

SOLDIER SETTLEMENT LANDS

The unpatented lands in the four western provinces against which charges we registered under the Soldier Settlement Art remain vested in the Dominion. There are 360 quarter-sections comprising approximately 57,600 acres thus administered. They are divided among the four western provinces as follows: Manitoba, 61; Saskatchewan, 161; Alberta, 110; British Columbia, 28.

Letters patent for such lands are issued by this Department to those entrants who have completed the duties in connection with their entries in accordance with the terms of the Dominion Lands Act, and who have repaid in full their indebtedness to the Soldier Settlement of Canada. In other cases where the entrants have completed the duties referred to but have not repaid their indebtedness to the Soldier Settlement of Canada, patents are issued in the name of the Director of Soldier Settlement of Canada under the authority of the provisions of Section 27 of the Soldier Settlement Act, and the Order in Council of June 4, 1921. During the fiscal year 32 applications for patent were received, of which 17 were approved.

ROADS AND RAILWAY RIGHTS OF WAY

Surveyed roads were reserved out of seven grants of lands. Two new plans of survey of roads were received and reservations for these roads noted in the records in order that they may be vested in the provinces. A number of old road matters have been investigated.

Information was furnished the provinces on request concerning a number of right of way matters pertaining to various railway lines.

LAND TRANSFERS TO PROVINCES

The interest of the Dominion in certain areas of lands which did not pass to the western provinces by the transfer of the natural resources and are not now required for Federal Government purposes has been transferred to the western provinces subject to any trusts existing in respect of such lands and to any interest other than that of the Dominion in the same by the following Orders in Council:

Date	P.C. No.	Area	Rights	Province
20th April, 1936	950	9254.51 ac.	surface	Alberta
...	...	9254.51 ac.	mineral	...
23rd July, 1936	1,847	1.25 ac.	surface	Alberta
11th May, 1936	1,112	640.00 ac.	surface	Alberta
11th May, 1936	1,115	213.40 ac.	surface	Alberta
30th March, 1937	647	20.00 ac.	minerals only	Alberta
9th April, 1936	887	615.60 ac.	surface	Saskatchewan
29th Jan., 1937	189	32.00 ac.	surface	Saskatchewan
6th June, 1936	1,340	1.886 ac.	surface	Br. Columbia

LETTERS PATENT

From the time of the establishment of the Department in May, 1873, there have been issued 496,787 Letters Patent, covering in the aggregate an area of 107,725,646 acres. Those issued up to July 5, 1883, are of record in the Department of the Secretary of State. Since that date the patents issued, numbering 481,690, are of record in the Land Registry of this Department.

During the fiscal year ended March 31, 1937, there were 45 Letters Patent issued, covering a total area of 5,699 acres, divided, according to provinces, as follows:

Province	Patents	Acres
Manitoba	5	421
Saskatchewan	16	2,379
Alberta	17	2,482

British Columbia	2	189
Northwest Territories	2	14
Yukon Territory	3	214
Totals	45	5,699

The various kinds of grants are dealt with in the following table:

...	*Special		(t)Homestead		(t)Soldier		Sale		Railway	
...	Patent	Acres	Patent	Acres	Patent	Acres	Patent	Acres	Patent	Acres
Manitoba	3	26	1	15	1	80	...	...	...	...
Saskatchewan	14	2,066	1	154	1	159	...	...	...	...
Alberta	16	2,368	1	114	...	...	...	...	...	...
British Columbia	1	160	...	...	...	...	...	...	1	29
Northwest Territories	...	...	...	...	...	...	2	14	...	...
Yukon	...	...	1	160	...	...	2	54	...	...

[*Under this heading are included lands entered for by returned soldiers, affected by loans from the Director of Soldier Settlement of Canada, which lands were patented to the said Director either at the request of the entrant or pursuant to salvage proceedings under the Soldier Settlement Act.] [(t)Under this heading are included lands entered for by returned soldiers, affected by loans from the Director of Soldier Settlements of Canada, said loans having been repaid in full. Patents were issued direct to the settler.]

There were 470 certified copies of Letters Patent issued during the fiscal year ended March 31, 1937.

SEED GRAIN, FODDER, AND RELIEF INDEBTEDNESS

During the fiscal year the Alberta, Saskatchewan, and Manitoba Adjustment Boards submitted recommendations relating to the adjustment or apportionment of outstanding seed grain, fodder, or relief indebtedness in 571 cases. Their recommendations were ratified by Orders in Council and 427 discharges and releases of liens were issued, resulting in writing off the amount of $100,488.94. There were 2,230 inquiries received from the provinces for statements of indebtedness outstanding relative to the issue of land grants, and 191 certificates of indebtedness were issued to be attached to title. Gross collections for the fiscal year amounted to $11,219.70.

The following summary shows the financial operations of the year ending March 31, 1937: -

...	Principal	Interest	Total
Debits	...	...	...
Balance outstanding March 31, 1936	$2,915,915 91	$2,527,964 74	$5,443,880 65
Accrued interest April 1, 1936, to March 31, 1937	...	155,343 02	155,343 02
Total debits	$2,915,915 91	$2,683,307 76	$5,599,223 67
Credits	...	...	...
Net collections, April 1, 1936, to March 31, 1937	$8,417 22	$2,655 21	$11,072 43
Amount written off as loss by Orders in Council	44,423 73	56,065 21	100,488 94
Amount collected and retained by Province of Saskatchewan as commission*.	2 00	33 36	35 36
Total credits	$52,842 95	$58,753 78	8,111,596 73
Amount outstanding March 31, 1937	$2,863,072 96	$2,624,553 98	$5,487,626 94

[*Clause 18, Natural Resources Agreement with the Province of Saskatchewan.]

TIMBER AND GRAZING

Grazing. - There was a considerable demand for annual grazing permits on Quarantine Reserves along the southern boundary of Saskatchewan and Alberta. There were 36 permits granted covering a total area Of 46,055.9 acres, and

during the summer grazing season of 1936 there were 1,201 cattle, 430 horses, and 300 sheep grazed on these pasture lands. The revenue, consisting of rent, amounted to $921.12.

On the Old Military Reserve at Farnham in the Province of Quebec, there were four grazing leases in force from which the sum of $97.50 was collected as rent. These leases expired on February 20, 1937.

Timber. - Within the boundaries of National Parks there were 14 licence timber berths and, during the year, 3 of these in Mount Revelstoke National Park, British Columbia, were cancelled. The remaining berths are located, as follows: 2 in Manitoba and 9 in British Columbia, covering a total area of 65.90 square miles. Operations were conducted on Licence Timber Berth No. 117 within Glacier National Park, B.C., and 248,256 feet B.M. of sawn lumber was cut. The revenue from these berths amounted to $1,265.46, and during the year licences, in duplicate, were prepared for the 11 berths. On the Dominion Lands Coal Block near Hosmer, B.C., there are two timber berth permits in force.

During the year 101 accounts, covering timber permits issued to homesteaders by the Dominion before the transfer of the natural resources, were verified for the western provinces.

NATIONAL PARKS BUREAU

The functions of the National Parks Bureau involve the administration of the National Parks Act and regulations made thereunder by the Governor in Council, the supervision of all activities within the National Parks, the establishment of National Parks, the preparation and distribution of information of all types respecting National Parks and wild life, and the conservation, marking, and care of historic and pre-historic sites of national importance. The Bureau also administers the Migratory Birds Convention Act. In the maintenance of law and order within the National Parks, the Bureau has the assistance of the Royal Canadian Mounted Police, who also act as wardens under the Migratory Birds Convention Act. Highways and other public works in the National Parks are constructed by the Surveys and Engineering Branch of the Department.

The National Parks system now includes twenty separate units, having a combined area of 12,525 square miles. During the past year the National Parks system was extended to include selected areas in Nova Scotia and Prince Edward Island. The Cape Breton Highlands Park in Nova Scotia contains an area of approximately 458 square miles in the northern part of Cape Breton Island. The Prince Edward Island Park, containing an area of approximately 7.6 square miles, consists of a coastline strip over 20 miles in length along the north shore.

NATIONAL PARKS VISITORS

An all-time record in the volume of tourist travel was established during the year Under review, when 908,161 visitors entered the National Parks. This figure represents an increase of 136,367, or 17 per cent, over the total for the fiscal year 1935 - 36, which was 771,794. The greater part of this movement to the parks is made up of motor tourist traffic, which constituted approximately 96 per cent of the total and comprised 226,847 motor vehicles and 873,391 passengers. Estimated passenger rail traffic to the National Parks was 34,770.

It is interesting to note that since the fiscal year 1926 - 27, when the movement totalled 391,371, the number of visitors has increased by more than 130 per cent.

Tourist figures by parks for the fiscal year ended March 31, 1937, compared with returns for the preceding year, are given in the following table:

Visitors to National Parks

National Park	1936 - 37	1935 - 36
Banff	178,940	143,162
Buffalo	10,557	11,133
Elk Island	46,295	44,767
Fort Anne	16,364	13,229
Fort Beausejour	20,000*	3,848
Georgian Bay Islands	4,878	5,521
Glacier	1,200*	1,000*
Jasper	14,659	10,981
Kootenay	53,004	40,447
Mount Revelstoke	7,188*	6,024*
Nemiskam	29	15
Point Pelee	287,900	259,040
Prince Albert	25,327	21,292
Riding Mountain	101,013	93,895
St. Lawrence Islands	16,800*	12,700*
Waterton Lakes	59,546	47,777
Yoho	64,461	56,963
...	908,161	771, 794

[*Estimated.]

RECREATION

The National Parks of Canada offer remarkable opportunities for outdoor life and recreation. Motoring, riding, hiking, climbing, fishing, canoeing, swimming, golf, and tennis are among the many sports which may be enjoyed in summer under ideal conditions. Motor camp-grounds, which have been established along the highways and in the townsites of the parks, offer excellent facilities for camping, and hundreds of miles of trails have been constructed which lead to points of interest and beauty not accessible by motor road. Supervised outings conducted by trail-riding, hiking, and alpine climbing organizations are annual features of the mountain parks.

Golf courses maintained by the Department in Riding Mountain, Prince Albert, Elk Island, and Waterton Lakes Parks are available to visitors on payment of a reasonable fee, and courses operated by private enterprise at Banff and Jasper are widely known for their sporting features. During the year a new clubhouse was constructed at Elk Island Park, and the courses at Waterton Lakes,and Riding Mountain Parks were improved by the installation of watering systems. Tennis courts, also, are available for the use of visitors in a number of parks, and tournaments, which attracted a large entry, were held at Prince Albert and Riding Mountain Parks. The outdoor swimming pools at the Banff Hot Mineral Springs and at the Radium Hot Springs in Kootenay Park were extensively patronized during the year, and supervised bathing beaches in other parks, where bathhouses have been erected, were also very popular.

Fishing ranks as one of the favoured sports in the western parks, and conditions have been greatly improved in recent years by extensive re-stocking of lakes and streams, some of which were once barren of fish. During the year steps were taken to improve the fishing in Riding Mountain Park and Prince Albert Park, and a new fishing area was available to anglers by the opening of Crypt Lake in Waterton Lakes Park.

The annual "ride" of the Trail Riders of the Canadian Rookies was held during the early part of August in Banff Park, commencing at Banff and taking in territory east and West of the Sawback Range. The outing conducted by the Sky

Line Trail Hikers took place in Yoho Park, with a central headquarters established at Lake O'Hara. A large number of climbing enthusiasts attended the annual camp of the Alpine Club of Canada, which was held in Fryatt Creek Valley, Jasper National Park, during the latter part of July and early part of August.

Banff National Park during recent years has developed into a winter sports Centre of note, and the annual winter carnival held in February attracted many visitors. The outstanding event of the winter season, the Dominion Ski Championship meet, was staged on the slopes of Mount Norquay, within sight of the town of Banff, early in March, and was well attended by competitors and spectators from foreign countries as well as Canada.

WILD LIFE CONSERVATION

The sanctuary conditions provided by the National Parks during the past quarter of a century have been responsible for a gratifying increase in the numbers of big game animals, particularly in the mountain parks of Alberta and British Columbia. Regular patrols by the Park warden service ensure the protection of game and also afford a means of determining increases or decreases in the numbers of species and their health conditions.

Observations during the year indicate increases among many species of animals, particularly elk and moose, which are abundant in Jasper and Banff Parks, with elk spreading from the latter area into Yoho Park in considerable numbers. Rocky Mountain sheep were reported to be more numerous than usual in Banff Park, particularly in the vicinity of the town of Banff. Increases of animals were also reported in Waterton Lakes, Prince Albert, and Riding Mountain Parks.

To conserve and perpetuate animal species native to the plains of Western Canada, the Dominion Government some years ago set aside four wild animal parks in Alberta, three of which are fenced. The areas include the Buffalo and Elk Island Parks, which contain large herds of buffalo as well as deer, elk, and moose, and the Nemiskam and Wawaskesy Parks, which are sanctuaries for pronghorned antelope, Natural increases in practically all species were registered during the year in these parks. A reduction in the number of buffalo at Buffalo Park was made by supervised slaughter.

Three Rocky Mountain sheep from Banff Park were donated during the year to the Zoological Gardens at Charlesbourg, near Quebec City, Quebec, as well as one male elk from Buffalo National Park at Wainwright. A donation of twentyfive elk was made to the Government of Saskatchewan, and a zoo at San Simeon, California, was furnished with eight buffalo from Elk Island Park.

Small exhibition herds of wild animals have been maintained in paddocks at Banff and Riding Mountain Parks for several years. Five buffalo were shipped from Elk Island Park to Prince Albert Park andthese have been placed in an enclosure near the main park highway.

A census of wild animals in fenced enclosures in the National Parks as at March 31, 1937, follows:

Animals in Fenced Areas

Animal	Banff Park Paddock	Buffalo Park	Elk Island Park	Nemiskam Park	Prince Albert Park Paddock	Riding Mountain Park Paddock	Total
Antelope	...	...	...	375	...	...	375
Buffalo	31	4,476	2,039	...	5	65	6,616
Elk	28	1,541	1,997	...	...	52	3,618
Four-horned sheep	6	...	...	...	...	...	6
Hybrids (cattalo)	...	33	...	...	...	...	33
Moose	...	121	774	...	...	5	900
Mule deer	...	1,242	261	...	...	4	1,507
Rocky Mountain goat	3	...	...	...	...	...	3
Rocky Mountain (bighorn) sheep	7	...	...	...	...	...	7

White-tailed deer	...	...	...	...	...	4	4
Yak	5	32	...	...	...	...	37
...	80	7,445	5,071	375	5	130	13,106

The conservation of wild life is a responsibility of the Dominion and Provincial Governments and, to promote unity of action, a conference of officials was called in January 1937 to consider mutual problems. This conference was attended by representatives of every province as well as by the District Migratory Birds Officers, the Superintendents of National Parks, and delegates from other Dominion Departments concerned. The conference passed twenty-one resolutions, which sum up its conclu-sions on the many problems placed before it. The attendance at the conference of the Chief of the United States Bureau of Biological Survey was most helpful in promoting an understanding of related problems in the United States.

The National Parks continue to serve as important wild life reservoirs, the overflow from which replenishes the wild life supply in adjacent territory. Increases in many species of big game were reported by Parks officials. Continued attention has been paid to improving the fishing in the parks and expert guidance governs fish-stocking activities.

FOREST FIRE CONTROL

The fire hazard in the National Parks, owing to the hot, dry weather, was extremely high during the year. Many forest fires occurred, particularly in Banff, Jasper, Mount Revelstoke, and Prince Albert Parks. Although one hundred and seven fires occurred, a total area of only 39,335 acres was burned. An indication of the conditions faced by the protective service in Prince Albert Park may be gained from the fact that sixty-five distinct flares or blazes were counted in the district surrounding the park at one time in July by an aeroplane patrol.

Regular patrols were carried out by the Royal Canadian Air Force in Prince Albert and Riding Mountain National Parks during the spring and late summer seasons when the fire hazard was greatest. These patrols were of great assistance in helping to locate and combat fires in their early stages.

A summary of fires in the fiscal year 1936 - 37, indicating the number, area burned over, and the cost of extinguishing, follows:

General Fires			
Region	Fires	Area Burned	Cost of Extinguishing
...	Number	Acres	$
Banff National Park	15	7,647.50	20,584 14
Georgian Bay Islands Park	2	1.25	33 20
Glacier National Park	4	1.50	105 90
Jasper National Park	16	1,045.50	5,616 37
Kootenay National Park	1	0.25	38 85
Mount Revelstoke National Park	4	1,202.00	1,778 41
Prince Albert National Park	22	25,492.17	11,928 52
Point Pelee National Park	2	200.00	699 00
Riding Mountain National Park	21	2,737.25	972 38
Waterton Lakes National Park	3	3.50	73 50
Yoho National Park	7	...	14 26
Total	97	38,330.92	41,844 53
Railway Fires			
Banff National Park	1	2.00	1 90
Glacier National Park	1	...	0 50

Jasper National Park	2	...	289 40
Yoho National Park	6	2.00	45 19
...	10	4.00	336 99
Grand Total	107	38,334.92	42,181 52

The policy of constructing all-weather motor highways in the National Parks was continued during the year. The new Chief Mountain International Highway, which provides direct communication between Waterton Lakes National Park in Alberta and Glacier National Park in Montana, was opened during the year, and was travelled by a large number of visitors to Canada.

Approximately 16 miles of new road were constructed to grade on the Banff-Jasper Highway with funds provided under special supplementary estimates, exclusive of 30 miles on the Golden-Revelstoke Highway, which does not traverse territory lying within the National Parks system. In Prince Albert National Park 7 - 5 miles of highway were constructed to grade from Waskesiu townsite to the Heart Lakes Portage.

At the present time a total of 592 miles of all-weather highway and 213 miles of secondary roads are maintained in the parks, in addition to 2,582 miles of trails and 1,165 miles of telephone lines. Revisions and improvements were also carried out on existing roads, including gravelling, oiling, and widening operations. A number of park trails and telephone lines were also improved or extended.

The mileage of roads, trails, and telephone lines within the National Parks of Canada on March 31, 1937, is detailed in the following table:

Means of Travel and Communication

Region	Roads			Trails	Telephone Lines
...	Motor	Secondary	Total	...	...
...	Miles	Miles	Miles	Miles	Miles
Banff National Park (including Lake Louise end, Banff-Jasper Highway)	136.50	19.00	155.50	750.00	225.00
Buffalo National Park	2.00	30.00	32.00	55.00	36.00
Cape Breton Highlands National Park	...	55.00	55.00	...	...
Elk Island National Park	16.00	2.00	18.00	3.75	...
Glacier National Park	...	10.00	10.00	108.50	2.50
Jasper National Park (including Jasper end, Banff-Jasper highway)	140.00	33.00	173.00	519.00	408.50
Kootenay National Park	63.00	13.00	76.00	117.00	62.00
Mount Revelstoke National Park	19.00	...	19.00	35.50	17.00
Point Pelee National Park	7.00	...	7.00	...	...
Prince Albert National Park	66.50	8.00	74.50	478.00	162.00
Riding Mountain National Park	50.25	34.50	84.75	100.00	150.00
Waterton Lakes National Park	44.50	3.00	47.50	236.00	58.00
Yoho National Park	47.25	6.00	53.25	180.00	44.00
Total	592.00	213.50	805.50	2,582.75	1,165.00

ENGINEERING

Engineering work carried out in the National Parks during the year included the maintenance and operation of public services such as electric lighting, telephone, water supply, and sewer systems; the construction and maintenance of motor highways and secondary roads, bridges, trails, and buildings in the parks, and the maintenance of streets and walks in park townsites.

Construction of the Banff-Jasper Highway continued; 8.27 miles being completed to grade at the Banff end, and 7.76

miles at the Jasper end. The uncompleted portions of this highway include 42.8 miles of road in Banff Park and 4.9 miles in Jasper Park.

The construction of a motor road, in Prince Albert National Park, from Waskesiu townsite around the eastern end of Lake Waskesiu to the Heart Lakes Portage, a distance of approximately 7.5 miles, was continued.

Additional engineering work was carried out on the construction of a bathhouse and swimming pool at Miette Hot Springs in Jasper Park; installation of a sewer system at Lake Louise townsite; extension of the water supply at Waterton Lakes Park; and improvement of golf courses at Riding Mountain, Prince Albert, and Waterton Lakes National Parks.

A complete summary of engineering work carried out in the National Parks and Historic Sites during the year is contained in the report of the Director of Surveys and Engineering Branch.

BUILDING CONSTRUCTION AND LANDSCAPE

Extension and maintenance of park buildings, streets, highways, and public utilities were carried on during the year with funds provided under regular Parks appropriations as well as under special supplementary estimates. Plans and specifications for all projects were either prepared, revised, or checked by the Architectural Division. A detailed summary of the work done appears in the report of the Chief Engineer, Engineering and Construction Service.

Following are some of the more important items of construction that were completed in the fiscal year 1936 - 37:

Banff National Park - Administration, Post Office, and Customs building; registration building and staff quarters at eastern entrance; extension to Cave and Basin bath-house.

Buffalo National Park - Abattoir.

Elk Island National Park - Golf club-house.

Georgian Bay Islands National Park - Two shelters; combination storehouse and stable.

Glacier National Park - Warden's cabin and storehouse.

Jasper National Park - Superintendent's residence and garage; fire-hall; warden's shelter; gateway registration building; toilet buildings at Cottonwood Creek camp-ground.

Point Pelee Park - Comfort station.

Prince Albert National Park - Addition to Administration building; addition to community building; three warehouses; 100 - man camp (including two bunk-houses, laundry, office, and combined dining hall, and kitchen).

Riding Mountain National Park - Gateway registration building; fire-hall; incinerator.

Waterton Lakes National Park - Community buildings at Waterton Park and Cameron Lake; stores building, extension to Administration building; addition to men's bath-house.

Yoho National Park - Camp caretaker's lodge; workshop.

Fort Chambly Historic Site - Museum building.

Landscaping - Landscape work carried out during the year included additional development work on the grounds surrounding the Administration building at Banff, and rock garden project. The grounds surrounding the buildings at the eastern entrance to Banff Park were also landscaped, as were the grounds enclosing the Administration building at Waskesiu in Prince Albert Park.

UNEMPLOYMENT RELIEF

Unemployment relief work, which has been carried on in the National Parks since 1930, was continued on a smaller

scale during the year under review. Permanent park residents with domestic responsibilities who were in need were provided with work on a quota basis in Banff, Jasper, Waterton Lakes, and Yoho National Parks in April, May, and June, 1936. A total of 225 individuals

were given employment during this period and were provided with 4,963 mandays of work. Dependants of individuals employed numbered 530, making a total of 755 permanent park residents assisted. Relief for permanent park residents was also provided in Banff and Jasper Parks between December 1936, and March 1937, during which a total of 207 individuals were provided with 7,168 man-days of work. Dependants of these individuals numbered 329, making a total of 536 park residents assisted.

A relief camp for single homeless men was operated in Prince Albert National Park during April and May, 1936, to care for 407 individuals transferred from relief camps operated by the Department of National Defence at Dundurn, Saskatchewan.

Activities carried out for the relief of unemployment included townsite improvement; highway and trail construction and maintenance; cutting firewood for camp-grounds; snow removal; brushing and clearing.

PUBLICITY AND INFORMATION

Development of tourist travel to the National Parks is stimulated by the work of the Publicity and Information Division. By means of lectures, the loan of motion picture films, the preparation and distribution of press articles, descriptive literature, maps, and photographs, and also by correspondence, the Bureau maintains close contact with individuals and organizations interested in the promotion of tourist travel. Particular attention was devoted to the attraction of visitors from the United States. Close co-operation was extended during the year to the Canadian Travel Bureau, which was furnished with many press articles, photographs, and other material.

The motion picture library of the Division now contains 121 film subjects comprising a total of 1,285 prints, descriptive of the scenery, wild life, and recreational opportunities of the National Parks. These films (of the silent type) are all in 35 millimetre size, and many are also available in 16 millimetre size.

During the year 18,570 feet of new negative film and 108,780 feet of positive film were added. The above included 31 prints of film subjects in 35 millimetre size and 222 prints in 16 millimetre size. Six new film stories or subjects were produced and released for showing under the following titles: Warriors of the Deep, Saskatchewan's Scenic Lakeland, Wild Life Ways, The Highlands of Cape Breton, in the Shadow of Assiniboine, Snowtime in the Rockies.

The following comparative statement of distribution of films descriptive of Canada's National Parks during the past three fiscal years indicates the growing demand: 1935, 1,721 films; 1936, 3,293 films; 1937, 3,884 films.

Prints are now in circulation in the United States, Great Britain, Holland, France, Australia, Argentine Republic, Austria, Poland, New Zealand, Norway, Czecho-Slovakia, Hawaii, and India, as well as in various parts of Canada. All films are edited and titled in the Division laboratory. During the past year approximately 1,500 reels were screened in the Division's projection room, and 457 were shown in Ottawa and vicinity.

The lantern slide library, which contains several thousand subjects depicting the scenery, fauna, and flora of the National Parks, also experienced an increased demand for this type of material. During the year the library stock was augmented by 1,914 slides. A total of 8,229 slides, accompanied by lecture notes, were lent for varying periods.

Approximately 165 halftone cuts, line cuts, and matrices were loaned to editors, publishers, and writers during the year.

A total distribution of 10,342 photographic prints of various sizes descriptive of National Parks subjects was made during the year to newspaper services, publishers, writers, and others. The photographic library was augmented by 241 new negatives and 14,622 prints and enlargements.

A distinctive feature of the work of the Division is the preparation of press articles descriptive of the scenic, wild life and recreational attractions of the National Parks. As a result of numerous requests for information of a general nature on National Parks, 25,000 copies of a new pamphlet, The National Parks of Canada, were printed. This publication contains, in its fifty-six pages, brief descriptions and numerous illustrations of the scenic and recreational attractions of the National Parks. A first edition of 10,000 copies of a catalogue of exhibits in the new historical museum at Fort Beausejour National Park, prepared by the honorary curator, Dr. J.C. Webster, C.M.G., was also issued during the year. Three thousand copies of the Annual Report of the Commissioner for 1935 - 36 were printed in illustrated form. A revised edition, of the descriptive pamphlet Waterton Lakes National Park was also, prepared for publication during the year, as well as a map folder Points of Interest in Banff and Vicinity.

During the year 96,113 copies of official Parks publications and approximately 6,500 copies of maps and literature published by private enterprise were distributed.

An exhibit was arranged at the Canadian National Exhibition in Toronto in August 1936. The exhibit occupied approximately 3,000 square feet of floor space and included mounted specimens of wild life native to the National Parks, and photographs, oil paintings, and coloured photographic transparencies arranged in electrically lighted cases. Exhibits of National Parks publicity material were also staged at the "Produced in Canada" Exhibition in Montreal, and at the Great Lakes Exposition at Cleveland, Ohio.

A group of fifty art photographs was exhibited in England through the courtesy of Mr. Harper Cory, lecturer and author. A group of 100 photographs, on special mounts, was forwarded to the Art Exhibition Bureau of London, England, for exhibition in Great Britain. A number of framed art photographs were also loaned to the Danforth Branch Public Library of Toronto.

REVENUE

Receipts from public utilities and other sources of direct revenue in the National Parks of Canada, including administration of the Migratory Birds Convention Act, amounted to $272,415.09 for the fiscal year 1936 - 37, compared with $218,167.55 for the preceding twelve months, an increase of $54,247.54.

A statement of revenue by parks, etc., follows:

Park	...	Revenue
Banff	...	$128,879 94
Buffalo	...	26,530 52
Elk Island	...	3,063 38
Fort Anne	...	1 15
Georgian Bay Islands	...	81 00
Glacier	...	124 19
Jasper	...	41,067 54
Kootenay	...	15,450 73
Point Pelee	...	1,577 00
Prince Albert	...	7,419 81
Riding Mountain	...	33,890 81
Waterton Lakes	...	8,896 95
Wawaskesy	...	216 00
Yoho	...	3,992 06
Historic Sites	...	4 00

Migratory Birds (taxidermist licences)	...	58 00
Fines and forfeitures: -	...	...
National Parks Regulations	$653 31	...
Magistrates fees	53 00	...
Migratory Birds Convention Act	455 70	...
...	...	1,162 01
Total	...	$272,415 09

NATIONAL PARKS OF CANADA

The extension of Canada's National Park system to include seashore areas in the Provinces of Nova Scotia and Prince Edward Island was an outstanding feature in the work of the National Parks Bureau for the fiscal year 1936 - 37. During this period the Cape Breton Highlands National Park, comprising an area of approximately 458 square miles in the northern part of Cape Breton Island, Nova Scotia, and a park comprising an area of approximately 7.6 square miles along the northern coast of Prince Edward Island, were established under the provisions of the Nova Scotia and Prince Edward Island National Parks Act of 1936.

An event of interest that occurred in Waterton Lakes National Park during the year was the ceremony attending the re-dedication of the Waterton-Glacier International Peace Park, which complemented a similar ceremony held in Glacier National Park in 1932.

As the term "National Park" in Canada is used to cover a variety of reservations the National Parks may be divided, for purposes of comparison, into three main classes. These include: (a) the scenic and recreational parks, situated in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, and Prince Edward Island; (b) the wild animal parks or preserves, situated in Alberta; and (c) the national historic parks situated in Nova Scotia and New Brunswick.

Scenic and Recreational Parks

BANFF NATIONAL PARK

This mountain playground, with its many ice-fields and glaciers, is typical of the central Rockies. The park has an area of 2,585 square miles and located therein are the world famous resorts of Banff, with its hot mineral springs, and Lake Louise. Motor highways in the park have a total length of 136.5 miles, in addition to which there are 750 miles of trails and numerous motor campgrounds. The park is a big game sanctuary and a year-round sports centre, recreations including motoring, riding, climbing, hiking, golf, tennis, boating, swimming, skiing, skating, and curling. Visitors during 1936 - 37 totalled 178,940.

Tourist travel to Banff Park during the fiscal year 1936 - 37 showed an increase of more than 25 per cent over 1935 - 36. Banff Park is linked with the adjacent areas, Yoho and Kootenay Parks, by standard highways, and in the compilation of tourist travel figures due consideration is given to traffic originating in these areas.

The total number of visitors entering Banff Park during the past year compared with figures for the previous season is given in the following table:

Visitors to Banff National Park

Route	Motor Vehicles		Passengers	
...	1936 - 37	1935 - 36	1936 - 37	1935 - 36
Westbound -	...	...	...	...
Via Banff Park (Eastern Gateway entrance)	40,872	33,038	135,839	109,098
Eastbound -	...	...	...	...
Via Kootenay Park (Radium Hot Springs entrance)	5,707	4,254	17,788	13,659
Via Yoho Park (Leanchoil entrance)	1,825	1,565	5,313	4,405
Tourists for Banff Park by rail - east and west (estimated)	...	...	20,000	16,000
Totals	48,404	38,857	178,940	143,162

The Information Bureau was opened on May 20 and closed September 30, during which period 34,414 inquiries of all descriptions were dealt with, an increase of 14,459 over the season 1935 - 36.

With the advent of equipped bungalow camps, which are operated at various points in Banff Park by Private enterprise, the popularity of the public motor camp-grounds generally has decreased. Registration at the Tunnel Mountain camp-ground at Banff, however, showed an increase during the 1936 season, when 4,889 motor vehicles and 18,410 campers were accommodated. The number of person days spent in camp was 46,438, representing an average stay of 2.52 days a person.

The new Park Administration, Post Office, and Customs building was occupied during the early summer. Well situated at the head of Banff Avenue the building overlooks the town, and its landscaped gardens at the rear formed a popular point of interest for visitors. New registration buildings at the eastern end of the park were also completed, and the surrounding grounds modestly landscaped.

A close check was kept on all matters relating to sanitation, and health ordinances were strictly enforced. Samples of water and milk were periodically subjected to biological examination; and tuberculin tests made of dairy cattle found the latter free of disease.

A total of 18,906 licences and permits were issued during the fiscal year 1936 - 37, compared with 14,848 for the previous year. In addition, 39 building permits were issued for an estimated property value of $28,225.

Extensive improvements were carried out on the large pool at the Cave and Basin bath-house, and a small wading pool for children was constructed. A new office building constructed during 1935 - 36 was occupied by the staff. A total of 36,249 persons passed through the turnstile at the Cave and Basin Springs, an increase of 12,997 over the corresponding period for 1935 - 36. The total number of persons making use of the Upper Hot Springs bath-house during the year was 56,083, an increase of 2,078 over 1935 - 36.

In the vicinity of Banff mosquito control was resumed and during the spring and early summer a total of 2,957 gallons of oil was distributed in potential breeding places.

All main highways were repaired and maintained during the year. Two miles of the road forming a section of the Trans-Canada Highway was improved by re-alinement, widening, and regrading. The park highways and streets in the town of Banff were treated with 154,191 gallons of dust-layer oil. Good progress was made in the construction of the Banff-Jasper Highway, a total of 8.27 miles having been constructed to grade within Banff Park during the year.

Improvements were made to the Cascade, Healy Creek, and Bow River trails, and to the trail around the canyon on Howse River. Other park trails were maintained.

A new forest telephone line approximately 3 miles in length was constructed from the Banff-Castle motor road to the Mount Norquay skiing area. The balance of the system, consisting of approximately 225 miles of line, was kept up to standard.

The fire hazard was high owing to the dry summer, and in spite of precautions exercised fifteen fires and one railway fire were reported, a total area of 7,649 acres being burned over. Three of these fires, located in the Cascade River, Mistaya River, and Howse Pass regions, respectively, assumed serious proportions, and were extinguished with some difficulty. The other fires were quickly suppressed.

The park museum, situated in the former Administration building, continued to attract many visitors.

Observations by park officials indicate that big game is increasing, particularly in the case of Rocky Mountain sheep and deer, which were very numerous in the vicinity of Banff. Elk and moose appear to have increased and black bear were plentiful.

The stocking of lakes and streams in the park has resulted in greatly improved conditions, notably in Redearth, Fortymile, Corral, and Cascade Creeks; and Taylor and Larch Lakes, and Lehman Lake, once barren of fish, now contain some of the largest cut-throat trout in the park waters. During the year the waters along the route of the Banff-Jasper Highway, including Bow, Peyto, Hector, Mistaya, and Waterfowl Lakes, were stocked with suitable species.

Distribution of eggs, fry, and fingerlings from the Banff fish hatchery during the past year were made as follows: in park waters-cut-throat trout, 535,000; rainbow trout, 91,000; salmon trout, 96,000; speckled trout, 256,000; total, 978,000. In provincial waters-brown trout, 456,000; cut-throat trout, 487,000; rainbow trout, 559,000; Kamloops trout, 95,000; total, 1,597,000. The grand total distributed was 2,575,000.

The Dominion Ski Championships held on the slopes of Mount Norquay from March 5 to 8, 1937, attracted competitors and spectators from the United States and other foreign countries, as well as from different parts of Canada. It is estimated that 5,000 persons were in attendance on Sunday, March 7. Extensive improvements carried out by the Parks Bureau resulted in the completion of a fine downhill course 1 1/2 miles long, and a championship Ski jump.

The annual winter carnival was held at Banff from February 10 to 13. The annual bonspiel of the Banff Curling Club took place during the week of February 8. The annual Indian Days Celebration was staged in Banff for a 3 - day period in July, providing an interesting spectacle for visiting tourists.

CAPE BRETON HIGHLANDS NATIONAL PARK

Established in 1936, Cape Breton Highlands Park is a typical example of the rugged coastline of Cape Breton Island. Its mountain background and remarkable seascape are visible from the motor road that crosses the park. The park has an area of 458 square miles, contains 55 miles of motor highways, and recreations include fishing, boating, bathing, and hiking,

The establishment of the Cape Breton Highlands National Park in Nova Scotia added a new type of scenic and recreational unit to Canada's system of national playgrounds - a seashore park. The new park is situated in the counties of Victoria and Inverness, in the northern part of Cape Breton Island. Its western boundary is formed by the Gulf of St. Lawrence and on the north and east the park is bounded roughly by the Atlantic Ocean.

The park is reached by a motor road known as the Cabot Trail, which contracts with the main provincial highway system of the province. Entrance may also be made over an eastern route leading through the famous Bras d'Or Lake region to Ingonish, and over a western route by way of the well known Margaree Valley to Cheticamp.

The park embraces some of the finest maritime scenery on the Atlantic seaboard. Steep, well-timbered hills rise sharply from the sea to a height of 1,200 to 1,700 feet, and picturesque headlands and capes jut out into the water to form delightful bays and sandy coves. From the Cabot Trail, which follows the shoreline of the Gulf of St. Lawrence and traverses the height of land eastward to Cape North settlement, the road passes through a region of well-wooded, rolling hills, which in appearance greatly resemble the Highlands of Scotland. From Cape North the highway runs in a southeasterly direction, and after touching Neil Harbour on the Atlantic Ocean continues south to the villages of North Ingonish and South Ingonish, which are located near the southern boundary of the park. The interior of the park is a rolling plateau or moorland, dotted with many little lakes. The region, according to historic records, was once the home of great herds of caribou.

A resident superintendent is located at North Ingonish and a park warden service, responsible for fire and game protection, has been organized. Development work was commenced on a small scale toward the end of the season, and for the most part was confined to the reconstruction and revision of portions of the Cabot Trail, which links together the main settlements in the region of the park, including North Ingonish and South Ingonish and the Cape North Settlement on the eastern watershed, and Pleasant Bay and Cheticamp across the height of land on the west.

The region surrounding the park already is very popular with motor tourists, and although no attempt was made during the year to tabulate registrations, it is estimated that several hundred automobiles travelled over the Cabot Trail between Cheticamp and Ingonish. Many were from the United States. The picturesque villages and fishing ports of the vicinity are popular centres of attraction for artists, and the nearby waters present fine opportunities for deep-sea angling. The fishing ports situated along the eastern coast of Cape Breton Island provide access to the finest sword-fishing grounds on the Atlantic Coast.

GEORGIAN BAY ISLANDS NATIONAL PARK

The park includes thirty islands in the Georgian Bay Archipelago, many of which provide recreational opportunities for camping, fishing, boating, and bathing. Unique limestone formations give Flowerpot Island its picturesque name. The park was established in 1929 and has an area of 5.37 square miles. Beausoleil Island, north of Midland and Penetanguishene, is the largest of the island group, and on it are located the park headquarters, camp-sites, and other tourist attractions.

During the past year 4,878 persons visited Beausoleil and Flowerpot Islands, a decrease of 643 from last year's attendance. Improvements carried out for the convenience of visitors on Beausoleil Island included the construction of large docks at Rockview Beach and Frying Pan Bay, and the main dock at headquarters was extended. A small lighthouse, which provides a beacon light visible for a distance of 6 miles, was erected on the main headquarters dock. Shelters were erected at Godette's Grove and at Champlain Point.

Improvements carried out on Flowerpot Island included the construction oil a pavilion equipped with rustic tables, seats, and a flagstone floor. Trails were cleared and.extended, and entrances constructed to two caves. The entrance to the small harbour on the south side of the island was deepened.

An increase in the number of deer inhabiting Beausoleil Island was noted, and red fox were reported to be quite numerous. Partridge, black squirrel, and many species of bird life were also more numerous.

GLACIER NATIONAL PARK

This park, with its snow-capped peaks, and immense ice-fields, luxuriant forests, alpine flora, and subterranean caves, is typical of the Selkirk Mountains region. It is the centre for alpine climbing, and in 1936 - 37 attracted an estimated total of 1,200 visitors. The park was established in 1886 and has an area of 521 square miles. Glacier National Park is not accessible to the visitor by motor highway, and, lacking facilities for accommodation, is visited by only a limited number of tourists.

Throughout the year the trails were maintained. Three bridges on the Beaver River trail were reconstructed. A new warden's cabin was completed at Stony Creek, and buildings at Glacier were re - Conditioned and painted.

Five small fires were reported in the park during the year.

Wild animal life is abundant, due to the ideal sanctuary conditions prevailing, and increases in many species were reported. Large herds of caribou were observed in the vicinity of Bostock Creek and Baloo Pass, and mule deer

and Rocky Mountain goat were common. A gratifying feature was the increase in moose and elk species, which some years ago were practically unknown in the park area. Grizzly and black bear, as well as beaver and marten also were plentiful. Predators, including coyote and wolverine, were scarce.

Among the predominant species of bird life were ptarmigan and blue grouse.

JASPER NATIONAL PARK

This mountain wilderness, on the eastern slopes of the Rockies, is rich in historical associations and contains many majestic peaks, alpine valleys, glaciers, canyons, and beautifully coloured lakes. Outstanding points of interest include Mount Edith Cavell, Maligne Lake, Tonquin Valley, and Miette Hot Springs. The park is a big game sanctuary and alpine playground, and recreations include motoring, riding, hiking, climbing, fishing, bathing, tennis, golf, and skiing. Motor highways extend for 140 miles through the park and trails cover 519 miles. The park was established in 1907 and has an area of 4,200 square miles.

A gratifying increase in the volume of tourist travel to Jasper National Park was registered during the fiscal year 1936 - 37. A total of 14,659 visitors entered the park during this period, an increase of 3,678, or 33 per cent, over the figure for 1935 - 36. Improved conditions on the Edmonton-Jasper Highway were mainly responsible for an increase in motor travel, as 1,175 motor vehicles and 3,589 passengers were registered at the park entrance. Rail traffic also showed a substantial gain, 11,070 persons entering the park in this manner, compared with 8,721 in 1935 - 36.

The main streets in Jasper townsite were maintained in good condition, and treated with two applications of dust-laying oil. Tree planting was carried out on the boulevards. Owing to the light snowfall during the winter of 1935 - 36, the water in Cabin Lake, from which the townsite supply is drawn, was much lower than usual during the summer. This condition was overcome by constructing a ditch from High Lake, 2 miles up the valley to an old watercourse, and the subsequent flow restored the waters of Cabin Lake to normal level.

Licences and permits to the number of 3,096 were issued during the year, an increase of 1,472 over the corresponding period for 1935 - 36.

All park roads were maintained in good condition. Work was carried out on the Maligne Canyon and Pyramid Lake roads, both of which were oiled. The Mount Edith Cavell Highway was widened between miles 15 1/2 and 17 1/2, and also gravelled where required. Construction on the Jasper end of the Banff-Jasper Highway was advanced to mile 55.8, approximately 7.8 miles having been completed to grade during the year. The bridge over Snake Indian River was repaired, and one of the scenic bridges at Maligne Canyon was rebuilt, and repairs carried out on two others.

Only two of the park motor camp-grounds - those situated at Patricia Lake and Medicine Lake - were open to the public last year, but registrations at both these points were greater this year. Figures for these areas follow: Patricia Lake, 158 cars and 581 campers; Medicine Lake, 40 cars and 119 campers.

The camp-ground at Cottonwood Creek, although closed for the season, was improved by the installation of water services and sanitary conveniences and the levelling of the grounds. Improvement to the camp-grounds at Patricia Lake was also undertaken.

A new auto bungalow camp, consisting of 25 cabins, with electric light and running water, was constructed by private enterprise on the banks of Athabaska River, adjoining the park camp-ground at Cottonwood Creek.

A new residence in Jasper townsite for the Park Superintendent was completed in July, together with a garage and storehouse, and a new fire-hall was erected. A permanent water supply system was installed in the cottage of the caretaker at the Eastern Park gateway. Progress was made in the construction of a bath-house and pool at the Miette Hot Springs. A concrete pool, 30 feet by

75 feet, and from 3 to 8 1/2 feet deep, was completed during the year. Dressing rooms, shower rooms, steam room, and a hot plunge also were in course of construction. A small shelter cabin was erected at Wolverine Creek, in Smoky River area, to accommodate park wardens on winter patrols.

Nine miles of secondary trail was constructed from Athabaska Falls to Fryatt Creek, and was used by members of the Alpine Club of Canada in reaching the camp-site in Fryatt Creek Valley. A standard trail also was constructed between Jasper and Pyramid Lake, which provides, along the way, fine views of Lac Beauvert and Lakes Edith and Annette. The forest telephone system in the park was extended a distance of 2 miles by the construction of a line from Jasper to the Patricia Lake automobile camp-ground.

A total of sixteen fires was reported, three of which reached serious proportions before they were extinguished. The most serious outbreaks occurred on the Medicine Lake-Maligne Lake trail and at Caledonia Lake. Two small railway fires were reported.

No serious losses were noted among the game animals during the year. Elk, moose, mule deer, Rocky Mountain sheep and goat, and caribou are apparently thriving. Grizzly bear were more numerous, and fine specimens of black and brown bear were observed in the vicinity of Jasper Park Lodge. Of the fur-bearing animals, beaver, otter, and lynx were the most plentiful. Coyote, wolverine, and cougar were less common.

Fishing conditions in Jasper Park waters were good. The Medicine-Maligne Lakes system was popular with fishermen, and 973 free permits for this area were issued, an increase of 23 over the corresponding period in 1935. Many of the large lakes in the vicinity of the town of Jasper were stocked with rainbow trout fry, as a result of investigations carried out in 1935 by Dr. C. M. Mottley of the Biological Board of Canada. Rainbow trout fry hatched in the Jasper Fish Hatchery were distributed as follows: in park waters, 428,000; in provincial waters, 175,000; total distribution, 603,000.

The annual camp of the Alpine Club of Canada was held in Fryatt Creek Valley, about 9 miles south of Athabaska River Falls, from July 18 to August 4, and was attended by visitors from many countries.

Jasper Park offers opportunities for many varied forms of recreation, including riding, hiking, golf, tennis, motoring, fishing, and climbing in summer and skiing in winter.

Skiing was very popular in Jasper Park during the past winter, and seven parties registered out to the Tonquin Valley and Shovel Pass areas. A rest cabin has been erected in Little Shovel Pass by the Maligne Lake Ski Club, a local organization.

KOOTENAY NATIONAL PARK

This mountain park is on the west slope of the Rockies and encloses the Vermilion-Sinclair section of the Banff-Windermere Highway. It has many deep canyons, beautiful valleys, and hot mineral springs. Motor camp-grounds are provided and recreations include bathing, riding, hiking, and motoring. There are within the park 63 miles of motor highways and 117 miles of trails. The park was established in 1920 and has an area of 587 square miles.

In common with the adjoining areas of Banff and Yoho Parks, Kootenay National Park in British Columbia enjoyed a gratifying increase in tourist travel during the fiscal year 1936 - 37. A total of 16,668 motor vehicles and 53,004 persons entered the park, an increase of 4,099 motor vehicles and 12,557 persons over the year 1935 - 36. These figures are made up as follows: eastbound traffic, 7,609 motor vehicles and 23,717 passengers; west-bound traffic, 9,059 motor vehicles and 29,287 passengers. In view of the fact that many visitors enter Kootenay Park by highway at Vermilion Pass and return eastward to Banff Park without registering at Radium Hot Springs, 5 per cent of Banff Park's west-bound traffic, namely 2,044 motor vehicles and 6,792 passengers, has been included in the above figures.

During the past year, the Province of British Columbia, with Federal Government aid, commenced the hard-surfacing and improvement of the Provincial Highway, which forms the main avenue of travel from Kingsgate on the International Boundary to Radium Hot Springs, the park headquarters.

The park motor camp-grounds received good patronage during the year. At the Sinclair Canyon (Red Rock) camp-ground, records show that 1,336 motor vehicles and 4,794 persons were accommodated. The time spent in camp was 7,801 person days, or an average stay of 1.7 days a person.

The Government buildings in the townsite of Radium Hot Springs were painted and a stone retaining wall was constructed in terraces between the bathhouse and the Park Gateway building. The installation of a complete sewer system for the townsite and camp-ground was also completed. The bath-house and swimming pool at Radium Hot Springs were improved by the installation of new showers.

The Banff-Windermere Highway, which traverses the park from north to south, was maintained in good condition. Park trails were widened and re-located where necessary. Only one fire was reported during the year. This blaze, which was confined to an area of less than half an acre, was extinguished without damage to timber.

Big game in the park appears to be thriving. Rocky Mountain sheep and moose were common along the Banff-Windermere Highway, and elk are increasing in numbers. Black and grizzly bear were also plentiful.

MOUNT REVELSTOKE NATIONAL PARK

This park is situated on the alpine plateau that forms the summit of Mount Revelstoke on the western slope of Selkirk Mountains. It is accessible by a spectacular motor highway. A camping area has been laid out and the chief recreations are fishing and hiking. Motor highways total 19 miles, and trails, 35.5 miles. The park was established in 1914 and contains an area of 100 square miles.

The most westerly unit in Canada's system of National Parks, Mount Revelstoke Park, is a popular point of interest to tourists from the Pacific Coast and western United States. As there is no resident superintendent in the park, a supervised record of visitors is not maintained, but on the basis of registrations at the lookout station, situated on the summit of Mount Revelstoke, it is estimated that 7,188 persons entered the park during the year.

The park is reached from Revelstoke by a motor road, 19 miles in length, which winds up the side of the mountain and provides spectacular views along the way. Maintenance of this road, including widening, was carried on during the year. Rock retaining walls were built and park trail improvement included the 2 - mile trail overlooking Columbia River.

A number of serious fires occurred in the districts surrounding the park. One, which had its origin on the Big Bend Highway near Sixmile Falls, crossed the park boundary and burned over an area of approximately 1,200 acres before it was extinguished.

Owing to the elevation of the park area, practically all big game moves down to the lower altitudes during the winter. During the summer months, however, caribou and deer were, numerous, and increases were noted in grizzly and black bear. The former, for the most part, are confined to the Clachnacudainn Range. Smaller fur-bearing animals and grouse were very plentiful.

No re-stocking of park waters with fish was undertaken during the year. Fishing was opened in Lakes Eva and Miller, into which cut-throat trout had been introduced during the three previous seasons. Good catches were reported.

Mount Revelstoke Park possesses ideal facilities for skiing, and the annual carnival held under the auspices of the Revelstoke Ski Club in February was well attended. The public camp-ground situated on Balsam Lake was well patronized during the summer and 1,797 campers were accommodated, an increase of 291 over the previous year.

POINT PELEE NATIONAL PARK

This park occupies the most southerly mainland point in Canada. It is a recreational area noted for its unique flora and fine bathing beaches, and is the resting place for migratory birds during their seasonal flights. There is a motor camp-ground in the park and 7 miles of motor roads. The park was established in 1918 and has, an area of 6.04 square miles.

Tourist travel to Point Pelee National Park, Ontario, during the year exceeded all previous records. A total of 71,975 motor vehicles carrying 287,900 passengers entered the park, an increase of approximately 11 per cent over the previous year when 64,760 motor vehicles and 259,040 passengers were recorded. The figures for motor tourist travel to the park were made up of the following: Canadian motor vehicles, 29,445, carrying 117,780 passengers; United States motor vehicles, 42,530, carrying 170,120 passengers.

Point Pelee Park forms one of the most important bird sanctuaries in Eastern Canada, and the large marshes in the central part of the park offer a resting place and feeding ground for waterfowl during migrations to and from their nesting grounds in Northern Canada. Owing to shortage of water in the marshes, fewer ducks, geese, and swans were observed during the past year. Pheasants, which inhabit the park, were observed in large numbers, and black squirrels and rabbits were numerous. A serious fire broke out in August in the marshland area bordering the park, which was extinguished only after much difficulty.

A total of 1,046 camping permits were issued during the year, compared with 998 for the corresponding period in 1935 - 36. Duck shooting permits issued totalled 186.

PRINCE ALBERT NATIONAL PARK

Prince Albert National Park embraces 1,869 square miles of lake and forest land and contains a remarkable system of waterways and many interesting forms of wild life. The townsite of Waskesiu is used by residents of Saskatchewan as a summer resort and it is equipped with an up-to-date campground. Recreations are golf, tennis, fishing, bathing, canoeing, and boating. There are over 74 miles of motor highways in the park and 478 miles of trails. The park was established in 1927.

The growing popularity of Prince Albert National Park, Saskatchewan, was shown by a substantial increase in the volume of tourist travel during the year. A total of 6,799 motor vehicles and 25,327 persons entered the park, as against 6,056 motor vehicles and 21,292 persons during 1935 - 36. Although the greater number of these visitors were residents of Saskatchewan, tourists from five other Canadian provinces and twenty-four of the States of the Union also registered at the park gateway.

An extension to the Administration building at Waskesiu was made, which not only improved its appearance but provided additional accommodation. An extension was built to the Community hall situated in the park motor campground, and the construction of a camp for the accommodation of seasonal employees at Waskesiu Lake, comprising several buildings, wits completed. Improvements in the vicinity of the park breakwater resulted in better anchorage facilities for watercraft. Two streets in the townsite of Waskesiu were graded

and gravelled. The recreation field was improved by the construction of a drainage ditch which keeps this area quite dry. Four new tennis courts were laid out and surfaced with clay.

The number of visitors making use of the park camp-grounds showed an increase during the year. Accommodation was provided for 4,894, as compared with 4,216 for 1935 - 36. Registrations at the various camp-grounds follow: Waskesiu, 4,652; Kingsmere Lake, 87; Crean Lake, 155. Motor vehicles numbered 1,264, an increase of 327 over the corresponding period last year.

All thoroughfares were kept in good condition. A new scenic drive for park motorists was made available when the road to Waskesiu Narrows, 10 miles in length, was completed. The new road from Waskesiu to the Heart Lakes Portage was graded for its entire length of 7.5 miles, and, when gravelling is completed, will provide another delightful scenic drive along Waskesiu Lake. All existing trails were brushed and kept in condition.

The abnormally dry weather prevailing throughout northern Saskatchewan was responsible for a number of serious fires in Prince Albert Park. A total of twenty-two fires was reported within park boundaries. Aerial patrols carried out by units of the Royal Canadian Air Force were of great assistance in helping to locate and combat the fires.

Biological surveys of lakes and streams in the park were carried on by Dr. D.S. Rawson of the University of Saskatchewan. As an experiment, a number of black bass were released, before spawning, in Waskesiu and the Heart Lakes. Excellent catches of lake trout in Kingsmere and Crean Lakes were reported.

Big game animals in the park appear to be increasing, particularly moose, elk, and caribou. The deer population remains about the same. Smaller animals including beaver, fox, snowshoe rabbit, and weasel have increased A decrease in the number of sharp-tail grouse and Hungarian partridge was noted. Wolves in the northern part of the park are above normal in numbers. In August 1936 five buffalo from Elk Island National Park, Alberta, were released in an enclosure of about 40 acres near the park gateway.

The second nine holes of the park golf course were opened for play in August, and the course was well patronized during the season. A total of 2,233 single round tickets were issued, in addition to 106 daily, 61 weekly, 1 monthly, and 11 seasonal tickets. The annual park golf tournament, which is now known as the Lobstick Golf Tournament, was held in August, in which leading provincial players competed.

The eight tennis courts at Waskesiu, which are among the finest in Saskatchewan, were well patronized.

PRINCE EDWARD ISLAND NATIONAL PARK

Prince Edward Island National Park was established in 1936, with an area of 7.6 square miles. It embraces a coastline strip, over 20 miles, in length, on the north shore of Prince Edward Island and includes some of the finest sand beaches in Eastern Canada. It is being developed as a recreational area in keeping with National Parks standards.

RIDING MOUNTAIN NATIONAL PARK

This park is a rolling woodland, dotted with many sparkling lakes, on the summit of the Manitoba escarpment. It is a big game sanctuary, summer resort, and recreational area. Motor camp-grounds are provided and recreations include swimming, golf, tennis, bathing, and riding. A wild animal enclosure contains herds of buffalo and elk. The total length of motor highways is 84 miles and there are 100 miles of trails. The park was established in 1929, with an area of 1,148 square miles.

Registrations at the park gateways numbered 26,498 motor vehicles and 101,013 persons, compared with 24,148 motor vehicles and 93,895 persons for the fiscal year 1935 - 36. The previous record for a season's attendance was set in 1934 - 35 when 26,418 motor vehicles and 100,035 persons were registered. It is worthy of special note that the number of visitors from the United States and other countries showed an increase over the previous year. A total of 639 motor vehicles and 2,268 persons from foreign countries was recorded.

The popularity of the park as a meeting ground for conventions was maintained. Organizations that met in Riding Mountain Park during the season were the Manitoba Bar Association, Manitoba Pharmaceutical Association, Manitoba Dental Association, and many other groups, which included individuals prominent in the professional and social life of the province.

The tourist camp-ground at Wasagaming was well patronized during the past year, 5,378 persons being accommodated. A total of 91,593 person days were spent in camp, averaging 17 days a person. An increase in the number of motor trailers making use of the camp-ground resulted in a demand for electrical distribution lines with which to service these travelling caravans. Extension and maintenance of the camp-ground were carried out. The completion of the water and electrical distribution systems in the camp-ground added greatly to the convenience of those in camps. Water is on tap in all kitchen shelters. Development work at the Lake Katherine camp and picnic ground was completed. This area, which is situated about 4 miles east of Wasagaming, was popular as a picnic resort, although camping during the year was limited. Temporary camping accommodation was also arranged at Moon Lake, along the new Clear Lake Dauphin Road.

Improvement of the park townsite and the extension of municipal services were carried out during the past year. The fire-hall and staff quarters, were completed, and good progress was made on the construction of an incinerator. Streets and walks were graded and surfaced and grounds improved in the vicinity of the Government work shops. The electrical distribution system for the townsite was completed, service connections made, and ornamental lighting fixtures placed on the breakwater and central park areas. Other improvements carried out included the completion of a water system that supplies water at all points in the townsite and camp-grounds. A sewage disposal system was constructed for the business section of Wasagaming, and sewers laid to serve a part of the section. General operation of municipal services and maintenance of streets, walks, Government buildings, and grounds was also carried on. Development work carried out by private enterprise included the construction of a motion picture theatre.

There are at present 179 privately owned cottages and 20 business establishments in Wasagaming, and 20 additional cottages on the north shore of Clear Lake. Government buildings total 86.

During the year 5,271 licences and permits were issued.

A total of 32 miles of newly constructed highway was opened during the year. The Clear Lake-Dauphin Highway between Clear Lake and a point on the northern boundary of the park, and the North Shore Road revision, which connects the former with the Norgate Road, were the most important avenues of travel made available for use. The popularity of the Dauphin-Clear Lake Road as an entrance to the park was evident, as 7,088 cars with 24,250 passengers were registered at the northern gateway. Roads were maintained during the year and the busiest sections of the highways were treated with oil. A new entrance gateway, of standard design, was constructed at the park boundary on the Clear Lake-Dauphin Road.

Although no extensions to the park telephone lines were made, maintenance of the 150 miles of existing line was carried out; also approximately 100 miles of trails in the park.

Twenty-one fires were detected and extinguished on park lands, and one fare adjacent to the park was also controlled. Fires in the park area covered 2,542 acres and that adjoining the park 195 acres. Several of these fires were of incendiary origin, and although costly to control, were confined to meadows and previously burnt areas. Air patrols were carried out by the Royal Canadian Air Force and proved of the utmost value in locating fires.

Conditions in the park were favourable for wild animal life. Moose, deer, and elk were reported by the warden staff to be in excellent condition, and observations indicate an increase in these species. During the late winter racks were kept filled with feed for elk and deer. Coyotes were present in the park. Rabbits were on the decline. Bird life in the park was normal, and ducks, geese, swans, cormorants, and pelicans were represented in migratory waterfowl passing through the park. The exhibition herd of buffalo placed in the enclosure at Audy Lake in 1931 have increased, and on March 31, 1937, numbered 65 head. A number of elk have been removed, leaving 52. Other species enclosed include 4 mule deer, 4 white-tailed deer, and 5 moose. Over 3,600 people visited the enclosures.

Fish rearing ponds were constructed in a small creek on the north shore of Clear Lake, and arrangements have been completed for the placing of rainbow trout fry in these ponds. They will eventually be liberated in Clear Lake.

The broad sandy beach at Wasagaming provided ideal swimming under the supervision of a lifeguard. The park tennis courts at Wasagaming were well patronized, the fourth annual tennis tournament sponsored by the Wasagaming Board of Trade attracting an entry of 150 competitors.

The park golf course, situated at the eastern end of Clear Lake, was used extensively both by local players and visitors. A total of 5,612 single-round tickets were sold, in addition to 128 daily, 48 weekly, 5 monthly, and 8 seasonal tickets. Improvements to the course included re-location of a part of the fourth fairway and green. Fairways were top dressed and approaches smoothed out. The piping for the water system was re-laid and a distribution line constructed between the golf course and the power plant at Wasagaming. The Manitoba Amateur Golf Championship Tournament was held on the park course in July, marking the first occasion on which this event has been staged elsewhere than in Winnipeg. The tournament attracted a large entry, including leading players of the province. The annual tournament of the Wasagaming Golf Club was held in September, which also drew a representative entry.

ST. LAWRENCE ISLANDS NATIONAL PARK

St. Lawrence Islands National Park is composed of thirteen islands among the "Thousand Isands" of St. Lawrence River, together with a mainland reservation at Mallorytown Landing, Ontario. These island parks form delightful recreational areas for campers and picnickers; and several of the larger islands, notably Beau Rivage, are used extensively for the summer camps of Girl Guides and similar organizations. Each island or group of islands is in charge of a caretaker, who is responsible for the care and maintenance of the docks, shelters, campstoves, and other conveniences that have been provided for visitors. The park was established in 1914, and contains 185.6 acres.

During the past year it is estimated that 16,800 visitors made use of the island parks, an increase of more than 4,000 over the season of 1935. In addition to the usual maintenance work carried out, new pavilions were erected on Aubrey and Grenadier Islands during the year.

WATERTON LAKES NATIONAL PARK
(Canadian Section, Waterton-Glacier International Peace Park)

Waterton Lakes Park is a mountain playground of unusual charm, on the east slope of the Rockies. Its varied flora and fauna, and the opportunities for such forms of recreation as swimming, boating, climbing, hiking, riding, golf, and tennis make it extremely popular. There are 44.5 miles of motor highways in the park and 236 miles of trails. It was established in 1895 and has an area of 220 square miles.

For the third successive season a gratifying increase was registered in the number of persons visiting Waterton Lakes National Park, Alberta. A total of 59,546 persons, which is a new high record, entered the park during the fiscal year 1936 - 37, an increase of 11,769, or almost 25 per cent, over the year previous. Motor vehicles to the number of 14,032 passed into the park, of which 9,104 were Canadian, and 4,928 were from the United States and other countries.

The new Chief Mountain International Highway, which directly connects Waterton Lakes Park with Glacier National Park, Montana, was opened in June 1936. The Canadian Customs port of Chief Mountain, situated on the International Boundary, was opened by the Department of National Revenue on June 15 and closed October 15, 1936. During this period 6,001 motor vehicles and 22,311 persons entered Canada by this port of entry, indicating the popularity of the new avenue of travel.

A notable event was the ceremony attending the dedication of the Waterton-Glacier International Peace Park, which took place at the Prince of Wales Hotel in Waterton Park on July 4, 1936. This ceremony complemented a similar one held in Glacier National Park, Montana, on June 18, 1932, and was carried out under the direction of Rev. Canon S.H. Middleton of Cardston, Alberta.

On July 5, 1936, a memorial cairn, erected to the memory of John George "Kootenai" Brown, first white settler in the park and later acting superintendent, was unveiled by His Honour the Lieutenant Governor of Alberta.

The Prince of Wales Hotel, the largest hostelry in the park, which had been closed for several seasons, was opened on June 27, and was well patronized during the year.

Streets in the park townsite were maintained in excellent condition and treated with two applications of dust-laying oil. The flagstone sidewalk constructed the year previous was extended from Waterton Avenue along Cameron Falls Drive for a considerable distance. The new Administration Office was completed during the year. An addition was made to the men's bathhouse at Lake Linnet bathing beach, and the women's bathhouse was completed and painted. Installation of a new water system for the townsite was, commenced, and approximately 1,400 feet of pipe was laid.

The Information Bureau was open from June 15 to September 15, during which time 7,914 inquiries were given attention. This total was made up as follows: Canadian, 3,484; United States and foreign, 3,608; telephone calls, 278; miscellaneous, 545.

The park camp-grounds at Waterton Park, Cameron Lake, and Red Rock Canyon were well patronized during the year. The new Community building in the main campground was completed with the laying of a flagstone floor. All buildings in the main camp-site were wired for electric light, which was available from the latter part of June to the end of the season. A new Community building also was erected at Cameron Lake campground. Caretakers were employed during the season at Cameron Lake and Red Rock Canyon in addition to the main park camp-ground. A total of 2,266 persons registered at Waterton Park camp-ground, and the average stay was 10.8 days a person.

A section of rock retaining wall was rebuilt on the Akamina Road, which was also graded and re-surfaced where necessary. The Pass Creek Road was widened between miles 5 and 6, graded throughout, and gravelled. The Chief Mountain International Highway was given a light application of dust layer over its entire length. The construction of a new bridge over Cameron Creek below Cameron Falls was completed.

Extensive repairs were carried out on trails in Belly River district and extensions to the Bertha and Hell Roaring trails constructed. A new trail to Rowe Lake was cleared, and work was commenced on a trail to Lost Lake. Park telephone lines were maintained in good condition, and the line to Yarrow Creek was rebuilt. Repairs were also made on the Belly River line.

A total of 2,211 head of stock were grazed under permit, an increase of 290 compared with 1935 - 36.

Fishing conditions in the park were very satisfactory during the year. Good catches of cut-throat and rainbow trout were reported, and a lake trout weighing more than 21 pounds was taken from Upper Waterton Lake. Angling was also popular at Cameron, Bertha, Alderson, and Twin Lakes. During the season Crypt Lake, at the head of Hell-roaring Creek, was opened for the first time, and good catches of cut-throat trout were reported. Experimental work undertaken at Pass Creek, to improve fishing conditions in that area, included the construction of five dams to provide fish pools. During the fiscal year the following distribution of eggs, fry, fingerlings, and mature fish was made from the Waterton Fish Hatchery: in park waters - cut-throat trout, 397,000; rainbow trout, 70; total, 397,070; in provincial waters - cut-throat trout, 168,000; rainbow trout, 637,000; total, 805,000. Combined total, 1,202,070.

Wild animal life in the park continued to increase, with the exception of snowshoe rabbit, which appear to be decreasing in numbers. Rocky Mountain sheep and Rocky Mountain goat were more numerous than usual, and mule deer and elk are also increasing within the park area. Fur-bearing animals, including badger, ermine, marten, mink, marmot, muskrat, and beaver, were also evident in large numbers. Coyotes were more numerous than usual.

Three fires occurred in the park during the year, all of which were suppressed before serious damage had resulted. Assistance was rendered to the United States Park Service in extinguishing a serious fire in Glacier National Park, which threatened Many Glaciers Hotel on Swiftcurrent Lake.

Nine holes on the park golf course were maintained in good condition throughout the season, and a large tank and water system were installed for use on the greens. The park tennis courts were extensively patronized and were kept in good condition by treatment with chemicals. A wading pool was constructed for children in the playground area. The Lake Linnet bathing beach was very. popular and a lifeguard supervised swimming throughout the season.

YOHO NATIONAL PARK

Yoho Park on the west slope of the Rockies contains the famed Yoho Valley with its numerous waterfalls; the Kicking Horse Valley, and Lakes Emerald and O'Hara. Motor highways have a total length of 47 miles; and trails, 180 miles. Established in 1886, the park has an area of 507 square miles. Visitors in 1936 - 37 totalled 64,461.

Yoho Park receives a large volume of motor traffic from Banff Park by way of Kicking Horse Pass which is not registered at the Leanchoil gateway. However, an automatic registration device installed west of the park boundary recorded a total of 13,498 motor vehicles during the season, which, on the basis of four persons a vehicle, accounted for a total of 53,992 passengers.

Eastbound motor traffic entering the park at Leanchoil included 2,737 motor vehicles and 7,969 passengers, compared with 2,348 motor vehicles and 6,607 passengers in 1935 - 36. Westbound motor traffic through the Leanchoil gateway,

which is not included in the compilation of tourist statistics, comprised 4,138 motor vehicles and 11,811 passengers, compared with 3,418 motor vehicles and 9,716 passengers in 1935 - 36. It is estimated that an additional 2,500 persons entered the park by rail.

Increased use was made of the park motor camp-grounds by the public. A total of 1,159 motor vehicles and 4,521 persons used the various camp-grounds as follows: Kicking Horse camp-ground, 1,069 motor vehicles and 4,219 persons; Field camp-ground, 33 motor vehicles and 100 persons; Chancellor Park campground, 57 cars and 202 persons.

During the year the construction of a new caretaker's lodge was commenced at the Kicking Horse camp-ground.

The main park highway, known as the Kicking Horse Trail, was improved by widening at several points, by the replacement of small bridges by steel culverts, and by general maintenance. A new bridge was also constructed over Sherbrooke Creek to replace the existing one. The branch roads leading to Emerald Lake and up Yoho Valley were repaired and improved by widening and reduction of curves. Grading of the Ottertail Road was also undertaken early in the season. A total of 12,560 gallons of oil was distributed on the streets and roads of the park.

Improvements to the park trail system included the re-location and grading of the trail from the Emerald Lake Road to Amiskwi Meadows, a distance of 18 miles, which involved the construction of nine pony bridges. Two miles of the Burgess Pass trail also were relocated and graded.

In addition to general maintenance of the park telephone system, the line from Hector west was re-located for a distance of 5 miles and new wiring installed.

No serious fires occurred within the park during the year. Seven fires reported were extinguished before great damage resulted. An additional six railway fires were extinguished, one of which burned over an area of 2 acres of grass land.

Increases in game animals were evident in Yoho Park. Rocky Mountain goat and moose appeared to be plentiful. Elk are increasing rapidly, apparently coming into the park from Banff Park. Predatory animals were very scarce.

A total of 91,400 rainbow trout fry was distributed in Wapta, Emerald, and O'Hara Lakes, and in Kendall and Cataract Creeks. Fishing conditions in park waters on the whole were very good.

Animal Parks

BUFFALO NATIONAL PARK

This fenced enclosure near Wainwright forms the largest wild animal preserve in Canada, and is the home of a plains buffalo herd numbering roughly 5,000 bead, as well as smaller herds of moose, deer, elk, yak, and hybrids. There are 2 miles of motor highways in the park and 55 miles of trails. Established in 1908, the park has an area of 197.5 square miles.

A total of 10,557 persons visited the park during the year, compared with a total of 11,133 for the corresponding period in 1935 - 36. The recreational area at Mott Lake was extensively patronized by bathers and picnickers.

Drought conditions during the late spring and early summer seriously affected grazing conditions on the summer range. Grazing, however, was not permitted in the winter quarters, and this area was in good condition when occupied by the buffalo in the autumn.

Approximately 435 acres were seeded to oats, but owing to lack of moisture the yield was light. Returns from farm operations for the year included: oats,

2,559 bushels; brome grass seed, 200 bushels; green feed and straw, 70 tons; hay, 175 tons. In addition, 1,300 tons of slough hay was procured from the Ribstone meadow, and 10O tons were cut and stacked at other points in the park.

A survey of pasture conditions made it advisable to relieve congestion by the slaughter of 1,500 head of buffalo. Operations were carried out in the new park abattoir during December and the early part of January, when the animals were in best condition. The meat and hides were placed on the market.

The cross-breeding experiment which has been carried on by the Dominion Department of Agriculture in Buffalo Park for a number of years was continued, and some valuable information obtained.

A donation of twenty-five elk was made to the Government of Saskatchewan during the year and the animals shipped to Maple Creek. One male elk was also forwarded to the zoological gardens at Charlesbourg, Quebec. Three buffalo specimens, including a bull, cow, and calf, were forwarded for mounting purposes to the Provincial Museum at Quebec City.

At the close of the fiscal year 1936 - 37 the number of animals in the park was as follows: buffalo, 4,476; elk, 1,541; moose, 121; mule deer, 1,242; yak, 32; hybrid live stock, 33; a total of 7,445 head. Coyotes were more numerous than usual in the vicinity, and fifteen were destroyed by the park warden service.

A new abattoir was constructed to replace the building destroyed by fire in November 1935. A new well was drilled on the western side of the main range to provide water for park animals. The main highway to the Wainwright entrance was gravelled, and approximately 55 miles of prairie trails maintained.

Repairs were carried out as required in the maintenance of approximately 120 miles of 8 - foot, and 10 miles of ordinary, fence, as well as 36 miles of telephone line. Fence repairs included the replacement of 1,558 fourteen-foot and 115 eight-foot posts, and the re-setting of approximately 6,000 old posts. A total of 55 telephone poles were installed and 50 re-set.

No fires occurred in the park during the year. As a fire protection measure approximately 140 miles of 20 - foot fireguard were ploughed. Brush was cleared from the strip of land between the parallel ploughings.

As a result of continued drought conditions in the districts many sloughs have dried up and, consequently, the number of waterfowl in the park has declined. Canada geese, ducks, and swans were observed on the lakes of the park during the spring and autumn migration periods. There was also a noticeable decrease in Hungarian partridge in the park, but pin-tailed grouse were more numerous.

Permits for a total of 525 cords of dry wood and 6,500 green willow pickets were issued during the year to settlers in the vicinity of the park. The unfenced part of the park along the valley of Battle River was again leased for grazing purposes.

ELK ISLAND NATIONAL PARK

This park consists of a fenced enclosure, near Lamont, containing over 2,000 buffalo, also moose, deer, and elk. A recreational area has been developed and opportunities provided for golf, camping, bathing, and boating. Motor highways have a total length of 16 miles, and trails 4 miles. The park was established in 1911 with an area of 51 square miles.

Although originally established as a big game preserve, Elk Island National Park, Alberta, in recent years has developed into a very popular recreational resort. During the year under review, the number of visitors to the park was 46,295, compared with 44,767 for the corresponding period last year. The total number of motor vehicles entering the park was estimated at 10,933.

The herds of big game animals in the park, which include buffalo, elk, moose, and deer, were in good condition throughout the year, and increases in all species were registered. During the year five buffalo were shipped to Prince Albert National Park as the nucleus of a small exhibition herd, and eight head were disposed of to a zoo at San Simeon, California. At the close of the fiscal year the park, which is completely enclosed, contained the following big game animals: buffalo, 2,039; elk, 1,997; moose, 774; mule deer, 261.

All main park thoroughfares were maintained in good condition, and the North Gate and South Gate roads were re-surfaced over a total distance of 15 miles. Roads in the vicinity of Sandy Beach, the park recreational area, were oiled, with satisfactory results. The park fences, which consist of 35 miles of main fencing and 7 miles of cross fencing, were maintained. The main fence forming the southern boundary of the park was relocated to conform to the legal boundary of the park which is the surveyed Provincial Highway. New gates were erected at the southern and western entrances to the park. All fireguards that parallel the park fence on the outside were ploughed. Approximately 550 tons of green feed was harvested in the park.

An investigation of the waters of Astotin Lake was carried out during the year by Dr. D.S. Rawson of Saskatchewan University, to determine the possibilities of stocking the lake with suitable species of fish.

In addition to the big came animals, numerous other species inhabit the park. Coyote, weasel, muskrat, porcupine, rabbit, squirrel, gopher, and shrews were observed, as well as many varieties of bird life. Blue heron, which nest on Crane Island in Astotin Lake, were again numerous, and other species of waterfowl were observed in increased numbers.

The picnic grounds and recreational areas at Sandy Beach and the park headquarters were extensively used by visitors. Swimming, bathing, and boating were popular, and 134 permits were issued for,camping at Sandy Beach campground.

The park golf course was maintained in good condition, and an attractive golf club-house was completed late in the year. During the year 1,367 golf tickets were issued.

NEMISKAM NATIONAL PARK

Nemiskam National Park, Alberta, is a fenced reserve of 8.5 square miles, established in 1922 for the protection of pronghorned antelope, of which it has a herd of 375. During 1936 - 37 twenty-nine persons visited the park.

Range conditions on the park were poor during the past year. A hot dry summer season greatly curtailed the natural food supply, and during the winter snow and crust impeded grazing. The antelope, however, were fed daily from December to March and came through the winter in excellent condition. There are now approximately 375 head in the park, an increase of 25 over last year's total.

WAWASKESY NATIONAL PARK

Wawaskesy National Park in southern Alberta, an unfenced reserve comprising 54 square miles, was established in 1922, as a sanctuary for pronghorned antelope, a species native to the region.

During the past year range conditions in the park improved, and the antelope frequenting this area were reported in fine condition. Although an actual census is not feasible owing to the nature of the preserve, it is believed that more than 500; antelope were in the park during the winter of 1936 - 37. An open hunting season of three weeks' duration for antelope was established by provincial authorities last autumn, and resulted in large numbers of antelope seeking safety in the park. Coyotes and other Predatory animals were quite scarce.

Historic Parks

FORT ANNE NATIONAL PARK

This national historic park at Annapolis Royal is on the site of the early Acadian settlement of Port Royal. It contains a historical museum with a fine library. Established in 1917, the park has an area of 31 acres. Visitors, in 1936 - 37 totalled 16,364.

Fort Anne National Park is one of the most notable of Canada's historic places. The fort today includes well-preserved earthworks and a large building erected in 1797, during British occupation. The building was restored in 1935 and serves as a museum.

Increased interest in Fort Anne and its associations was evident, as 11,364 persons visited the museum during the past year, an increase of 3,135 over the figures for 1935 - 36. In addition, it is estimated that approximately 5,000 persons who did not register visited the grounds.

Several travel tour group, from the United States came to Annapolis Royal during the season, and members availed themselves of the opportunity of going through the park museum and grounds.

A number of interesting donations were made to the park museum during the year. These included: a small leather-bound notebook that belonged to Stephen Rodda, surgeon-barber at Annapolis Royal in 1744 - 45, which records the attacks on the fort by Du Vivier and Marin during those years; a bicycle constructed about 1860 and used in the vicinity; a charcoal-burning flat iron; a tunic and sash worn by a member of the Duke of Wellington's Regiment, a detachment of which formed the last garrison of Fort Anne in 1854; a large framed picture of Queen Victoria; and an early model clothes wringer.

Photostat copies of plans, of Annapolis Royal and vicinity were also acquired from the Public Archives of Canada at Ottawa. Other acquisitions included books for the Museum library, including The Great War, in four volumes, by Right Honourable Winston Churchill.

The colours presented to the Annapolis Regiment by the late Hon. Robert E. Harris were placed in the museum for safe keeping, and are on display in the ante-room in a glass case.

FORT BEAUSÉJOUR NATIONAL PARK

This national historic park, near Sackville, is on the site of a French fort erected prior to 1755. It contains a historical museum with interesting exhibits. The park was established in 1926 and has an area of 59 acres.

Fort Beausejour National Park, situated on the Isthmus of Chignecto, New Brunswick, contains an area of 59 acres and preserves the ruins of a French stronghold constructed in 1751 - 55. The fort was captured by a New England force, assisted by a few British regulars under Monckton, in 1755, and re-named Fort Cumberland and later enlarged. On the acquisition of the site as a National Historic Park by the Department in 1926, the original name was selected for this historic area. The old fortifications, both French and English, consist chiefly of earthworks and are in a very good state of preservation, and the park holds much of interest to students of early Acadian history. During the past year approximately 20,000 persons visited the park.

The outstanding feature of the year was the official opening of the new historical museum. This was held on August 1, 1936, and was attended by more than 5,000 persons, among whom were many prominent in the political, social, and business life of the Dominion. The ceremonies were carried out under the

chairmanship of Dr. J.C. Webster, C.M.G., of Shediac, New Brunswick, a member, of the Historic Sites and Monuments Board of Canada, and honorary curator of the museum.

The museum, which is constructed of stone, with a copper roof, contains a wealth of historical exhibits, both civil and military, relating to the Isthmus of Chignecto. Included are very complete groups of maps and plans, portraits, coats-of-arms, and military uniforms which have been donated to the museum by Dr. J.C. Webster, the honorary curator. Many other exhibits have also been loaned or donated to the museum, especially by natives of Cumberland County, Nova Scotia, and Westmorland and Albert Counties, New Brunswick.

During the past year a number of improvements were effected in the museum grounds and vicinity. The entrance gateway to the park was widened and artistic gate-posts of boulders constructed. Direction signs were also placed on the main Provincial Highway which provides access to the park.

MIGRATORY BIRDS CONVENTION ACT

The National Parks Bureau is responsible for the administration of the act based on the Migratory Birds Treaty, which provides for the better protection of birds that migrate between Canada and the United States. During the year regulations covering the shooting of migratory birds were made more restrictive than in the past, including lowering of daily bag limits, curtailment of the shooting season, extension of the prohibition of the sale of ducks, and the provision of a close season on wood ducks and Atlantic Coast brant.

MIGRATORY BIRDS CONVENTION ACT
(Chapter 130, Revised Statutes of Canada, 1927, and amendments)

On August 16, 1916, a treaty for the better protection of birds that migrate between Canada and the United States was signed at Washington, D.C. This treaty was made effective by Act of the Parliament of Canada in 1917.

The Minister is responsible to Parliament for fulfilment of Canada's obligations under the Treaty; under the Director of the Lands, Parks, and Forests Branch, the Controller of National Parks is responsible for the administration of the statute, and the Superintendent of Wild Life Protection is technical adviser and executive assistant.

By virtue of Order in Council, P.C. 2283, of October 14, 1932, responsibility for police work pertaining to the enforcement of the provisions of the Migratory Birds Convention Act and Regulations made thereunder, was transferred to the Royal Canadian Mounted Police; all other powers and responsibilities continuing to remain with the Department of Mines and Resources.

PROTECTION OF MIGRATORY BIRDS

The continental supply of these birds is still depleted, following a succession of dry years which practically removed the southern part of the prairie nesting area as a breeding ground. Conditions in Eastern Canada and in British Columbia have not been as bad. In the east the black duck has apparently made a substantial recovery from its serious depletion of several years, ago. The prairie drought did not directly affect British Columbia, although undoubtedly a percentage of prairie-bred birds find their way to the Pacific coastline in migration.

In the summer of 1936, following general observations by numerous voluntary observers and by district officers of the Department, it became apparent that it would be desirable, in the interest of conserving Canada's migratory waterfowl, to further restrict the shooting of these birds. This action was taken as being the only factor in the situation that was immediately controllable by man.

The 1936 regulations, therefore, were made more restrictive than in the past, aside from minor adjustment, the chief changes were:

(1) To limit all duck and goose shooting in Canada to approximately two months, less if the province has agreed - as in Saskatchewan and Manitoba.

(2) To prohibit baiting of waterfowl with grain.

(3) To prohibit use of live decoys.

(4) To limit bags to not more than: daily - ducks, 12; geese, 5; seasonal - ducks, 150; geese, 50. (Daily limits larger in Territories.)

(5) Sale of ducks throughout Canada, which had previously been allowed in Quebec, Northwest Territories, and Yukon Territory during the open season, was prohibited, except in the far north.

(6) Wood ducks closed; brant, on the Atlantic coast, closed.

The United States of America, Canada's partner in the Migratory Birds Treaty, made great restrictions in the Migratory Birds Regulations in 1935 and continued these in 1936. For the sake of comparison with the Canadian regulations mentioned above, the United States law can be summarized briefly as follows:

(1) A one month open season.

(2) Daily bag limit - 10 ducks; daily bag limit - 4 geese.

(Possession limit - same as daily.)

(3) Baiting prohibited; live decoys prohibited; sink-boxes prohibited; sale prohibited.

(4) Hunting before 7 a.m., or after 4 p.m., prohibited.

(5) Three shell limit on repeating shotguns.

(6) The following species closed completely: Ross's goose, Atlantic Coast brant, greater snow goose, redhead, canvas-back, wood duck, ruddy duck, buffle-head duck.

It will thus be seen that the United States regulations in 1936 were in general twice as strict as the Canadian regulations. This difference can be taken as balanced by the fact that the United States has a larger population than Canada on the one hand, and on the other by the fact that a larger proportion of the population of Canada than of the United States, has reasonable access to migratory birds as a source of food and sport.

Eel-grass on the Atlantic Coast continues to be seriously depleted, as in the past several years. Experiments have been conducted toward overcoming this shortage, but it is yet too early to say with what success. The failure of eel-grass has affected particularly the Atlantic Coast brant and Canada goose, but it is also of wide importance to fisheries and to commercial interests.

The field administration of the Migratory Birds Convention Act continued under the supervision of four. District Migratory Bird Officers, all of whom operated under the direction of the National Parks Bureau.

New bird sanctuaries were established as follows: Black Pond, in the Province of Prince Edward Island; Quoddy, in the Province of New Brunswick; Carrousel Island and Senneville, in the Province of Quebec.

The boundaries of the Lethbridge Country Club Bird Sanctuary, in the Province of Alberta, were extended and the Cape Whittle, Bird Sanctuary, in the Province of Quebec, was cancelled. In addition to the sanctuaries established

under the Migratory Birds Convention Act numerous Provincial and private bird sanctuaries continue to fill an important place in protecting bird life, and the establishment of further sanctuaries of this kind, especially on waterfowl migration routes, is urged as being of the utmost importance.

The Honorary Migratory Bird Officers appointed under the Act, 781 in all, gave the usual valuable assistance.

During the calendar year 1936 the following permits and licences were issued under the Migratory Birds Convention Act: -

322	Permits for scientific purposes.
163	Permits for banding purposes.
189	Permits allowing the destruction of certain birds when found injuring agricultural or fishery interests.
684	Permits to possess birds for propagating purposes.
9	Permits to take birds for propagating purposes.
22	Permits allowing the collecting of eider-down.
2	Permits to possess and discharge rifles on bird sanctuaries.
3	Permits to transport unloaded guns across bird sanctuaries.
1	Permits to take photographs from the air over a bird sanctuary.
1	Permits to erect beacons on a bird sanctuary.
2	Permits to keep dogs on bird sanctuaries.
1	Permits to erect a temporary cabin on a bird sanctuary.
61	Taxidermists' licences.

The gathering of vital statistics respecting the bird life of Canada by the bird-banding method was continued throughout the year. The actual work is done by some 200 bird-banding co-operators, who devote their attention to this study as a contribution to ornithology. These banders operate under permit, and the Bureau acts as the Central Canadian Registry for recording banded birds. During 1936, 34,277 records of birds banded by Canadian cooperators were added to the official records, this number showing an increase of approximately 9,000 over 1935. Some 2,646 banded birds were recovered and reported to the Bureau.

The following printed material was distributed during the year: Migratory Birds Convention Act, 6,050; abstracts of the Act, 20,550; posters, 46,590; pamphlets, 29,679.

One hundred and eighty-one lectures were given by officers of the Bureau, and lecture material, including motion pictures and lantern slides, was furnished freely to voluntary assistants. The total number of motion picture films and lantern slides lent for this purpose amounted to 2,559.

WILD LIFE CONFERENCES

The National Parks Bureau was represented at several conservation or scientific conferences relating to wild life as follows: -

Fourteenth Annual Convention of the Izaak Walton League of America, Chicago, Illinois, April 16 - 19, 1936.

Fifty-fourth Stated Meeting of the American Ornithologists' Union, Pittsburgh, Pennsylvania, October 19 - 23, 1936.

The Second North American Wildlife Conference, St. Louis, Missouri, March 14, 1937. This conference saw the completion of the organization of a United States National Federation of wild life interests, the organizmion of which federation began with the first North American Wildlife Conference held in Washington, D.C., February 3 - 7, 1936.

Joint Annual Meetings of the Massachusetts Audubon Society and the Northeastern Bird Banding Association, Boston, Massachusetts, January 23, 1937.

A conference of Provincial and Federal game officials met at Ottawa, January 5 - 7, 1937. Every province in Canada was represented and officers of all Dominion Departments concerned in wild life conservation attended. It is felt that

the conference did a great deal to promote understanding of wild life problems and that it made several advances toward the development of a national wild life policy for Canada.

The work of the conference is indicated by the following resolutions, which were adopted: -

1. Favouring uniform limitation of the waterfowl hunting season to two months. 2. A request to the United States to include a season bag limit in their restrictions upon the hunting of migratory waterfowl. 3. Favouring the prohibition of baiting of waterfowl. 47398 - 7

4. Favouring the prohibition of live decoys in hunting waterfowl. 5. Against the drainage of marshes, swamps, and lakes. 6. For the establishment of adequate sanctuaries for waterfowl. 7. Against the pollution of the sea and inland waters with oil. 8. Asking a uniform fur record year to enable the statistics of the fur catch to be compiled accurately. 9. Favouring uniform royalties on furs. 10. In favour of uniformity in marking wolf pelts. 11. Dealing with the marking of shipments of raw furs to the United Kingdom. 12. In support of an act covering interprovincial shipment of furs. 13. Limiting the use of aeroplanes in trapping. 14. Favouring humane methods of trapping. 15. Against the use of poison in taking of fur. 16. Against the use of snares in taking of fur. 17. For the prohibition of export of live fisher and marten from Canada. 18. Favouring change of law permitting easier entry of firearms brought in by bona fide sportsmen. 19. In support of education in wild life conservation in schools. 20. In support of wild life research. 21. An appreciation of the action of the Department in calling the conference, and of courtesy of officials of the House of Commons.

Although the proceedings of the conference are not available to the public, copies of any of the resolutions of the conference are supplied on request.

The National Parks Bureau, with the help of many hundreds of cooperators, gathered details from all parts of Canada concerning fluctuations in the population of the northern varying hare or snowshoe rabbit. The data gathered have been compiled for publication in Canada by Mr. Charles Elton, Director of the Bureau of Animal Population, Oxford University, Oxford, England. The cycles of abundance and scarcity of this very important species are now under observation throughout its range in North America, and the records of fluctuations for some years have been published in a form that will make them available to future workers.

ADVISORY BOARD ON WILD LIFE PROTECTION

A number of changes were made in the Advisory Board on Wild Life Protection, which is an interdepartmental committee organized on December 28, 1916, for the purpose of formulating a definite policy regarding the protection and use of wild life in the Northwest Territories and to advise in the administration of the Northwest Game Act and concerning the legislation necessary under the Migratory Birds Treaty. The membership of the Board is now as follows: -

Ex-Officio Members
Dr. Charles Camsell, Deputy Minister of Mines and Resources.
R.A. Gibson, Director, Lands, Parks, and Forests Branch.
Dr. Harold W. McGill, Director, Indian Affairs Branch.
Major-General Sir James MacBrien, Commissioner, Royal Canadian Mounted Police.
Members
Dr. Arthur Gibson, Dominion Entomologist, Department of Agriculture.
J.A. Rodd, Director of Fish Culture, Department of Fisheries.
Dr. R.M. Anderson, National Museum of Canada.
Dr. Marius Barbeau, National Museum of Canada.
A.L. Cumming, Superintendent of Mackenzie District.
K.R. Daly, Senior Departmental Solicitor.
Aurèle LaRocque National Museum of Canada
Hoyes Lloyd, superintendent, Wild Life Protection.
T.R.L. MacInnes, Indian Affairs Branch.
D.L. McKeand, Superintendent of Eastern Arctic.

J.P. Richards, Bureau of Northwest Territories and Yukon.
P.A. Taverner, Ornithologist, National Museum of Canada.
J. Lorne Turner, Registrar of Lands.
F.H.H. Williamson, Controller, National Parks Bureau.
Major T.H. Irvine, Superintendent "G" Division, Royal Canadian Mounted Police.

On March 15, 1937, ratifications of the Migratory Birds Treaty were exchanged between Mexico and the United States. As many of the migratory birds, included within the terms of the Treaty between the Republic of Mexico and the United States of America migrate from Canada to Mexico, and as under the new Treaty they will receive additional protection while in that country, the final ratification of this Treaty should be of great benefit in conserving migratory birds in which Canada has a part interest.

HISTORIC SITES AND MONUMENTS

The restoration, preservation, marking, and administration of historic sites of national importance have been entrusted to the National Parks Bureau. In this work the Bureau is assisted in an advisory capacity by the Historic Sites and Monuments Board of Canada, an honorary body of recognized historians representative of the various parts of the Dominion.

The personnel of the Board is as follows:

Chairman, Brig.-Gen. E.A. Cruikshank, LL.D., F.R.S.C., F.R. Hist., Ottawa, Ont.; His Honour F.W. Howay, LL.B., LL.D., F.R.S.C., F.R. Hist., New Westminster, B.C.; J. Clarence Webster, C.M.G., MD., D.Se., LL.D., F.R.S.C., Shediae, N.B.; Professor Fred Landon, M.A., F.A.S.C.; London, Ont.; Professor D.C. Harvey, M.A., F.R.S.C., Halifax, N.S.; Hon. E. Fabre-Surveyer, B.A., LL.M., B.C.L., F.R.S.C., Montreal, P.Q.; F.H. II. Williamson, Controller, National Parks Bureau, Ottawa.

The annual meeting of the Board was held in Ottawa from May 29 to 31, when a number of new sites were reviewed and a selection made for later action. Since the inception of the work in 1919, more than one thousand sites have been under consideration, and from this number three hundred and ten have been selected as being of national importance. Two hundred and thirty-five of these have been marked by the erection of suitable memorials.

During the year, five historic sites were marked with suitable memorials, on the recommendation of the Historic Sites and Monuments Board of Canada. Restoration and development work was carried out also on several of the larger historic properties controlled by the National Parks Bureau, including: Louisbourg Fortress, Nova Scotia; Fort Beausejour National Park, New Brunswick; Fort Chambly, Quebec; Fort Lennox, Quebec; and Fort Prince of Wales, Manitoba.

During the fiscal year 1936 - 37 the following sites were marked: Jean Pierre Roma, near Brudenell, P.B.I.

A cut stone monument with tablet was erected on a small plot of land donated by Mr. Henry Parker and Mr. Wm. Stewart at Brudenell Point, to mark the site where, in 1732, Jean Pierre Roma founded a base for control of the Gulf fisheries and for trade with France, Quebec, and the West Indies. His establishment was destroyed after the fall of Louisbourg in 1745. The memorial was unveiled with appropriate ceremonies on September 5, 1936.

The Portages of the Chaudière, Hull, Que.

A field stone cairn with tablet was erected in Eddy Park, Hull, to commemorate the first of the three portages of the Chaudière on the route from the St. Lawrence to the Great Lakes. It was traversed by Champlain in 1613, and until the middle of the last century by explorers, missionaries, and fur traders.

Samuel de Champlain, Ottawa, Ontario

A bronze tablet was affixed to the monument on Nepean Point, Ottawa, erected to the memory of Samuel de Champlain, who was born at Brouage, France, 1567, and who died at Quebec, December 25, 1635. He was King's geographer, navigator, explorer, founder of the city of Quebec, and Governor of New France. The tablet was unveiled on June 24, 1936, with suitable ceremonies arranged under the auspices of the Ottawa St.-Jean Baptiste Society.

Combat at McCrae's House, near Chatham, Ontario

A cairn with tablet was erected on a small plot of land adjacent to the River Road near Chatham, donated by Mr. Frank Parker, to mark the site of the engagement that took place on December 15, 1813, when a small company of the Provincial Dragoons, Kent, Middlesex, and Norfolk Militia, surprised and took, after a sharp conflict, an enemy outpost composed of three officers and thirty-six soldiers of the Regular Army of the United States. The memorial was unveiled on September 26, 1936, in accordance with arrangements made by the Kent County Historical Society.
Roseau Route, Letellier, Manitoba

A cairn with tablet was erected adjacent to the Jefferson Highway in the village of Letellier, with the permission of the Council of the Municipality of Montcalm, to mark the war road of the Sioux leading to the Lake of the Woods. This was the nearest route to the West and was first used in 1733 by the French. La Jemmeraye was buried near the mouth of the Roseau in 1736. The unveiling of the memorial took place on July 26, 1936, under the auspices of the St. Boniface Historical Society.

PRESERVATION AND DEVELOPMENT WORK

Preservation and development work was carried out at some of the larger sites as indicated below:

Fortress of Louisbourg, near Louisburg, N.S.

Excavation of rooms in the Governor's apartments and in the Moat surrounding the Citadel building was carried on. Rebuilding of the exposed walls was completed to a height of 2 feet above ground level. The walls of the small guard-house, exposed last year, were completed. Excavation of the moat was continued, exposing the end wall, of the north casemates. All walls of the convent building were excavated and the interior of the rooms cleared out. Road repairs were made and additional surfacing placed as required. The grounds surrounding the new museum building were graded, terraced, sodded, and seeded. The street in front of the building was graded and gravelled, as wall as the approach road to the caretaker's quarters at the north end. Concrete entrance walks were constructed at the main entrance to the museum and caretaker's quarters. Two concrete gun emplacements were constructed. All outer doors on the, museum building were rehung and storm doors made for five entrances. All basement windows in the building were made waterproof and the basement floors painted.

Fort Beausejour, near Sackville, N.B.

The gateway at the main entrance was widened and two cobblestone gateposts erected. The grading of the grounds around the new museum building was partly completed. A concrete walk was constructed at the museum entrance and everything made in readiness for the official opening on August 1, 1936. A number of painted signs were prepared and erected along the main highway adjacent to the site and on the fort grounds.

Fort Chambly, Chambly, Que.

The outer walls of the fort were repainted and a concrete retaining wall was constructed in Richelieu River, on the north side, with a riprap fill to protect the dry-stone north wall of the fort and improve the appearance of the river front from the terrace. The interior area of the fort was regraded and laid out with grass areas, gravelled walks and terrace, and a sunken garden in the centre. The stone arch in the dungeon was rebuilt and the walls repainted. New entrance doors were provided for the fort and the entrance driveway improved.

Fort Lennox, Ile-aux-Noix, Que.

All debris and deteriorated material were cleared from the ovens and kitchens in the embankment at the rear of the men's barracks building, and the earth floors graded to the first course of the interior stone work. The walls and vaulted ceilings were pointed and the brick fire-places and flue openings in the cook houses were repaired. Entrance steps in stone were reconstructed and eleven doors were made, hung, and painted, together with casement sash for the window openings in the cook-houses and bakery. Approximately 150 feet of embankment near the west shore wharf, which was washed away during the spring flood, was repaired and a stone revetment was constructed along the toe of the slope.

Fort Prince of Wales, Churchill, Manitoba

The work of restoring the ruins of this northerly fortification was continued under the supervision of the Resident Engineer of the Department of Transport. The west wall was almost entirely rebuilt and about two-thirds of the east wall repaired. A lintel facing was constructed in front of the flat arch over the main gate and the name "Prince of Wales Fort" was set into the centre panel, with the dates 1733 and 1771 at either end. Five additional cannon were mounted on carriages on the south wall. Two more guns were unearthed, bringing the total number discovered to forty-two.

ACQUISITION OF SITES

Permission was obtained from the Premier of Prince Edward Island to place a monument on the grounds in front of the Provincial Legislative building at Charlottetown, to commemorate the events connected with the survey of the Gulf and River St. Lawrence, Prince Edward Island, and adjacent territory between 1827 and 1856.

Mrs. Orlando Taylor of Lunenburg, Nova Scotia, has donated a Plot of land 25 feet square with right-of-way thereto at Port La Tour, on which to erect a memorial to mark the site of the last foothold of France in Acadia.

Permission was obtained from the Department of Public Works and the Council of the Town of Windsor, N.S., to place a memorial on King's Square, Water Street, to commemorate the literary achievements of T.C. Haliburton, 1796 - 1865.

Permission was obtained from the President of the Canadian National Railways to erect a standard and tablet on the front of the lot at 230 St. Laurent Street, Levis, P.Q., to mark the birthplace of Louis Frechette, C.M.G.

Permission was obtained from the Reverend Mother Superior of the Hotel Dieu, Quebec, P.Q., to attach a bronze tablet to the wall of the hospital facing Charlevoix Street, to mark the site of the first hospital established in America, north of Mexico, in 1637.

Permission was obtained from the executors of the Viau Estate to affix a tablet to the outer wall of the building, at the northwest corner of St. Paul, and St. Sulpice Streets, Montreal, to mark the birthplace of Sieur d'Iberville, 1661 - 1706.

Approval was obtained from the Indians of the Caughnawaga Reserve to affix a tablet to the outer wall of the fort in front of the Presbytery, at Caughnawaga, P.Q., to commemorate the events connected with its construction in 1725.

Permission was obtained from the Quebec Department of Highways to erect a standard and tablet on the side of Highway No. 2 at St. Patrick, P.Q., to mark the place where Sir John A. Macdonald spent many of his summers between 1873 and 1890.

The Ontario Department of Highways has granted permission for a memorial to be erected on a small plot of land at the intersection of Highway No.7 and the 4th Concession of Otonabee Township, east of Peterborough, to commemorate the events connected with the discovery and first production of Red Fife wheat in Canada, in 1842.

An area of approximately 4 acres, containing part of the remains of Fort Malden, was transferred, by the Town of Amherstburg, Ont., to the Crown.

Permission was granted by the Municipality of Oil Springs to affix a bronze tablet to the front of the Community hall on Main Street, Oil Springs, Ont., to commemorate the events connected with the first oil wells in Canada, dug in 1858.

Permission was obtained from the Hudson's Bay Company to erect a memorial on their property a Fort Alexander Post, Man., to mark the site of Fort Maurepas, one of La Verendrye's trading posts.

A plot of land 25 feet square was provided by the Board of Trustees of the McMurray School District, Fort McMurray, Alta., on which to erect a memorial to commemorate the events connected with the earliest trade route between eastward and northward flowing waters that followed Clearwater River and Methye Portage.

OUTSTANDING HISTORIC SITES IN CANADA

Fortress of Louisbourg, Nova Scotia. - Situated 3 miles south of Louisburg, Cape Breton Island. Built by the French during the years 1720 - 40, Louisbourg was the scene of great struggles between the French and English. Its final capture by the British in 1758 was the first of a series of events that culminated in the transfer of Canada to the British Empire. Picturesque ruins and historical museum. Area 328 acres. Acquired 1928.

Fort Lennox, Ile-aux-Noix, Quebec. - Situated 13 miles south of St. Johns in Richelieu River. Gateway to Canada and advance post against the Iroquois and other invaders. Island fortified by the French before 1759. Rebuilt by the British 1812 - 27. Fortifications in fine state of preservation. Historical museum. Area 150 acres. Acquired 1921.

Fort Chambly, Chambly, Quebec. - Situated 15 miles southeast of Montreal. Built of wood in 1665 as A defence post against the Iroquois. Rebuilt of stone in 1709 - 11 to resist the advance of the British forces. Captured by United States troops in 1775. Interior buildings burned in 1776. Restored in 1777 and abandoned in 1880. Existing ruins consist of three well preserved, walls and caretaker's residence. Historical museum. Area 2 acres. Acquired 1921.

Fort Wellington, Prescott, Ontario. - Constructed in 1812 - 13 as the main post for the defence of the communication between Kingston and Montreal. Here were assembled the troops that captured Ogdensburg on February 22, 1813. Large blockhouse and other buildings within palisade and earthworks. Historical Museum. Area 81 acres. Acquired 1923.

Fort Prince of Wales, Churchill, Manitoba. - The most northerly fortress on the North American continent, built by the Hudson's Bay Company 1733 - 77. Destroyed by a French naval force in 1782. Ruined walls remain on which are mounted original cannon. Area 50 acres. Acquired 1922.

HISTORIC SITES ACQUIRED AND MARKED

At the close of the fiscal year 1936 - 37, a total of 239 sites of national importance in Canada had been acquired by the Department. Of this number, 235 have been marked by the erection of suitable memorials on the recommendation of the Historic Sites and Monuments Board of Canada. The remaining four sites had been marked prior to acquisition. Following is a complete list of historic sites acquired and marked to date:

Prince Edward Island
Prince Edward Island, Charlottetown
Jean Pierre Roma, Brudenell
First Submarine Telegraph, Charlottetown.
Discovery of Prince Edward Island, Charlottetown
First Organized Land Survey, Holland Cove
Nova Scotia
Louisbourg Fortress, Cape Breton Island
Edward Fort, Windsor
Lawrence Fort, Fort Lawrence
First Post Office in Canada, Halifax
Champlain's Habitation, Lower Granville
U.E. Loyalists, Shelburne
King's College, Windsor
Admiral d'Anville's Encampment, Rockingham
La Have Fort, LaHave
First Printing Press in Canada, Halifax
His Majesty's Naval Yard, Halifax
Shannon and Chesapeake, Battle of, Halifax
Joseph Frederick Wallet des Barres, Sydney
Canso, Canso
Samuel Vetch, Fort Anne Park, Annapolis Royal.
Wolfe's Landing, Kennington Cove
Canada's Coal Industry, Port Morien
Ste. Anne, Englishtown, Cape Breton Island
Fort St. Peters, St. Peters
St. Peters Canal, St. Peters
Paul Mascarene, Fort Anne Park, Annapolis Royal
Cape Breton - Newfoundland Cable, North Sydney
Bloody Creek, near Bridgetown
Liverpool Privateersmen, Liverpool
Simon Newcomb Wallace Bridge
First Agricultural Fair in Canada, Windsor
New Brunswick
Fort Beausejour, near Sackville
Monckton Fort (Fort Gaspereau), near Port Elgin
La Tour Fort, St. John
Charnisay Fort, St. John
U. E. Loyalists, St. John
Meductic Fort, near Woodstock
Battle of the Restigouche, Campbellton

Nashwaak Fort, Devon
Nicolas Denys, Bathurst
Tonges Island, Fort Beausejour
First Steam Fog Horn, St. John
Sir Howard Douglas, Fredericton
First Marine Compound Engine, St. John
Major Gilfrid Studholme, St. John
Jemseg Fort, Lower Jemseg

Yorkshire Immigration, Fort Beausejour Park
Combat of the Petitcodiac, Hillsborough
First Coal for Export, Minto
Beaubears Island, near Newcastle
Martello Tower, St. John
Mallard House, St. John
Nerepis Fort, near St. John
Founding of New Brunswick, St. John
The 104th New Brunswick Regiment, Fredericton
Quebec
St. Maurice Forges, Les Vieilles Forges
Three Rivers, Battle of, Three Rivers
Laprairie Fort, Laprairie
Second Battle of Laprairie, near Laprairie
Chambly Fort, Chambly
Hochelaga, Montreal
Lennox Fort, Ile-aux-Noix
Chateauguay, Battle of, Allan Comers
Crevier Fort, Notre-Dame de Pierreville
Lacolle Battle, Lacolle
Chateauguay Fort, near Howick
Richelieu Fort, Sorel
Longueuil Fort, Longueuil
Ile-aux-Coudres, opposite Baie St. Paul
Le Fondateur des Bois-France, St. Louis de Blandford
Ste. Therese Fort, near St. Johns
Tadoussac, Tadoussac
Charlesbourg, Royal Fort, Cap Rouge
First Canadian Steamship, "Accommodation", Montreal
Three Rivers Fort, Three Rivers
Madeleine de Vercheres, Vercheres
Montreal's Birthplace, Montreal
First Railroad in Canada, St. Johns
Coulée Grou, Battle of, Rivière des Prairies
Cedars, Battle of, Cedars
St. Jean Fort, St. Johns
Two Mountains, Battle of the Lake of, near Senneville
Eccles Hill, Battle of, near Frelighsburg
Opening of the St. Lawrence River to all Nations, Quebec
Ile-aux-Noix, Battle of, Fort Lennox, Ile-aux-Noix
Coteau-du-Lac Fort, Coteau-du-Lac
Odelltown, Battle of, Odelltown
Hogan Memorial Park, Percé
Royal Navy, Fort Lennox, Ile-aux-Noix
Sir Wilfrid Laurier, St. Lin des Laurentides
Battle of September 6, 1 - 775, near St. Johns
Benjamin Sulte, Three Rivers
Chambly Canal, Chambly
First Triangulation Station, King Mountain, near Kingsmere
Quebec Seminary, Quebec
Lachine Canal, Lachine
Grenville Canal, Grenville

Témiscouata Portage, near Cabano
Carillon Canal, Carillon
First Paper Mill in Canada, St. Andrews East
Jacques Cartier, Gaspe
Lt. Col. Charles de Salaberry, Beauport
First Patent in Canada, Quebec
Chambly Road, near St. Hubert
Lachine Massacre, Lachine
Soulanges-Cascades Canal, Cascades
Chaudière Portages, Hull
Ontario
First Meeting of the Executive Council of Upper Canada, Kingston
Glengarry House, near Cornwall 1Glengarry Cairn, Monument Island, near South Lancaster
Wellington Fort, Prescott
Marked prior to acquisition. [1Marked prior to acquistion.]

Windmill, Battle of the, near Prescott
Chrysler's Farm, Battle of, near Morrisburg
Southwold Earthworks, near St. Thomas
Fort Ste. Marie II, Christian Island, Georgian Bay
Mission of St. Louis or St. Ignace II, near Midland "Cliff Site," Port Dover
Chippawa, Battlefield of, Chippawa
Frenchmans Creek, Action of, near Bridgeburg
Vrooman's Battery, Queenston
Cooks Mills, Battle of, Welland
George Fort, Battlefield of Niagara-on-the-Lake
Beechwoods or Beaver Dams, Battlefield of, Thorold
Ridgeway Battlefield, near Ridgeway
Navy Island Shipyard, near Chippawa
Sault Ste. Marie Canal, Sault Ste. Marie
Fort William
Port Arthur
Port Stanley
Port Talbot
Wintering Site, Port Dover
Waterloo Pioneer Settlement, near Kitchener
Longwoods, Battle of, near Moraviantown
The Defence of York, Toronto
Point Pelee, Point Pelee Park, near Leamington
McKee Point (War 1812 - 14), Sandwich
Mattawa Portage, Mattawa
Nottawasaga Fort, Wasaga Beach, near Stayner
Montgomery's Tavern, Toronto
Frontenac or Cataraqui Fort, Kingston
St. Joseph Fort, St. Joseph Island
First Steamship on Lake Ontario, near Bath
Kaministikwia Portage, near Fort William
Duke of Richmond, Site of His Death, near Richmond
De Levis Fort, Adams Point, near Johnstown
Pointe au Baril, Maitland
Rideau Canal, Ottawa
Norfolk Fort, Turkey Point, near Normandale
Starting Point of Brock's Expedition, Port Dover
The Old Welland Canal, Allanburg
Bishop A. Macdonell, St. Raphael
Bishop Strachan, Comwall
Niagara Portage Road, Stamford
Fugitive Slave Movement, Windsor
Canada's First Electric Telegraph Line, Toronto
Allan Crawford, Ottawa
Arctic Expedition (1913 - 18), Ottawa
George Fort, Niagara-on-the-Lake
Sir John A. Macdonald, Boyhood Home of, Adolphustown
Sir John A. Macdonald, Kingston
Coming of the Mohawks, Deseronto
Pioneers of the Huron Tract, Goderich
Navy Yard, Amherstburg
Normandale Furnace, Normandale

Mississauga Fort, Niagara-on-the-Lake
Dundas Street, near Dundas
Sir Charles Bagot, Kingston
Lord Sydenham, Kingston
Fort Drummond, Queenston
Sir Gordon Drummond, Toronto
Nanticoke
Fort Erie
Capture of Ohio and Somers, Fort Erie
U.E. Loyalists, Cornwall
The Crawford Purchase, Kingston
Treaties of Niagara, Niagara-on-the-Lake
The Six Nations, Ohsweken
Action at Butlers Farm, Niagara-on-the-Lake
Butler's Rangers, Niagara-on-the-Lake
The Historic Carrying Place, Carrying Place, Bay of Quinte
McKee's Purchase, Blenheim
Lansdowne Iron Works, Lyndhurst

Navy Yard, Kingston
Burlington Heights, Hamilton
Capture of the Tigress and Scorpion, Penetanguishene Royal Navy, Amherstburg
Combat at McCrae's House, near Chatham Samuel de Champlain, Ottawa
Manitoba
Douglas Fort (Red River Settlement), Winnipeg
Rouge, Garry, and Gibraltar Forts, Winnipeg 1Battle of Seven Oaks, Winnipeg
Indian Treaty No. 1, Lower Fort Garry
Dominion, Lands Survey System, near Headingly
La Reine Fort, Portage la Prairie
Early Trade, Wawanisa
Port Churchill, Churchill
Prince of Wales Fort, Churchill
Henry Kelsey, The Pas
Roseau Route, Letellier
Saskatchewan
Livingstone Fort, near Pelly
Walsh Fort, near Cypress Lake
Cut Knife Battlefield, Indian Reserve No. 114 Battleford
Indian Treaty No. 6, near Carlton Batoche
Battle of Fish Creek, near Fish Creek
Alberta
First Coal Mine in Alberta, Lethbridge Macleod Fort, Macleod
Indian Treaty No. 7, near Gleichen
Calgary Fort, Calgary
David Thompson, Jasper Park
Henry House, Jasper Park
Jasper House, Jasper Park
Edmonton and Augustus Forts, near Edmonton
Frog Lake Massacre, near Frog Lake
Fork Fort (Sir A. Mackenzie), near Peace River
Rocky Mountain House
General Strange's Column, Edmonton
Father Lacombe and Rev. John McDougall, Wetaskiwin
British Columbia
Langley Fort, Langley
New Westminster
Nootka Sound, Friendly Cove, Vancouver Island
Sir Alexander Mackenzie, Prince George
Cariboo Wagon Road (Fort Yale), Yale
Prospect Point, Vancouver
Gonzales Hill, Victoria
Kamloops Fort, Kamloops
First Coal Mine in British Columbia, Nanaimo
Cariboo Gold Fields, Barkerville
Sir A. Mackenzie, Bella Coola
Hope Fort, Hope
Steele Fort (N.W.M. Police)
Simon Fraser, Musqueam
The Last Spanish Exploration, Point Grey
Pacific Cable, Bamfield, Vancouver Island
Sir George Simpson, Kootenay Park

Collins Overland Telegraph, Quesnel
Fort Alexandria, Alexandria
Northwest and Yukon Territories
Yukon Gold Discovery, Dawson [1Marked prior to acquisition.]

APPENDIX

THE ALPINE CLUB OF CANADA
(From the Report of the Chairman of the Club-house Committee)

The club-house at Banff opened for the season on Monday, June 29, 1936. Very fine weather prevailed, but, as the annual camp of the Club was held in Jasper National Park, registrations at the club-house were less numerous than usual.

The total registration during the season was 251, provinces and countries being represented as follows:

Alberta	80	United States	67
British Columbia	25	England	8
Manitoba	10	Scotland	3
Ontario	45	Denmark	2
Quebec	1	China	7
Saskatchewan	3	...	

(From the Report of the Secretary of the Alpine Club of Canada)

The thirty-first annual camp was held from July 18 to August 4, 1936, below the cliffs of an outlier of Mount Fryatt in Fryatt Creek Valley, Jasper National Park. A fly camp was established below the cliffs near the waterfall leading to the upper valley, and a small bivouac camp was maintained above the falls.

Access to the camp was provided by a trail constructed along the west bank of Athabaska River from Athabaska Falls. Most of those attending motored along the Banff - Jasper Highway to a point about 25 miles south of Jasper where a crossing of Athabaska River was made by a scow Controlled by a cable.

Our sincere thanks are due to the National Parks authorities for kindness in constructing the necessary trail to the camp and for arrangements carried out for the cable crossing.

The weather was exceptionally fine for the duration of the camp, there being only one day on which climbing was prevented by rain. Sixteen of the members passed the test for active membership, climbs being made as follows:

From the Main Camp

Mount Christie (second ascent), Mount Fryatt, (second ascent), Mount Lowell (first ascent of north tower). Two attempts were made on Mount Brussels.

From the Fly Camp

First ascents of "The Three Blind Mice," Mount "Parnassus" and Mount "Xerxes"; second ascents of Mount "Olympus," Mount Belanger, and Mount Lowell. A bivouac party crossed to Alnus Creek and climbed Mount Serenity.

Visitors at camp included members of the club from Bromsgrove, Falmouth, London, and Stourport, England, as well as parties from the United States and from different parts of Canada. A total of 93 persons were accommodated under canvas, representatives attending from the Alpine Clubs of England, France, the United States, Italy, and Switzerland; also from the Royal Society, the Royal Geographical Society, the Appalachian Mountains Club, the Montana Mountaineers, the Mazamas, and the Sierra Club.

The annual meeting of the club was held in camp on July 31 for the election of officers, presentation of reports, and other business.

DOMINION FOREST SERVICE

The Dominion Forest Service is engaged in the study of problems relating to the protection, development, and utilization of the forests of Canada. The provinces control 98 per cent of the forest resources, the Dominion administering only the forests of the Northwest Territories, those of the National Parks, and a few other Dominion - Controlled areas such as forest experiment station, Indian reserves, and miscellaneous properties. However, as many of the forest problems are of national rather than provincial interest, Dominion assistance is provided through the activities of the Dominion Forest Service. The separate divisions of the Forest Service are Forest Economics, Silvicultural Research, Forest Protection, and Forest Products Laboratories.

In Europe, the forest industry is organized for continuous use of all the resources.of the forest in the manufacture of a diverse series of readily saleable products. In Canada the orderly management of forest lands has been impossible in many cases because of the irregular and unplanned development of industry. Capital has tended to rush into those particular branches of production which appeared at the time to be most profitable. Development of mill capacity has been along lines of specialization in manufacture, only certain kinds of woods being utilized. As a result, other species and grades of timber, which could easily be extracted during the course of logging, have been left untouched. Obviously in these circumstances scientific management of the forest resources presents difficulties.

The solution of many of the problems will be found in co-operation for the working out of equitable adjustments. Discussion of these mutual problems is most helpful. A forum for such discussions is provided in the Associate Committee on Forestry of the National Research Council, recently established. This Committee, however, does not undertake the solution of problems, but attempts to identify them, and to analyse their importance and refer them to the attention of competent authorities.

FOREST ECONOMICS

Work in Forest Economics comprises statistical and field investigations of the development and trend of forest industries. Estimates are prepared of the forest resources, and of the rates at, which they are being depleted. Methods, of conducting forest surveys are studied. Progress has been made in the adaptation of air photographs to inventory surveys.

The three basic factors in the forest economy of a country are: the available resources, the annual depletion, and the annual growth. If the latter two balance, and if the stock of merchantable timber is sufficient to meet the requirements until the oncoming stands of young growth attain merchantable size, the situation may be considered safe so far as the supply of wood is concerned. There are secondary features, however, which are of the greatest importance to the industries engaged in the manufacture and marketing of forest products. Among these are the supplies of the species in greatest demand, and their location in respect to the manufacturing plants, and transportation.

RESOURCES

The latest compilation of areas of forest land, and the estimated amount of timber, total and accessible, by provinces, were published in Forests of Canada, 1935, and in the Annual Report of the Director of Forestry for 1935 - 36. Since then the British Columbia Forests Branch has published revised figures which

show, among other changes, that 31,575 square miles of land of productive quality is now classed as non-forested. The summary for the Dominion is revised as follows:

...	Square Miles	Square Miles
Productive forest area	...	769,500
Merchantable timber	361,800	...
Young growth	407,700	...
Unproductive forest area	...	454,000
Total forest area	...	1,223,500

The total stand of timber of merchantable size is estimated to amount to 273,656 million cubic feet, of which 170,144 million cubic feet is considered accessible under existing conditions of transportation and markets. The accessible timber includes 245,313 million feet board measure which is large enough for the manufacture of lumber, and 1,107 million cords of smaller material suitable for pulpwood, fuel, wood,etc. Conifers comprise 78.3 percent of the accessible timber.

The available supplies of the species ordinarily used in the manufacture of pulp and paper - spruce, fir, hemlock, jack pine, lodge pole pine, and poplar - are estimated to be over 1,000 million cords, three-quarters, of which are in the eastern provinces.

There is estimated to be the, equivalent of about 800,000,000 cords of the three main kinds of wood - spruce, fir, and hemlock - now being used for groundwood and sulphite pulp. This wood will not all be available for the manufacture of pulp as these species are in demand also for lumber, lath, ties, fuelwood, and many other purposes. However, some other woods, such as hardwoods, may be used for certain kind is of pulp.

DEPLETION

The main causes of depletion are the cut for use, and the destruction due to fire, insects, and decay.

Cut. - There has been a steady recovery during the past four years in the production of practically all wood products. The amount of standing timber cut for production of the various primary wood products is. estimated, as follows:

Average Annual Production of Woods Products

Equivalent in Standing Timber

...	Average 1928 - 30 1,000 Cu. Ft.	Average 1930 - 35 1,000 Cu. Ft.	Average 1926 - 35 1,000 Cu. Ft.
Fuel-wood	913,066	851,552	882,309
Logs and bolts	1,137,264	599,419	868,341
Pulpwood	711,193	605,683	658,438
Hewn ties	103,942	50,166	77,054
Fence-posts	30,168	28,262	29,215
Fence-rails	10,781	13,588	12,185
Poles	14,419	5,177	9,798
Round mining timber	12,873	6,366	9,620
Wood for distillation	6,066	5,293	5,679

Miscellaneous products	30,993	25,782	28,387
Total	2,970,765	2,191,288	2,581,026

Fire. - It is estimated that an average of 271 million, cubic feet of merchantable timber was destroyed annually by fire during the period 1926 - 35 and in 1936 the loss is reported to have exceeded 840 million cubic feet.

Estimated Depletion of Merchantable Timber by Fire

...	Average 1926 - 30	Average 1931 - 35	1936
Saw material, million ft. B.M	430	472	2,078
Small material, 1,000 cords	1,894	1,244	3,524
Equivalent in standing timber, million cu. ft	303	240	843
Conversion factors. - 1,000 feet board measure = 219 cubic feet	...	...	...
1 cord = 110 cubic feet	...	...	...

Besides the merchantable timber destroyed, there was an average of 880,000 acres of young growth and cut-over lands burned during the ten years 1927 - 36. On the basis of an average potential growth of 300 cubic feet an acre, this loss of young growth is estimated to be equivalent to 264 million cubic feet.

Insects and Fungi. - It is practically impossible to determine the extent of the losses due to insects and fungi, but it is estimated to reach close to 700 million cubic feet annually. These destructive agents are present in all forests, and, although they do little net damage in an endemic state, they often inflict serious losses when they become epidemic. The European spruce sawfly, which has caused very extensive damage in eastern Quebec and New Brunswick, and is spreading to western Quebec and Ontario, is the most serious insect infestation at present.

The various rot-producing fungi cause serious losses in both quantity and quality of timber; and the white-pine blister rust threatens the white pine in the eastern provinces and in British Columbia.

Total Depletion. - The average annual depletion of merchantable timber and young growth during the ten years 1926 - 35 is estimated at 3,816 million cubic feet.

...	Cubic Feet
Merchantable timber out	2,581,000,000
Merchantable timber burned	271,000,000
Young growth burned	264,000,000
Timber destroyed by insects and fungi	700,000,000
...	3,816,000,000

INCREMENT

Information as to whether the forests are producing enough wood to replace the depletion is, as yet, inadequate even as a basis for an estimate of the annual increment. A review of some thirty studies of conditions on cut-over lands conducted by the Commission of Conservation and this Service from 1918 to 1936 indicates that reproduction is adequate, and that an annual rate of growth of from 35 to 50 cubic feet an acre is not uncommon. However, there are large areas of mature timber which, in 100 years or more, have produced only 5 cords, or about 5 cubic feet per annum. Northern European forests, under climatic conditions somewhat similar to those in Canada, yield, on the average, about 25 cubic feet per annum under silvicultural management.

It is estimated that about 400,000,000 acres (625,000 square miles) of forests are immature and may be expected to produce an increment in excess of decay. It is evident that the available supplies of certain species are being seriously depleted, and that they are being replaced, at least temporarily, by less desirable

species such as poplar, white birch, and jack pine in the eastern and Prairie Provinces, and by hemlock, white fir, and lodge pole pine in British Columbia. Naturally the timber on the more accessible areas has been depleted to the greatest extent by cutting and fire, and as a result it is becoming more difficult and expensive to supply the manufacturing plants with raw material.

FOREST INDUSTRIES

There has been a distinct improvement in recent years in the wood and paper industries, which in 1935 contributed over $350,000,000 to the wealth of the Dominion; provided employment, on a man-year basis, to over 200,000 people, and paid $188,000,000 in wages.

Employment in woods operations indicates a,continued increase in production since 1932, the index of employment in the woods being as follows, 1926 being taken as 100:

1927	109.3	1932	42.5
1928	114.5	1933	66.5
1929	125.8	1934	124.7
1930	108.0	1935	126.9
1931	61.1	1936	138.7

THE LUMBER INDUSTRY

The lumber industry has continued to make steady progress towards the recovery of its pre-depression status, owing primarily to the development of the overseas trade, chiefly that with the United Kingdom. The comparative values of the products of the industry during the five year period 1926 - 30 and 1931 - 35 are shown below.

Value of Sawmill Products

...	Average 1926 - 30	Average 1931 - 35	Average 1926 - 35
Lumber	100,646,185	37,797,906	69,222,015
Shingles	8,874,270	4,670,654	6,772,462
Lath	4,135,693	466,453	2,301,073
Sawn ties	3,628,171	1,518,618	2,573,395
Pulpwood	12,689,644	3,958,639	8,324,141
Box shook, staves, and headings	1,872,914	1,292,378	1,582,646
Other products	3,425,213	2,582,984	3,004,099
Total	135,272,090	52,287,632	93,779,861

THE PULP AND PAPER INDUSTRY

The production of Canadian newsprint in 1936 was the largest in the history of the industry. The News Print Service Bureau reports that the world production of newsprint in 1936 amounted to 8,217,000 tons of which Canada supplied 3,192,000 tons (38.8 per cent).

The net value of the products as marketed, including the value of the pulp exported and paper manufactured, was $157,838,506 in 1935, as compared with $147,619,922 in 1934.

The apparent total cut of pulpwood in 1935 was 6,095,016 cords, of which 1,109,873 cords (18 per cent) were exported, and the remainder manufactured into

pulp or paper in Canada. The pulpwood exported had an average value of $6.3 per cord, and that manufactured into pulp and paper in Canada yielded an average value of $31.66 a cord. The average annual production of wood pulp during the period 1931 - 35 was 3,263,106 tons, valued at $73,751,269; and of paper 2,734,365 tons, valued at $121,498,023.

TRADE IN FOREST PRODUCTS

In 1936 exports of forest products were valued at $209,291,745, and comprised 20.6 per cent of the total exports of Canadian products, while imports of these products amounted to $15,431,270, thus providing a favourable trade balance of $193,860,475, as compared with the total favourable balance of $380,014,519 on all products.

The value of forest product exports to principal countries in 1936 was as follows:

...	Value
United States	$142,758,362
United Kingdom	33,766,992
Australia	10,670,506
Japan	5,074,295
China	2,666,766
New Zealand	2,266,720
British South Africa	1,860,816
Argentina	1,779,218
All other countries	8,448,070
Total	$209,291,745

LUMBER

Exports of sawn lumber to the United Kingdom in 1936 were greater than in any year since 1903, amounting to 958 million feet board measure, valued at $19,750,000. This comprised 51.7 percent of Canada's lumber exports, and 17.4 per cent of the United Kingdom' slumber imports. It may be noted that Canada's annual extorts to the United Kingdom during 1926 - 30 averaged approximately 200 million feet, valued at $6,961,000, and comprised only 10 per cent of her lumber exports, and 5.8 per cent of the United Kingdom's imports of lumber. Owing largely to the tariff preference of 10 per cent ad valorem enjoyed by British countries on lumber, and to energetic sales promotion by the Canadian exporters, the United Kingdom has become the principal market for Canadian lumber exports.

Canadian export of doors to the United Kingdom has increased in value from $1,584 in 1932 to $2,778,423 in 1936, in which year the exports comprised 67.1 per cent of the United Kingdom's total imports of doors.

Shingle exports, to the United Kingdom, though still comparatively small, have increased from 5,964 squares, valued at $11,983, in 1934, to 19,745 squares, valued at $51,168, in 1936.

Exports of Canadian lumber to the United States increased from an average of approximately 242 million feet annually, valued at $5,442,000, during, the period 1932 - 35, to 531 million feet, valued at $12,842,000, in 1936, largely as a result of the trade agreement made between Canada and the United States in 1935.

Exports of Planks, Boards and Square Timber

Countries	Average 1926 - 30		Average 1931 - 35		1936	
...	M Ft. B.M.	Value, $	M ft. B.M.	Value, $	M Ft. B.M.	Value, $
United Kingdom	199,453	6,961,113	481,760	9,239,880	957,948	19,750,191
Irish Free State	10,730	455,552	8,327	155,174	4,139	79,625
New Zealand	9,240	264,850	2,392	55,574	6,352	176,098
Australia	36,189	765,484	109,588	1,410,967	117,069	1,542,487
British South Africa	13,090	299,930	12,854	217,217	41,753	845,314
British West Indies	In other British or foreign		12,123	246,174	16,034	35,479
Other British countries Specified	In other British or foreign		10,882	201,765	22,077	455,396
Total British countries.	268,702	8,746,929	637,926	11,526,751	1,165,372	23,184,590
United States	1,458,829	39,529,242	372,797	8,293,199	530,866	12,841,995
China	21,378	375,803	74,820	864,995	73,223	957,336
Japan	185,058	2,736,269	75,922	1,032,543	30,053	493,587
Other foreign countries	Specified In other British or foreign		19,963	409,096	59,142	1,072,229
Other Foreign countries	1,665,264	42,641,314	541,502	10,599,833	693,284	15,365,147
Other British or foreign countries	55,778	2,494,916	...	...	...	...
Total	1,989,744	53,883,159	1,179,428	22,126,584	1,858,656	38,549,737

PULP AND PAPER

Exports of pulp and paper in 1936 showed a decided increase over those of each of the preceding five years, but the value was more than $40,000,000 lower than the,average for the years 1926 - 30, although the average quantity was higher.

Exports of Pulp and Paper

...	Wood Pulp		Newsprint		Other Paper		Total
...	Tons	Value, $	Tons	Value, $	Value, $	Value, $	
Average 1926 - 30	867,961	45,423,190	2,133,689	132,130,559	6,201,113	183,754,862	
Average 1931 - 35	590,291	27,082,384	2,122,474	85,965,541	4,336,264	117,384,189	
1936	754,496	31,246,695	2,993,089	103,639,634	7,221,794	142,108,123	

In 1936 bleached sulphite was the chief pulp exported, a large part of which was sold for use in the manufacture of rayon.

Exports of Wood Pulp, 1936

...	Quantity	Value
...	Tons	$
Mechanical	133,519	2,841,051

Sulphite bleached	351,650	18,376,727
Sulphite unbleached	113,088	3,634,971
Sulphate	119,400	5,567,284
Other pulp	13,373	591,062
Screenings	23,466	235,600
Total	754,496	31,246,695

In 1936 Canada exported close to 3,000,000 tons of newsprint, which comprised about two-thirds of the world exports of newsprint for that year, and 93 per cent of the Dominion's total exports of paper. Wrapping paper and boards are becoming important items in the exports.

More than three-quarters of Canada's exports of pulp and paper go to the United States, with the United Kingdom, Australia, Japan, and New Zealand following in order of importance.

Exports of Paper, 1936

...	Tons	Value
Newsprint	2,993,089	103,639,634
Wrapping	16,665	1,094,109
Bond and Writing	5	3,953
Book paper	3,686	433,965
Wall-paper	...	229,153
Bags, boxes, and cartons	...	147,676
Roofing and building	...	94,696
Pulp and fibre wall boards	17,197	1,054,558
Paper board, n.o.p	...	2,949,853
Wastepaper	31,031	521,667
Other paper manufactured by	...	692,164
Total	...	110,861,428

AERIAL FOREST SURVEYS

Continued progress has been made in the development of technique in the use of aerial photography for forest surveys. It has been found possible both to obtain an area classification of forest types and to estimate the volume of the stand with sufficient accuracy for inventory purposes. The Dominion Forest Service prepared, an estimate from photographs of an area of 285 square miles in Quebec, which showed approximately 1,000,000 cords of pulpwood, and which agreed very closely with a previous ground cruise.

An area of 364 square miles in the Lower Gatineau region near Ottawa was surveyed by steep-oblique photography. The cut-over and burned areas were determined, and the forests classified by types and age-classes. A ground survey was made to supply detailed information as to the condition and rate of growth of the stands of timber. From the air photographs a relief map was made, which showed the mountainous nature of the country, the forest cover, the cleared areas, and the locations of roads and other features.

An area of 100 square miles in the Noranda mining,area was surveyed by aerial photography, and the location and quantity of the timber available determined. Riding Mountain National Park in Manitoba, an area of about 1,200 square miles, was photographed in the early spring before the snow melted, for the purpose of preparing a working plan for the park. It had been photographed some years previously by high verticals, which provided a base map, and in the rephotography steep obliques from an altitude of 10,000 feet were used. Photography of this type is particularly useful for forestry purposes, as it is possible to measure the height of the stands directly. Winter photographs also give a clearer distinction between coniferous and deciduous timber. Volumetric estimates of the timber are being prepared from the photographs, and a ground survey will provide data regarding the rate of growth, so that a definite plan of operation can be formulated.

A series of experimental photographs of a strip of forest 10 miles long at the Petawawa Forest Experiment Station has been taken for the Forest Service by the Royal Canadian Air Force. This study now includes twenty-eight strips, taken each of the four seasons, with verticals and horizontal obliques from in

various altitudes, and with various filters. These photographs are of the greatest value in determining the best means of photographing the forests for forest survey purposes.

The development of a double vision projector, by means of which outlines of forest types and other features can be transferred directly from the photograph to a map of any desired scale, marks an important accomplishment.

SILVICULTURAL RESEARCH

Silvicultural research comprises investigations for the purpose of determining the most suitable methods of harvesting forest crops and managing forests. These problems are studied at five forest experiment stations located in the different forest regions: the Acadia Forest Experiment Station, containing 78 square miles, is situated 15 miles northeast of Fredericton, N.B.; the Valcartier Station is 17 miles northwest of Quebec city; and the Petawawa Station lies northwest of Pembroke in the Ottawa Valley. In Manitoba an area of approximately 36 square miles of the Duck Mountain Provincial Forest was turned over to the Dominion for research purposes; and in Alberta, the Kananaskis area, of 63 square miles, lies 62 miles west of Calgary.

At each of these stations the most important timber-type forms the basis of the chief research investigations. Supplementary investigations in forest types not represented on the experiment stations are conducted, in co-operation with provincial authorities, and with industries, on outside areas.

PETAWAWA FOREST EXPERIMENT STATION

The Petawawa Forest Experiment Station, situated 125 miles northwest of Ottawa, on Ottawa River, contains, approximately 100 square miles in the Algonquin - Laurentide section of the Great Lakes - St. Lawrence forest region. The characteristic timber-type is white and red pine, with their fire-type associates, namely, poplar and white birch; even in the occasional lowland black spruce stands, white pine is found. Secondary associates are balsam fir and white spruce.

Investigations at this station, therefore, are concentrated on cover-types of pure pine, and of mixed pine, poplar, and birch.

In continuation of experimental thinnings of stands of young poplar with understory of white pine and white spruce, an area of 45 acres of the Cornus-Maianthemum site-type, burned over in 1923, was thinned from 2,700 to 800 poplar an acre. Thinnings were left as they fell. Detailed records were taken on a pair of permanent sample-plots established, one,of which was laid out within the area in order to represent the thinning, and the other, in the same type, was left uncut as a control plot. The area is under observation also by the Entomological Branch, Department of Agriculture, to ascertain whether white pine weevil makes any progress under the shade conditions found in mixedwood stands. Their investigation includes instrumental measurements of sunlight intensity on thinned and unthinned plots.

Another study is concerned with the effects of various cutting methods and methods of slash disposal upon growth and reproduction of black spruce swamps. Two permanent sample-plots were established in black spruce stands, clean-cut, with the slash left, during the winter 1935 - 36. The site-type of the first was that whose indicator species are sphagnum and Carex trisperma, the age being 101 to 140 years; the other being in Sphagnum-Ledum site-type, 71 to 100 years old. It is believed that site-type is the significant variable affecting growth and reproduction. Apparently on the first site-type, reproduction depends upon seed; whereas in the second site-type it seems to be the result of layering. It seems certain that a single cutting method is not equally applicable to both site-types.

A demonstration wood-lot of 60 acres of tolerant hardwoods was surveyed and is now under working-plan management; only the annual increment will be removed. The permanent sample-plots established on this area will provide valuable information for the care and management of farmers' wood-lots.

Three permanent sample-plots were established in a dense stand of white pine, 45 years old, of the Maianthemum-Corylus site-type, a fair white pine site, to study methods of improving the stand. The first plot was left in its

natural state to act as control; the second was thinned to 400 selected trees an acre, 200 of which, likely to provide the final crop, were pruned to the height of 20 feet; and in the third plot the 400 selected trees were released by girdling all the other trees, and 200 selected trees were pruned. This experiment was made to determine how rapidly white pine of high quality can be produced on suitable sites at a minimum cost. The Entomological Branch, Department of Agriculture, has these plots under observation for study of control of white pine weevil.

Twenty permanent sample-plots, established at various dates since 1918, were remeasured during August and September, and data are available for analysis and report. The plots cover studies of experimental cutting methods, thinnings, and regeneration studies.

About 100,000 white and red pine were planted. One thousand white spruce were planted on cut-over hardwood type to observe their behaviour in competition with sprouts, suckers, and hardwood seedlings One thousand Carolina poplars were set out in a similar cut-over stand.

Side-branch cutting of red and Norway spruce about 3 inches long were laid in sandy soil all winter to determine whether they would develop a root system. In the spring about 50 per cent of the Norway spruce had developed roots, but the red spruce failed to establish any roots.

From another investigation it was found that cuttings of Carolina poplar may be made in the autumn, as well as in the spring, if they are heeled in when cut, and planted early in the spring.

A new and satisfactory method of reproducing poplar from cuttings was discovered whereby cuttings with several buds are placed horizontally in furrows and covered with about 4 inches of loose soil.

Various attempts to reproduce basswood from seed and from cuttings during the year were unsuccessful, but the investigation is being continued.

As a result of investigations made last year, all coniferous seeds were sown in the autumn this year. The species were seven strains of Scotch pine, Siberian larch, Douglas fir, and Norway spruce of Norwegian and Latvian origin. Experiments in the use of zinc sulphate for weed control have been only partly successful to date.

Populus berolinensis and Populus trichocarpa from British Columbia are found to be rust-resistant at Petawawa.

Studies of site-classification by vegetation were extended to the Algonquin Park region.

The collecting of phenological records, started in 1935, was continued with particular reference to species related to the site-types with which poplar and white pine are associated.

One million feet of mature and overmature scattered white pine, and one million feet of red and jack pine and white spruce were sold in accordance with the requirement of the working plan for the station. During the progress of this experimental operation, detailed information concerning costs of various logging methods and slash disposal, and data on relationship between boardfoot scale and cubic volume were obtained. A series of intensive studies will be conducted on this cut-over area.

A summary of sixty-six permanent sample-plots established at various periods since 1918 at the Petawawa Station in pure pine and in mixedwood stands to study the value of thinnings shows that in general the net annual increment, as well as the increment per cent, increases directly with the degree of thinning practised. Exceptions to this rule are attributable to variations in site-type, situation, or wind damage.

ACADIAN FOREST EXPERIMENT STATION

The central section of the Acadian region is represented by the Acadian Forest Experiment Station, 78 square miles in area, lying 15 miles northeast of Fredericton. The forest cover is mainly mixedwood, tolerant hardwoods, red and white spruce, balsam fir, some white pine, with wire birch as the fire type. The principal investigations within the station are concerned with second growth stands in which spruce and balsam fir are struggling through wire birch overstory. More mature stands of pulpwood species are studied on stands surrounding the station. Study of farmers' wood-lots is a secondary project of this station.

An intensive investigation of cut-over lands was conducted on the Restigouche watershed to study the effect of cutting upon the remaining stand and upon reproduction. Altogether seventeen cutting operations were examined. The data have been compiled, and an interim report has been prepared, which advise that this mixedwood forest cannot produce sawlogs in quantity except at widely separated intervals of time, as the predominant stand is of balsam fir which has a rotation age of eighty years. The next stand of value must come from a new crop.

An interim report on the remeasurements of the Bathurst experimental cutting area to 1931 shows that prolific reproduction of spruce has followed clear cutting, and that many of the seedlings were just entering the sapling class in 1931. The plots are due for remeasurement in 1937.

A watering system for the nursery was installed. Twenty-four seed-beds of white and red pine, white and red spruce, white cedar, black walnut, butternut, and basswood were established. The basswood seed, however, failed to germinate.

A series of red, white, jack, and Scotch pine plantations was established, a total of about 25,000 plants having been set out.

The working-plan survey report covering the survey of 1933 - 34 has been completed; this is to become the basis of a working plan for the management of the station. The report provides information pertaining to the present stand of timber and its growth, and gives a detailed description of the forest soils and timber types. The total land area is 44,337 acres, of which 21,075 acres are reserved for military purposes. The total volume of conifers is 48,000 cords; 2,600 feet B.M. of spruce, balsam fir, and pine, and 56,000 cords of hardwood species. As 94 per cent of the stands are less than sixty years of age, it is obvious that little or no material is available for the market at present, with the possible exception of fuel-wood from thinning and improvement cuttings. The increment rate is low, which indicates the need for silvicultural treatment.

Two permanent sample-plots were established on the forested lands of the University of New Brunswick to demonstrate, particularly to the forest school students, the value and methods of thinning practice in improving woodlands.

VALCARTIER FOREST EXPERIMENT STATION

The Valcartier Forest Experiment Station, which comprises 7 1/2 square miles, situated 17 miles northwest. of Quebec City, lies on the southern border of the Central Transition Section of the Boreal Forest Region.

The forest cover is mixed, black spruce, balsam fir, and white birch, with some white and red spruce and yellow birch and maple of the Great Lakes - St. Lawrence Region at the south. Investigation is confined to the pure and mixedwood pulpwood types.

Tree planting was continued during the planting season of 1936. Altogether 110,000 spruce and red pine plants were set out, covering 98 acres of the Valcartier Plains block.

In the nursery six beds were sown with white and red pine from Ontario, white spruce from Quebec, and red spruce from New Brunswick. From the nursery 16,500 seedlings were transplanted. These seedlings - beech, larch, maple, and red pine are for experimental purposes.

Demonstration thinnings of several acres each in balsam fir and spruce stands in the neighbourhood of the three camps were made. The trees for removal were marked by a research officer; the thinnings were done as a relief project.

Areas cut over for relief camp fuel-wood during the previous winter were surveyed, and a series of permanent sample-plots was established on them.

The chief activity in the Province of Quebec was conducted outside the station, in the Lake Edward area. The semi-permanent survey of 1925, Covering over 5 square miles was re-examined. The area was last cut over about 30 years ago. The purpose of the survey was to determine:

(1) the rate of growth since last measurement; (2) the extent to which spruce and balsam fir were able to compete with hardwoods; (3) the annual mortality; (4) the cull factor in conifers; (5) the value of site classification based on vegetation.

In addition to the survey, four permanent sample-plots concerning these cut-over lands were remeasured.

Although compilation of the data is not yet complete, a summary report shows that the average stand now contains from 18 to 29 cords, varying according to site-type. Conifers alone vary from 6 to 15 cords. Net annual increment of conifers varies from 12 to 54 cubic feet, and mortality from 11 to 13 cubic feet. The cull factor in spruce ranges from 6 to 28 per cent, and that of balsam fir from 16 to 47 per cent, according to the site-type.

Another project, the study of intermediate cuttings in tolerant hardwood type with a view to improving the yellow birch and basswood in particular, was commenced near Thurso, P.Q. The project calls for the establishment of three 10 - acre semi-permanent sample-plots; one for control, another to be logged in the usual manner, and the third to be marked by a research officer having in mind improvement of reproduction, growth, and quality of the species desired. Two of these plots were recorded. The third, the control plot, has yet to be established.

DUCK MOUNTAIN FOREST EXPERIMENT STATION

The Duck Mountain Forest Experiment Station, southwest of Dauphin, Manitoba, lies in the mixedwood section of the Boreal Forest Region. The characteristic association of species is aspen, balsam poplar, white spruce, white birch, and balsam fir. Jack pine predominates on sandy areas, and jack pine and black spruce are characteristic of the hilltops. The swamp types are black spruce and larch. Investigations are centred around the mixedwood and jack pine types, particularly of the younger age classes. Field work was completed for the working-plan survey.

Two permanent sample-plots were established to study the value of thinning in a young mixedwood stand. In a stand 6,600 trees an acre, 46 years old, in the Hylocomium-Linnaea site-type, one plot was left undisturbed as control or measure, the other was thinned to 2,000 trees an acre to favour white and black spruce.

Removal of overtopping trees by release cutting formed the basis of another study. In a stand of three acres, one plot was left undisturbed, and from the other, over-topping trees were removed in order to free roots and crowns of black and white spruce.

Silvicultural cleanings were conducted in other stands, from which only dead and defective trees were removed.

The taking of phenological records, started in 1935, was continued.

In co-operation with the Saskatchewan Forest Service, and The Pas Lumber Company, a study was made of the cut-over lands of the Carrot River drainage area to determine the condition of these cut-over lands with respect to the present stand, reproduction, and the prospects for a future cut.

The interim report shows that four main site-type groups, based on vegetation and physiographic position, were recognized. For each group, a series of "yield - since - cutting" curves were prepared.

Reproduction was studied on lands cut over once; on those cut over two or more times; and on lands burned over previous to the last cutting. White spruce reproduction was satisfactory only on the last-named.

KANANASKIS FOREST EXPERIMENT STATION

The east slope of the Rockies section of the subalpine forest region is characterized by Engelmann spruce, with lodgepole pine in many places forming pure stands or in mixture with the spruce following fires. The project of the Kananaskis Station is to investigate the development of these two species.

The main research activity at the Kananaskis Forest Experiment Station was the continuation of the working-plan survey. Unfortunately, serious fires made it impossible to complete the field work. Three square miles of rough area were covered. Following the fire in August 1936, a sale of 10 million feet of fire-killed timber was conducted. Both the burned-over and the cut-over lands will form the basis of intensive studies relating to seed-bed conditions and reproduction.

OTHER PROJECTS

A review of all reports covering surveys of cut-over lands conducted by the Commission of Conservation and the Dominion Forest Service between 1918 and 1936 has been completed and prepared for publication. The purpose of the review is threefold: (1) to determine the amount and nature of work that has been accomplished; (2) to analyse the results, make deductions, and determine wherein the data are incomplete; (3) to formulate comprehensive plans for future projects. From the study it is concluded that the problem is not one of obtaining reproduction, but rather of managing it in order to ensure satisfactory growth of young stands, and to maintain satisfactory proportions of species.

The stand tables and increment obtained from the rate-of - growth surveys of 1929 - 30 in Eastern Canada have been summarized and issued as mimeographed research notes as follows: New Brunswick, Research Note No. 45; Nova Scotia, No. 46; Gatineau and Lièvre Watersheds, P.Q., No. 47; Algonquin Park, Ontario, No. 48; and Sudbury District, Ontario, No. 49.

These tables show the number of saplings, poles, and merchantable trees in total cubic volume and in merchantable volume, both in cubic feet and in feet board measure. The average annual mortality and the net annual increment in cubic feet are also given. Information is lacking, however, concerning cull and, logging wastage, which must be considered in determining allowable depletion.

FOREST PROTECTION

Research in forest protection is carried on at the forest experiment stations to develop methods of measuring and forecasting forest-fire hazard so that necessary protective measures can be taken. Experimental investigative work is also carried on to develop improved methods of detecting and fighting forest fires and for the testing of new kinds of equipment. With the co-operation of provincial authorities, the Forest Service compiles annual statements of the losses caused by forest fires throughout the country.

The fire season of 1936 was the most serious one that Canada has experienced since 1932. The number of fires reported. Was 5,946, compared with an average for the past 10 years of 5,774. The total loss and damage caused by these fires, including the cost of suppressing them, was $7,288,504, compared with the past 10 - year average of $4,578,764. Weather conditions were favourable in Quebec and the Maritime Provinces, and fire losses in these regions were below normal. In Ontario and westward some bad periods of "fire weather" were experienced, and the losses were above the average for the past 10 years. The details for each province as secured from the forest authorities concerned, are as follows:

BRITISH COLUMBIA

Severe lightning storms, accompanied by dry weather, in the central and southern interior of the province, during the months of July and August, were the cause of 34 per cent of the 1,547 fires that were reported during the year. The total area burned was 437,143 acres; this area comprised 103,427 acres of merchantable timber, 65,345 acres of young growth, 260,195 acres of cut-over lands, and 8,176 acres of non-forested lands. The total loss and damage, including fire-fighting costs of $130,291, was $1,305,503, compared with a 10 - year average of $1,172,781. Eighty-eight per cent of the fire-fighting cost was incurred in the Nelson and Kamloops Districts.

ALBERTA

Alberta experienced a long and dry fire season, with practically no rain from the middle of June to the middle of August. Abnormally high winds occurred during this period, and again in November when heavy loss occurred. The high winds and the absence of rain made fires difficult to control, and resulted in one of the worst fire seasons on record in the province. The total number of fires reported was 248, which is less than the average, but more than 11 per cent of these each exceeded 500 acres in extent. Lightning was given as the cause of 12 per cent of the fires. The total area burned was 204,454 acres, this area comprising 104,885 acres of merchantable timber, 51,867 acres of young growth, 1,168 acres of cut-over lands, and 46,534 acres of non-forested lands. The total loss and damage, including fire-fighting costs of $115,419, was $1,666,517, compared with a 10 - year average of $402,956.

SASKATCHEWAN

In Saskatchewan, low water-levels and scanty winter precipitation in the northern part of the province produced a serious early spring fire hazard that lasted until the end of May, when as high as 20 fires a day were reported. The peak of the summer fire hazard was reached about the middle of August, but at no time was the province free from fires until October 20. The total number of fires reported was 365, 31 per cent of which each exceeded 500 acres in extent. Lightning caused 10 per cent of all fires. The total area burned was 510,972 acres, comprising 47,957 acres of merchantable timber, 300,800 acres of young growth, 27,450 acres of cut-over lands, and 134,800 acres of non-forested lands. The total loss and damage, including firefighting costs of $59,489, was $584,945, compared with a 10 - year average of $355,433.

MANITOBA

The western and northern parts, of Manitoba experienced a normal fire hazard. In the eastern and southeastern sections, however, the hazard was almost continuous from the beginning of July to the early part of September. The smoke-filled atmosphere rendered observation from lookout, towers difficult, and flying was held up at times. As a result the province experienced one of the worst fire seasons in its history. A total of 554 fires was reported, 13 per cent of which each exceeded 500 acres in extent. Lightning caused 19 per cent of all fires. A total area of 520,625 acres was burned, comprising 64,804 acres of merchantable timber, 34,817 acres of young growth, 3,853 acres of cut-over lands, and 417,151 acres of non-forested lands. The total loss and damage, including fire-fighting costs of $44,114, was $231,680, compared with a 10 - year average of $259,092.

ONTARIO

The fire season of 1936 was one of the most severe on record in Ontario, The western districts experienced an exceptionally high hazard throughout the season, with intense heat in the middle of the summer, and a large number of electrical storms, with little rain. In the eastern and southern districts the spring hazard was below normal, but high temperatures and lack of precipitation caused an extremely high hazard during the months of July and August. The late summer and autumn hazard was below normal owing to general rains. The total number of fires reported was 2,264, of which 10 per cent each exceeded 500 acres in extent. Lightning was given as the cause of 33 per cent of the fires. The total area burned was 1,264,433 acres, comprising 586,663 acres of merchantable timber, 258,604 acres of young growth, and 419,166 acres of non-forested lands. The total loss and damage, including firefighting costs of $780,000, was $3,260,705, compared with a 10 - year average of $1,669,470.

QUEBEC

This province experienced one of the most favourable fire seasons in recent years. Abundant precipitation prevailed during the months of May and September throughout the province. Periods of dry weather were experienced in the southern and western sections in June, in the Gaspe and Abitibi regions in July, and in the Gaspe and south-shore regions in August. The proportion of fires caused by settlers burning brush decreased from 49 per cent in 1935 to 27 per cent in 1936. Lightning caused 6 per cent of all fires. The total number of fires reported was 556, only 1 per cent of which each exceeded 500 acres in extent. The total area burned was 29,546 acres, which comprised 857 acres of merchantable timber, 3,558 acres of young growth, 9,231 acres of cut-over lands, and 15,900 acres of non-forested lands. The total loss and damage, including firefighting costs of $24,268, was $48,698, compared with a 10 - year average of $527,319.

NEW BRUNSWICK

Moderate temperatures and well-distributed rainfall resulted in one of the most favourable fire seasons on record in New Brunswick. The total number of fires reported was 102, none of which exceeded 100 acres in extent. Lightning caused 13 per cent of the fires. The total area burned was 513 acres, comprising 15 acres of merchantable timber, 77 acres of young growth, 243 acres of cut-over lands, and 178 acres of non-forested lands. The total loss and damage, including fire-fighting costs of $1,460, was $2,235, compared with a 10 - year average of $95,860.

NOVA SCOTIA

Although rainfall in the province was below normal, it was evenly distributed, and there were no long periods of drought such as occurred in recent years. As a result the number of fires and the losses were among the lowest on record in the province. The total number of fires reported was 146, none of which exceeded 100 acres in extent. No fires were attributed to lightning. The total area burned was 1,532 acres, comprising 46 acres of merchantable timber, 352 acres of young growth, and 221 acres of cut-over lands. The total loss and damage, including fire-fighting costs of $3,078, was $6,032.

DOMINION LANDS

There are certain areas administered by the Dominion Government on which organized forest protection exists.

On Indian lands, 51 fires were reported, which burned a total of 11,224 acres, comprising 2,201 acres of merchantable timber, 36 acres of young growth, 987 acres of cut-over lands, and 8,000 acres of non-forested lands. The total loss and damage, including fire-fighting costs of $6,050, was $13,126.

In the National Parks of Canada, 106 fires were reported, which burned a total of 38,195 acres, comprising 5,569 acres of merchantable timber, 22,177 acres of young growth, and 10,449 acres of non-forested lands. The total loss and damage, including fire-fighting costs of $41,482, was $141,526.

On Dominion Forest Experiment Stations, seven fires occurred, only one of which did any serious damage. This fire occurred in Alberta at the peak of the hazard season in August. It started from a dry lightning storm outside the experiment station area and, spread by violent winds, swept in a few hours through a valuable tract of timber. The total area burned on experiment station areas was 8,009 acres, comprising 3,340 acres of merchantable timber, 2,100 acres of young growth, and 2,569 acres of non-forested lands. The total loss and damage, including fire-fighting costs of $1,212, was $27,537.

FOREST AND STATISTICS TABULATIONS

The entire mass of forest-fire statistical data for all Canada, dating back to 1918, was recomputed, the best information available from all sources being used. Any slight differences in figures shown compared with previous reports are attributable to revisions in the data. Table 1 shows by years, the fire losses in Canada for the 10 - year period 1927 - 36, and the average for the period. These losses do not include damage to soil, loss in scenic value, cost of operation of forest-protective services, or the loss to industries dependent on the forests directly or indirectly. Table 2 shows the number and proportion of fire's attributable to each cause in each year for the 10 - year period 1927 - 36, and the average for the period. It will be observed that the average proportion of fires attributable to lightning is 16 per cent, whereas the proportion for 1936 is 26 per cent. This high figure for 1936 arises from the exceptionally high proportion of lightning fires this year in Ontario, Manitoba, and British Columbia. If 16 per cent be taken as the normal proportion of lightning fires in Canada, it follows that 84 per cent is attributable to human agencies, and, therefore, theoretically preventable.

FIRE HAZARD RESEARCH

The system developed by the Forest Service for computing the daily index of forest-fire hazard from records of rainfall, evaporation, relative humidity, and wind is now in general use in Quebec with satisfactory results. Studies are under way to simplify the system, so that a minimum of technical knowledge is required for its operation.

At the Petawawa Forest Experiment Station, observations were made daily in six forest sites studied in previous years to obtain data for the simplification of the system of index measurement. Studies on the behaviour of different types of evaporation-measuring apparatus were continued, with a view to developing a type of evaporimeter most suitable to forest use. Preliminary investigations begun last year on the use of chemicals in forest-fire suppression were continued.

At the Valcartier Forest Experiment Station, studies were continued in the pulpwood forests and in slash left after logging operations. Frequent and evenly distributed rainfall during the two seasons that these studies have been underway has greatly limited the amount of useful data obtained on fire hazard in this area. Co-operation was continued with the Quebec Forest Protection Service Station at Duchesnay, P.Q.

In co-operation with the National Research Council an attempt is being made to develop suitable apparatus for the comparative measurement of the intensity of test fires in hazard studies. The Council is also endeavouring to design apparatus to facilitate the measurement of the moisture content of forest litter in the field.

During the winter, work was begun on a bulletin outlining a method of forecasting weather and forest-fire hazard from local observations. A study extending over 3 years was completed, and a report prepared on the technique of oven-drying forest-fire fuels in field laboratories. Work was well advanced on the statistical treatment of data collected for the simplification of the method of fire-hazard index measurement. A statistical improvement was made in the tables developed last year for the computation of the index of fire hazard in grassy types.

TABLE 1

Statement of Forest Fires in Canada by Years for the 10 - Year Period 1927 - 36, with the Average for the Period

Item	Year										Total	Average
...	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	...	...
Total number of fires	3,605	4,243	6,712	6,805	6,965	6,298	6,298	5,911	4,955	5,946	57,738	5,774
Total area burned over Acres	471,878	1,346,026	6,028,551	2,670,188	2,093,922	2,463,923	1,008,558	1,475,117	856,183	3,026,646	21,440,992	2,144
Merchantable timber	...	...	...	...	...	...	...	...	...	...	...	...
Area burned Acres	114,708	217,350	663,574	746,129	394,824	708,085	204,405	321,414	172,592	919,764	4,462,845	446,285
Timber burned M ft. B.M.	109,407	77,360	540,900	779,081	538,551	569,126	255,383	899,545	98,971	2,077,584	5,945,908	594,591
Timber burned Cords	1,365,671	485,817	2,178,434	2,043,142	1,241,647	2,705,374	650,318	836,554	785,552	3,524,493	15,817,002	1,581,700
Estimated stumpage value $	830,954	610,726	2,803,952	4,452,046	1,715,113	5,063,577	1,199,305	1,754,882	1,254,981	4,646,726	24,332,262	2,433,226
Young growth	...	...	...	...	...	...	...	...	...	...	...	...
Area burned Acres	137,124	374,180	1,092,086	577,980	590,234	586,141	220,620	242,101	191,940	739,701	4,752,107	475,211
Estimated value $	193,471	539,518	2,004,050	1,456,135	1,215,682	1,209,063	454,648	573,455	326,423	1,284,102	9,256,547	925,611
Cutover land	...	...	...	...	...	...	...	...	...	...	...	...
Area burned Acres	35,875	101,297	720,912	427,285	535,418	772,625	331,614	562,446	258,964	303,348	4,049,784	404,978
Estimated value $	36,449	64,169	338,434	275,578	219,776	615,605	187,303	246,031	262,725	66,253	2,312,323	231,232
Non-forested area burned Acres	184,171	653,199	3,551,979	918,794	573,442	397,069	251,918	349,156	232,687	1,063,833	8,176,248	817,625
Other property burned Value $	91,670	147,304	301,499	506,779	363,516	264,769	162,075	149,923	355,541	84,560	2,427,636	242,764
Actual cost of fire-fighting	197,684	201,439	1,237,689	1,135,909	931,604	683,650	509,939	827,451	526,743	1,206,963	7,458,871	745,887
Total damage and loss $	1,350,228	1,563,156	6,685,624	7,826,447	4,445,591	7,836,664	2,513,270	3,551,743	2,720,413	7,288,504	45,787,640	4,578,764

TABLE 2

Statement of Fires by Causes for the 10 - Year Period 1927 - 36, in Canada

Cause	Year																				Total	Average	
...	1927		1928		1929		1930		1931		1932		1933		1934		1935		1936		Total	...	...
...	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	...	Annual Number	Per Cent
Camp-fires	669	19	798	10	1,347	20	1,265	18	1,481	21	1,329	21	1,202	19	1,111	19	875	15	1,185	20	11,262	1,126	20
Smokers	369	10	522	12	856	13	700	12	998	14	809	13	893	14	971	17	985	20	947	16	8,140	814	14
Settlers	532	16	598	14	769	11	954	14	1,097	16	1,385	22	1,265	20	946	16	1,143	23	567	9	9,266	926	16
Railways	574	16	989	23	1,014	15	731	11	625	9	354	6	312	5	255	4	192	4	176	3	5,222	522	9
Lightning	716	19	473	11	1,167	17	1,483	22	880	13	651	10	940	15	957	16	331	7	1,529	26	9,127	913	16
Industrial operations	129	4	159	4	222	3	137	2	133	2	91	1	94	1	198	3	123	2	132	2	1,418	142	2
Incendiary	95	2	226	5	387	6	522	8	674	10	746	12	511	8	349	6	400	8	608	10	4,518	452	8
Public works	54	1	27	1	80	1	98	1	97	1	47	1	56	1	104	2	35	1	42	1	640	64	1
Miscellaneous known	130	4	191	5	239	4	266	4	368	5	243	4	300	5	365	6	324	6	288	5	2,714	271	5
Unknown	337	10	260	6	631	10	559	8	612	9	643	10	725	12	655	11	547	11	472	8	5,441	544	9
Totals	3,605	100	4,243	100	6,712	100	6,805	100	6,965	100	6,298	100	6,298	100	5,911	100	4,955	100	5,946	100	57,738	5,774	100

WHITE-PINE BLISTER RUST

The fourth season of preliminary control treatment for white-pine blister rust was carried on at the Petawawa Forest Experiment Station during May, June, and July, 1936. A total of 21 square miles have already been covered, and an area of 8 square miles remains to be treated. These areas include practically all the valuable stands of white pine on the station. The work done so far has been largely investigative and experimental, with the object of demonstrating the feasibility, effectiveness, and cost of protecting the white pine from this disease. The area treated in 1936 comprised over 6 square miles of pole-sized pine timber, and about 5 square miles of a poplar stand with scattered white pine seed-trees and young pine.

The treatment consists of removing all gooseberry and currant plants, which comprise the botanical genus Ribes, on which an essential part of the life of the rust is passed. The rust cannot develop on any other kind of plant, and cannot spread from, pine to pine, so that if there are no Ribes plants the pines cannot be infected. The spores that carry the disease from the Ribes to the pines cannot live more than a few minutes in the wind and, therefore, the area of infection is limited. Of all the species of Ribes the worst from the stand-point of infection of the pines is the cultivated black currant, which will spread the disease a distance of a mile, whereas from other species it will spread only about 300 yards.

Labour cost in removing the Ribes has been about 20 cents an acre, but the cost varies widely, of course, with the prevalence of the Ribes plants. In order to effect complete removal, a follow-up treatment will be required in 4 or 5 years at a probable cost of about one-third the original operation.

White-pine blister rust infects all five-needle pines, including the eastern white pine, and the western white pine which occurs in British Columbia. The situation in Ontario and Quebec is particularly favourable from the standpoint of control, as the eastern white pine is not nearly so susceptible to the disease as the western white pine, and the drier climate, as compared with that of British Columbia, or the eastern United States, is unfavourable to the growth and spread of Ribes plants, which require considerable moisture. The main pine areas in the eastern provinces are practically free from infection from the cultivated black currant, whereas United States pineries, which are largely privately owned, are commonly interspersed with farmers' and villagers' gardens in which black currants are cultivated.

In the United States the Federal, State, and municipal authorities have been fighting this disease for many years, and have spent millions of dollars in their endeavour to stamp it out, to which end from 15,000 to 20,000 men are employed each summer.

The accessible stand of eastern white pine in Canada is estimated to include 8,788 million feet board measure of saw material, and about 9,944,000 cords of pole-sized timber, 70 per cent of which is in Ontario, 20 per cent in Quebec, and 10 per cent in the Maritime Provinces. The value of the merchantable white pine stumpage, based on prevailing royalties, is about $50,000,000; and during the 10 years 1926 - 35, the value of the white pine lumber produced in the eastern provinces has averaged $9,539,000 annually. The value of the young stand is difficult to estimate, but is a very valuable potential source of wealth.

PUBLICATIONS

A French translation of this Service's Bulletin 61 (Native Trees of Canada) was issued bearing the title Arbres Indigenes du Canada. Other bulletins publish,ed were No.88, Forests and Forest Industries of the Prairie Provinces, and No.89, A Forest Classification for Canada.

Circulars issued were No.47, Wood and Charcoal as Motor Fuel, and No. 48, Utilization of Sawmill Waste and Sawdust as Fuel.

Tree Pamphlet No.6, Red Pine, was reprinted.

FOREST PRODUCTS LABORATORIES OF CANADA

The conversion of timber stands into manufactured products for home consumption and export is one of Canada's important industries. The greatest concentration of timber-using industries occurs in Eastern Canada, and in British Columbia. Timber supplies the raw product for lumber, pulp, paper, rayon, wood-distillation products, railway ties, poles, piling, furniture, doors, shingles, shipping containers, planing-mill products, and for a wide variety of other wooden products and wooden parts.

With the development of more diversified uses of wood, and the extension of markets to nearly all timber-importing countries of the world, where Canadian timber must come into competition with other countries, timber industries have to face new problems each year. Besides, as old mature stands are cut, the character of the industry changes materially. Species of timber previously considered of no value assume importance; and increased attention must be given, therefore, to avoiding waste in both logging and subsequent manufacture.

The three Forest Products Laboratories are located at Ottawa, Montreal, and Vancouver; all of these cooperate with the wood-working industries in the study of technical problems affecting the manufacture and utilization of forest products.

In the main laboratories at Ottawa, all phases of wood utilization except those concerning pulp and paper are investigated.

The Pulp and Paper Laboratory at Montreal works in co-operation with the Canadian Pulp and Paper Association, and with McGill University, and its entire attention is given to special problems in the manufacture of pulp and, paper.

The Vancouver Laboratory is concerned particularly with those problems in timber mechanics and timber products that are peculiar to the special types of timber of the west coast, and which, because of distances involved, could not be dealt with satisfactorily at Ottawa.

The improved condition in the lumber and pulp industries has been reflected in the increased demand from industry for the assistance of the laboratories in these problems. The program of the laboratories for the year included work on 93 specific projects, as well as a large number Of minor investigations made as the result of requests, from the industry. A total of 2,858 inquiries for technical information and advice were answered.

Details of the principal problems given attention during the year follow.

OTTAWA LABORATORIES

DIVISION OF TIMBER MECHANICS

Testing of Small Clear Specimens

Testing was. completed on air-dry shipments of eastern cedar and yellow birch from,New Brunswick, and on aspen poplar from Saskatchewan. A French edition of the table giving values for the physical and mechanical properties of Canadian woods was prepared.

Comparative Strength of Sapwood and Heartwood of Yellow Birch

The investigation of the comparative strength of the sapwood and heartwood of yellow birch was completed and a final report prepared.

The Strength of Brown-stained and White Wood of Hard Maple

Tests on brown-stained and clear white wood of hard maple were completed and a final report prepared.

Glues and Gluing

Tests were completed on glued joints prepared in 1931 to determine the effect of time of service upon the joint strength. Re-tests were made on various concentration,s of low-grade bone-glue to determine the relation of glue grade to strength.

The Splitting Effect of Nails in Orange-crate Construction

Analyses of tests on white spruce, balsam fir, amabilis fir, and western hemlock orange crate slats at 8 per cent and at 12 per cent moisture content were completed.

Logging Sleighs

A series of tests was made on sleigh models to determine the effect of design and other variables upon the coefficient of friction of sleigh runners. An investigation of logging methods, with particular reference to sleighs, was, made at the Montmorency operations of the Anglo-Canadian Pulp and Paper Company. This investigation is, being carried out in co-operation. with the Woodlands Section of the Canadian Pulp and Paper Association.

Standard Specifications for Structural Timbers

The final draft of the standard, specifications for all species of Canadian timbers ordinarily used for structural purposes was approved by the committee of the Canadian Engineering Standards; Association. The Chief of the Timber Mechanics, Division was chairman of the committee of the Canadian Engineering Standards Association that dealt with this specification.

Eastern Canadian Structural Timbers

The testing was completed on 1,215 eastern spruce timbers in the Sizes exporter to the United Kingdom. These tests were undertaken at the request of, and the co-operation with, the Eastern Canadian Timber Commissioner to the United Kingdom, the Canadian Lumbermen Association, and the Provincial Governments of Quebec, New Brunswick, and Nova Scotia.

Strength of Dowel Joints

Recent inquiries from furniture manufacturers and from the Canadian Trade Commissioner at Liverpool, England, indicated the need of an investigation to determine the effect of such factors as, method of gluing, moisture content, imperfections in manufacture, and other variables upon the strength of dowel joints. Canadian dowel manufacturers exporting to the United Kingdom are co,operating in this investigation.

Plywoods and Veneers

The investigation of the gluing properties of potato and other commercial starches, carried out in co-operation with the National Research Council, was completed, and a report for publication prepared. The Royal Canadian Air Force specifications for plywood require that the "adhesion of plies shall be tested by forcibly separating the layers", but do not suggest any means whereby the force required to effect the separation may be determined. The design, and construction of equipment for the measurement of these forces were undertaken. Tests were made of the waterproof qualities of commercial Douglas, fir plywood.

Standard Specification, for Butter-boxes

At the request of the Dairy and Cold Storage Branch, Department of Agriculture, tests were made,on export and domestic butter-boxes obtained from Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and Nova Scotia. Based upon these tests, a recommended standard butter-box specification was prepared and presented at the Manitoba, Saskatchewan, and Alberta Dairy Conventions. At these meetings its adoption as a standard was recommended by both dairy and box-manufacturing interests.

Logging Chains

A committee of the Canadian Engineering Standards, Association was formed to standardize specifications for chains used by the pulp and paper, and lumber companies. The committee is composed of representatives of these companies, and of the National Research Council, McGill University, the chain manufacturers, and these laboratories.

Minor Investigations and Miscellaneous Testing

Minor investigations, usually arising from technical inquiries, have resulted in an increasing number of tests, among which are: tests for glue and furniture manufacturing companies; tests for the Aircraft Inspection Detachment of the Royal Canadian Air Force on samples of white spruce for possible use in aircraft, construction; tests for a construction company on loads necessary to embed a toothed-ring type of timber connector; tests on fibre-board dynamite boxes to determine whether they complied with shipping specifications; tests for a steel company,on a new design of nail; comparative tests on boxes of various types for export of foodstuffs; tests for a conduit manufacturer; and the, City of Montreal Engineering Department, on impregnated-fibre conduit.

DIVISION OF WOOD PRESERVATION

Creosote Treatment of White Spruce

White spruce, owing to its wide and abundant distribution, is used for mine timbers, ties, poles, posts, decking, and miscellaneous structural purposes. The wood of this species, however, when placed under conditions favourable to decay has not a very long life unless treated with wood preservatives.

Of the many factors that influence the penetration of wood with preservatives, the moisture content of the wood when treated is very important. In the experimental work on the treatment of spruce it was, therefore, decided to study this variable first. The preservative used was a creosote oil. After treatment the pieces were sawn open, planed, and examined for details of penetration. Tests indicate the possibility of successfully treating spruce that has been well air-seasoned before treatment.

With respect to the above work, two trial charges of green spruce test-pieces were treated with creosote at the request of a pulp and paper company. The results of these treatments were fairly satisfactory for the dense, slow-growing spruce, as the preservative penetrated the closely spaced summer-wood bands in a manner apparently adequate to protect the timber as a whole from decay.

Service Tests of Treated and Untreated Timber

In continuing the work referred to in the 1935 - 36 report, 77 additional tests were set up to obtain reliable data on the service life of treated and untreated timber products, including railway ties, telephone poles, piling, caps, stringers, and wharf decking. This brings the number of tests now recorded and under observation to 427. As the nature of the products indicates, these tests embrace different species of Canadian woods used in actual service under a great variety of conditions, and in areas extending from Vancouver to Halifax.

Service Tests of Treated and Untreated Fence-posts and Untreated Saplings

Many inquiries have been received from farmers as to the utilization of various woods for fence-posts, and the length of service that may be expected of such posts, both treated and untreated. The following work was carried out in order to have definite information regarding the adaptability of posts to treatment; the amount of preservative they absorb; and their length of service when treated as compared with their length of service when untreated.

Seventy-five posts of 20 species of timber were cut on the Petawawa Forest Experiment Station during the winter of 1935 - 36, and then peeled, and piled for air-seasoning until the beginning of September 1936. Treatment of the posts with creosote oil by the open-tank process was then begun. This work will be completed in the summer of 1937, when all the poles will be installed at the same time in the same location.

To study the effect of type of soil on durability, 230 peeled and unpeeled jack pine saplings, and 100 peeled cedar fence-posts, divided into two lots, were installed in light sandy soil, and in a very heavy clay soil. They will be inspected at regular intervals.

In a study of the effect of season of cutting, and of proper handling on durability, 600 jack pine saplings - 3 lots of 200 each - were cut at various intervals during the summer of 1935. Half of each lot was left lying unbarked in the woods for a period of several months; the other half was promptly removed after cutting, then peeled and kiln-dried. Installation of the different divisions of the three lots was completed during the summer of 1936.

Fire-retardant and Preservative Properties of Natural Brine from Maple, Ontario

Fire-retardant Tests. - Ten boards were impregnated with different salt concentrations of the solution, and from these boards 40 test sticks were tested in the fire-tube apparatus. The results showed that boards treated with the full-strength brine (26.5 per cent salt) bad an average absorption of 11 pounds of dry salt a cubic foot, and that this high absorption rendered the boards fire-retardant to a marked degree, roughly equivalent to that of a 5 - pound absorption of di-ammonium phosphate. Boards treated with the diluted brine, and having an absorption of 5 pounds of dry salt a cubic foot, showed somewhat erratic fire-retardant properties, ranging from fair to poor. Boards treated with a 2 - pound absorption of dry salt showed no fire-retardant properties.

Tests of the Wood-preservative Value. - Small pieces of wood were impregnated with varying concentrations of the natural brine and placed over mats of growing fungus. After 6 months those impregnated with full-strength, or nearly full-strength brine, show no signs of fungus attack; lower concentrations, as well as untreated controls, are badly attacked. The effect of the brine on hygroscopicity, machining properties, corrosion, etc., must also be considered.

Treatment of Ties with Tar

At the request of the Canadian Pacific Railway, hemlock, jack pine, and hardwood ties were treated with coke-oven tar to determine the possibility of using the straight tar as a preservative, the absorption of tar by ties of the different species, and the penetration secured.

Service Tests on Red-stain and Red-rot Jack Pine Ties, Treated and Untreated

This test covers ties installed in 1925. The test track was examined in 1936, and the ties removed during the year were noted and recorded. The removals to date because of decay show practically no difference in service life between ties infected with red-rot and with red-stain, but indicate in a striking manner the value of treatment with preservative (creosote coal-tar mixture).

Service Tests on Creosoted Jack Pine and Hemlock Ties

Ties of each of these two species were treated with creosote oil at the laboratories in 1919, and installed in the main line of the Canadian Pacific Railway in 1920. The ties were all in good condition in 1936 with no removals after 17 years' service.

Service Tests on Creosoted Hardwood Ties

This test consists of 831 ties - birch, maple, and beech - installed in the track of the Canadian Pacific Railway in 1930 and 1931. Recent yearly inspections showed that many of the beech ties were checking at their ends, and that this checking was aggravated by driving spikes to shim the track. The checking was less noticeable in the maple ties, and was almost entirely absent in the birch ties. No removals of ties were noted in the 1936 inspection, but a photographic reproduction of the test ties was made that will permit the study of the rate of failure, and the acceleration of such failure by spiking for shims, or by natural checking of the ties in service.

Mine Timbers

At the request of the Canadian Institute of Mining and Metallurgy, an investigation of the use of timber in Canadian mines was started. Of particular importance is the preservative treatment of mine timbers. A representative of the Laboratories visited a number of the large mines in the Kirkland Lake, Porcupine, and Sudbury Districts to make a preliminary study of conditions.

Preservative Value of Sodium Fluoride and Dinitrophenol when Applied to the Surface of Timber in a Thin Paste

Some interest has been evidenced in Canada recently in a new process for the treatment of wood. The preservative, which usually contains mainly dinitrophenol and sodium fluoride, with or without the addition of a considerable amount of sodium bi-chromate, is brush-painted in the form of a paste over the surface of green wood. The pile of treated wood is then covered with waterproof paper for from 20 to 90 days to protect it from rain, and to prevent the loss of moisture while the preservative is penetrating into the wood. Tests are being carried out in the Laboratories on the treatment of ties by this process.

DIVISION OF LUMBER SEASONING

Kiln-drying Studies

The experimental work was confined to kiln-drying hardwoods, the species studied being maple, beech, ash, and oak. As these species season rather slowly, relatively few charges were completed within the year, particularly as most of the stock was of 4 - inch thickness. Though sufficient material on which to base conclusive recommendations has not been seasoned as vet, it has been found practicable to kiln-dry thick hardwoods without any appreciable amount of degrade within a reasonable length of time. Construction work was commenced on an experimental dry-kiln of semi-commercial proportions, which will have a maximum capacity of about 6,000 feet board measure of 1 - inch lumber. The kiln is of the internal-fan, cross-circulation type equipped for variable speed circulation, and its addition to the laboratory equipment will make possible experiments on material of commercial sizes, and in volumes comparable to industrial practice.

A noteworthy feature of the year's work was the increasing number of requests for advice on the construction and remodelling of dry-kilns, particularly from the smaller wood-working concerns.

Equilibrium Moisture Content Studies

Studies of the fluctuations in equilibrium moisture content in 1 - inch and 1 1/2 - inch softwood lumber, covering a period of 5 years, were reported upon. 47398 - 9 1/2

This study showed that, provided the lumber is piled with reasonable care, the moisture content will not.exceed 20 per cent at any season of the year after it has dried below that point, except under abnormal weather conditions. It showed also that good seasoning yard conditions, and painstaking piling practices, tend to minimize the fluctuations in the moisture content from season to season, and to prevent the occurrence of damp "pockets" in lumber piles.

Air-seasoning Studies

On the invitation of certain operators who sought criticism of their seasoning practices, a survey was made of rails and seasoning yards in New Brunswick and eastern Quebec in the summer of 1936.

An analysis was made of a number of tests on the drying rate of various species of softwood lumber in the Ottawa Valley. The woods studied were white pine, red pine, jack pine, eastern spruce, and eastern hemlock, mostly one inch in thickness. It was found that such lumber, if piled early in the summer, would dry to a moisture content of 20 per cent or less in about 7 weeks, but that 1 - inch lumber required another 3 weeks to. reach the same degree of dryness. Autumn - piled stock will not ordinarily be thoroughly seasoned until the following May. Attention was given to the seasoning of the upper grades of white pine in specially constructed sheds, a practice that is finding favour because of the reduction of degrade effected thereby.

Use of Yellow Birch and Hard Maple for Spokes and Felloes of Artillery Wheels

A number of artillery wheels of chemically treated yellow birch and hard maple were made in 1934 to, compare their strength and length of service with those made of standard oak and ash. Since then these wheels have been thoroughly examined each year. The wheels have been subjected to the same hard usage as other wheels, and so far have shown no signs of failure of consequence.

Wood Taint in Butter-boxes

Tests were concluded during the year by the Department of Agriculture on the quality of butter stored in boxes made of various Canadian softwoods under the supervision of the Forest Products Laboratories. Some of the boxes were coated with paraffin, and others with a casein-formalin mixture.

Wood-fuel Investigation

The desirability of increasing the use of wood as fuel has been directed to the attention of the Laboratories on several occasions. In the spring of 1936, therefore, plans were made for a widespread study of the possibilities of extending the use of fuel-wood in those regions largely dependent upon imported coal.

In co-operation with the Fuel Research Laboratory, the designs of woodburning stoves and furnaces were studied to assist in developing the most efficient and most easily operated types. Consideration has been given also to methods of cutting, transporting, and distributing fuel-wood so that cheaper and more desirable practices may be adopted, to the greater use of wood as an industrial fuel, and to the greater use of charcoal as a fuel.

DIVISION OF TIMBER PHYSICS

Wood Sections

The Laboratories receive numerous requests from wood-working plants, Government departments, and other inquirers for specific identification of woods of domestic and foreign origin, many of which refer to customs or trade matters. It is necessary, therefore, to maintain standard microscopic preparations of commercial timbers for reference purposes. Sections of twenty-six species were added to the Laboratories' collection during the year.

Variation in the Quality of Spruce and Balsam Fir

This is an investigation of the variation in quality of spruce and balsam fir in different types of stand in Eastern Canada. The measurement of basic density of pulpwood, too, is a good indication of its mechanical properties, and of the amount of pulp the wood is capable of yielding, so that determinations of this property, together with inspection of the wood, gives a very good method of evaluating timber or pulpwood. During the summer of 1936 material was collected in New Brunswick and Nova Scotia. The series of collections of spruce and balsam fir from softwood, mixed hardwood, and black spruce stands at various points from western Ontario to the Maritime Provinces was thus completed. The material was selected from the limits of various pulp and paper companies, with the co-operation of foresters of these companies. Essential data regarding the type of stand, soil condition, topography, aspect, drainage, and other characteristics were recorded for each stand sampled at the time of collecting the wood. At the Laboratories, tests have been recorded on some 800 trees from more than 30 localities. An attempt is being made to present the information in such form as will enable woods operators to apply it readily to the forest types of their respective districts so that the density of wood from each district or type may be estimated.

A Study of Variability in Wood for the Purpose of Developing Methods of Selecting Strong Stock

A study of samples of ash, dried in the kilns of the Laboratories for the use of the Department of National Defence, showed that there was considerable variation in density of the wood, but no correlation between width of rings and density of the wood was possible.

Fibre Dimensions

The practice of measuring cell dimensions is widespread. In practice it has been found that the properties of paper made from wood of high density are different from those of paper made from wood of low density. The diameter of wood cells of spruce wood of high density is different from that of low density, and it is, therefore, desirable to record measurements of the diameter of the cells of softwood pulpwoods in the expectation that such a measurement of the paper-making fibres will show some quantitative relationship with qualities of paper. Specimens from both light and heavy white spruce trees, and from trees of heavy-weight black spruce were sectioned for microscopic measurements of cell diameter.

General

Samples of the timber tested or investigated at the Laboratories were identified for record; these samples included joists tested for mechanical properties, timber used in standard tests of different species, the wood in boxes and crates under test, material (ties, poles, etc.) used by the Wood Preservation Division, and material inspected by these and other divisions of the Laboratories.

Samples of domestic and foreign timbers were received from timber dealers, pulpwood operators, paper mills, engineers, and contractors, the Department of National Revenue, the Commercial Intelligence Service, and other sources for identification.

Some of the samples submitted with requests for information on the suitability of the wood for timber, plywood, and special uses require short special investigations, an instance being the examination of pulpwood samples from mills to check methods of density measurement.

Figures were prepared in collaboration with the Woodlands Section of the Canadian Pulp and Paper Association showing the weight of water and wood in representative pulpwood of various moisture contents, for a report of the Association on the cost of rail shipment of pulpwood.

DIVISION OF TIMBER PATHOLOGY

Reference Collection of Pathological Material

A re-examination of the standard cultures was commenced. All cultures found unsatisfactory as an aid in identifying fungi isolated from wood are being discarded, among them being the single-spore cultures, as cultures made from different spores from a single fruit-body may vary considerably. The standard series will contain sporophore tissue cultures, and those of polysporous origin.

Red-stain in Jack Pine: Its Development in Creosoted and Untreated Railway Ties under Service Conditions

Red-stain is the early stage of decay caused by the fungus Trametes Pini which attacks jack pine and other softwood trees. Its continuous growth reduces the firm, red-stained wood to a stage known as red-rot, in the advanced condition of which the strength of the wood is destroyed. The study is being made to determine whether Trametes Pini continues to develop in red-stained wood, and continues to produce the red-rot stage in railway ties under service conditions. Results to date indicate that Trametes Pini is not active under track conditions. The experimental track still contains approximately 200 ties, which will be removed and analysed at regular intervals. During the year a report entitled "Analysis of 20 Creosoted and 30 Untreated Ties Removed from Track in April, 1935," was completed and submitted; this analysis involved the preparation and study of some 6,000 cultures.

Blue-stain in Softwoods

Laboratory tests of eight chemicals or combinations of chemicals recommended for control of stain and mould in softwoods were set up, with spruce sap,wood as the test material. The piles were under observation for a month and then examined. Small pile's of white and of red pine sticks were set up to test the efficiency of certain chemicals in protecting the wood against attack by stain and mould fungi. Spruce lumber was piled in a lumber yard at South Nelson, N.B., in July, to test the efficiency of certain chemicals in controlling stain and mould development. The pile was dismantled and examined in October. Results to date indicate that two of the chemicals tested - one being a mixture of ethyl mercury chloride with inert substances, and the other a mixture of sodium chloro-orthophenylphenolate and sodium tetrachlorophenolate in equal amounts - give excellent protection against stain, and that the latter also checks mould development.

Rate of Deterioration of Pulpwood in Storage

In 1932 sample pulpwood sticks were placed in a "block" pile at Hawkesbury, Ont., and others in a "corded" pile at Kipawa, Ont. A sample from each test stick was furnished the Laboratories for analysis. The sticks were stored until 1936, when 20 sticks from Hawkesbury and 13 from Kipawa were sent to the Laboratories for study.

Hawkesbury Samples - Tests on this material indicated that during the storage period the sound sticks suffered complete decay to the extent of more than 31 per cent of their original size, and that decay had become established in another 60 per cent. Lenzites saepiaria, a very active destroyer of softwoods in storage and service, was found to be the most prevalent agent of decay. Stereum sanguinolentum, which causes red heart of standing balsam fir and spruce, was also isolated, and five other fungi were obtained in culture, one of which had been isolated previously from stored Northern Ontario pulpwood.

Kipawa Samples. - Two sticks showed a trace of typical decay after 4 years' storage. Of the total volume of 12 - 22 cubic feet examined, 18.8 per cent bad developed incipient decay.

Technical Inquiries

The following problems received attention as the result of inquiries: stain in softwoods and hardwoods, with special reference in several cases to chemical treatments recommended for control; decay in buildings and mine timbers, and of pulpwood in storage; development of "slime" in pulp-mills; cultures of wood-destroying fungi; and the identification of a culture submitted. Other requests had reference to discoloration in birch shims; durability of stained pine and of water-driven white pine; decay in Western hemlock ties; identification of decay in elm, birch, ash, and cedar; relative durability of certain woods when exposed to marine conditions, and of summer - and winter - felled cedar.

Decay in Western Hemlock Railway Ties

Some of the Western hemlock ties, imported into England from British Columbia by one of the large railway companies, were discarded because of the presence of decay. The fungus responsible for the decay was identified from samples forwarded to the Laboratories as Fomes pinicola, which attacks weakened standing trees and down timber.

General

The preparation was commenced of a publication on fungal defects in Eastern Canadian timbers.

DIVISION OF MARKETS AND EXHIBITS

Markets

Investigations on the marketing of lumber and lumber products usually arise from inquiries with respect to specific information on wood products, their sources of supply, their cost or design, record in use, and other topics, which are received from trade commissioners, provincial governments, Canadian and foreign manufacturers, and others.

Exhibits

Exhibits prepared so as to show modern trends and good practices in the use of wood were on display at the, Produced-in-Canada Exhibition, Montreal, and the Central Canada Exhibition, Ottawa.

WOOD CHEMISTRY

Wood Gas for the Operation of Motors

Information was assembled on developments in the use of gas, produced from wood or charcoal, for the operation of internal combustion engines. These developments are of importance to lumbering and mining operations distant from cheap transportation, and in some cases to wood-working plants where wa,ste wood is available at low cost.

Attention was given also to the following problems: the bleaching of discoloured maple, and of western red cedar; production of turpentine from Canadian pines; finishing of yellow birch; the manufacture of leaf oils, of potash, and of Canadian snake-root oil; tannin extract from Western hemlock: the distillation of hardwoods; use of wattle bark for tanning; carbonization of wood; application of acid-proof stains to wood; and the use of birch oils.

General

A number of papers were prepared for technical and trade journals, or for delivery before scientific or trade associations. Among the subjects dealt with were - Wood Preservative and Fire-retardant Properties of Muskiki Brine; Fire-retardant Treatment of Wood; Wood-box Construction; Variability of Wood; Use of Wood for Fuel; Strength Properties of Eastern Canadian Woods;

Preservative Treatment of Structural Timbers; Canadian Forests as a Source of Fuel; Symposium on the Utilization of Hardwoods Occurring in Pulpwood Limits; Recommended Specifications for Butter Boxes; Density Studies of Eastern Canadian Spruce and Balsam.

Accommodation

A number of changes in the accommodation and facilities of the Laboratories were made by the Public Works Department.

A new chamber, 18 feet by 10 feet by 10 feet, and provided with automatic temperature and humidity control, was erected for maintaining timber at a uniform moisture content of 12 percent, so as to permit the testing of air-seasoned material throughout the year.

An experimental, semi-commercial dry kiln, with an overhead heating system and fans for cross-circulation, was erected. Its walls, and ceiling are constructed of creosoted 2 - inch planks, double thickness, separated by a heavy roofings paper, the joints between planks being staggered. The kiln is lined with an asbestos board, with the joints carefully caulked.

A reinforced concrete wet storage tank, 30 feet by 10 feet by 6 feet, was built for material awaiting test in the green condition. Adjustments were made to the sawmill and the storage room for wood-preservation tanks, and tracks were laid to provide ready transportation of material to the sawmill, dry kilns, and wood-working shop.

Co-operation with National Research Council

Members of the staff served on the Paper Standards, Paint and Pigments Specifications, Creosote Specifications, and Specifications for Chemicals subcommittees of the National Research Council.

PULP AND PAPER DIVISION (MONTREAL)

The chief activities of the Division during the past year were the study and development of methods for analysis and testing of pulp and paper; researches in pulping wood, by mechanical and chemical processes; the standardization and calibration of instruments for testing pulp and paper; the testing and analysis of samples of various woods, pulps, and papers submitted by commercial firms and individuals; and the furnishing of information on a variety of subjects, on the manufacture of pulp and paper. A detailed description of the activities of the Division follows:

METHODS OF ANALYSIS

The final design of the Johnston pulp fibre classifier was approved, and arrangements were made with the Canadian Pulp and Paper Research Corporation and a Canadian manufacturer for its manufacture and distribution in Canada and elsewhere.

The Steel brightness tester has been assembled and tested. A comparison between this instrument and that devised by Dr.O. Maass for measurement of the opacity of paper was conducted. Studies in the use of colour filters to determine relative brightness in light of different colours have been undertaken. The instrument has been used in the examination of samples of board.

An instrument, devised for measuring the oil-absorbency of paper, has been used successfully to determine the behaviour of papers in contact with ink.

Further investigations have been made into the manner in which drainage takes place in the sheet machine and the freeness tester, because of the desirability of linking more closely measurements of drainage and freeness with the behaviour of stuff flowing on a Fourdrinier wire.

At the request of the Subcommittee on Paper Quality of the Canadian Government Purchasing Standards Committee, studies were made of the chemical and physical properties of papers purchased for purposes of record and correspondence by the Dominion Government. Information was also obtained regarding testing procedure that might be included in specifications of quality for Government purchases of paper.

PULPING BY CHEMICAL AND MECHANICAL PROCESSES

Only laboratory-scale studies of pulping processes are made, as it has been found that these can be conducted more rapidly and economically than those of a semi-commercial scale.

A series of investigations was conducted into the possibility of pulping Canadian hardwoods by the sulphite process, most of the work being carried out on white birch (Betula papyrifera), yellow birch (Betula lutea), and aspen (Populus tremuloides). Although the average fibre-length of these hardwoods is much shorter than that of the conifers, it varies to a lesser extent. Satisfactory pulps were obtained in laboratory operations, and the conditions for operation were determined. Aspen gave bright pulps; birch pulps, however, required bleaching before a white pulp could be obtained. Pulps from hardwoods by the sulphite process can apparently be blended satisfactorily with coniferous pulps, and, for special purposes, some advantage may be secured in some cases by such blending. Pulps made by the soda process appear to possess higher bulking properties, but the yield is reduced. Mechanical pulping of the hardwoods yields a rather uniform, short-fibred pulp that might be suitable for moulding operations, although its colour will prevent its extensive use as newsprint.

Some experiments were made on the pulping of jack pine with both a lime and a soda base sulphite cooking acid. Some satisfactory pulps were produced from sapwood, but heartwood appeared to be more resistant to pulping. Jack pine is unlike Southern pine in that the proportion of heartwood is fairly high. Mechanical pulsing proved more satisfactory, but the summer-wood pulps less readily than the spring-wood.

Besides the investigation of hardwoods and jack pine, support was given to investigations by students in the Faculty of Graduate Studies at McGill University on the effect of pre-treatment of wood on pulping by the sulphite process, land the influence of high concentrations of sulphur dioxide and calcium sulphite on yield of pulp, and delignification of wood.

Mechanical pulping experiments were continued, a miniature pulp grinder being used. The results obtained were noticeably close to those obtained in commercial practice, excepting that, owing to the absence of large amounts of pulp, which in commercial grinders must escape from under the wood, the rate of production was much higher.

By following this procedure it was found possible to duplicate previous experiments with considerable accuracy, so that the method could be used to investigate the effect of variation in the controllable variables of the groundwood process - a research that has cast considerable light upon the mechanism of grinding. Insulating the apparatus, and determining the heat input and output, showed that all the energy consumed in grinding appears as sensible heat.

PRINTABILITY OF PAPER

Work on the printability of paper was continued, and a more detailed investigation was made of the changes in dimension that take place when paper is exposed to varying conditions of humidity and temperature. A hysteresis effect was observed when papers were exposed to moist air and then allowed to dry out or, conversely, were first dried and then humidified. The effects were

studied in a vacuum, in still air, and in currents of air to ascertain the effect upon loss and regain of moisture. In some cases exposure to, moisture was found to effect a permanent deformation. This work is of considerable importance where close register on the printing press is essential, as, for instance, in multicolor printing and lithography. A number of types of paper were compared as to their behaviour with respect to humidity.

Attention was given to determining accurately the percentage of moisture present in paper.

Considerable attention was given to the development of the oil-absorbency tester, which was used to determine the ability of different papers to absorb oils such as are used in inks. The influence of the moisture content of the papers studied upon oil-absorbency was also examined.

A proof-press was used to record the printing qualities of the different papers tested.

PHYSICAL CHEMISTRY OF PULPS AND CELLULOSE

Continued support was given to investigations being conducted by students in the Faculty of Graduate Studies at McGill University. Six workers were engaged on basic problems related to the pulp and paper industry, included in the research program of the Division. Among the properties of cellulose and pulp under investigation were the thermal conductivity of pulps and paper, the dielectric constant of cellulose and pulps, the adsorption of gases, vapours, and electrolytes on pulps, and the determination of the consistency of pulp suspensions by measuring their electrical conductivity.

STANDARDIZATION AND CALIBRATION OF INSTRUMENTS

During the year, fourteen Canadian standard freeness testers and one hundred and sixty-seven parts of the same tester were calibrated. Two British pulp evaluation apparatuses and five parts were calibrated.

GENERAL

Testing of Pulp, Papers, Etc.

Testing of pulp, papers, etc., was carried out throughout the year. The total number of tests amounted to 1,418.

Technical Inquiries

Technical inquiries relating to forest products, and the manufacture of pulp and paper, were received and answered to the number of three hundred and eighty-six. Some of the inquiries were for scientific information, but most of them dealt with manufacturing problems.

VANCOUVER LABORATORY

The improvement in the export trade, particularly with the United Kingdom, and other parts of the Empire, combined with the greater stress being placed on secondary species, such as Western hemlock, in these markets, and the limited local demand for forest products, has resulted in some changes in the nature of the work of the Laboratory.

Close to 900 inquiries were answered, a slight increase over the previous year; and many requests were received for assistance in developing new uses for wood, in improving methods of manufacture, and in extending markets, particularly for the lower grades of material or secondary species.

DIVISION OF TIMBER MECHANICS

Standard Tests for Mechanical and Physical Properties

Tests were made on air-dried material of broad-leaved maple, and on Douglas fir from the interior wet belt of British Columbia. Studies were continued on the effect of rate of growth upon the specific gravity and strength of Sitka spruce, with particular reference to the use of this species for aeroplane construction. One specification recommended by the Vancouver Laboratory, which has. been in use for some time by the Royal Air Force of Australia, requires a minimum specific gravity of 0.36 (based on weight and volume oven-dry). This specification has been accepted during the past year by Canada, South Africa, and New Zealand. Certain mechanical tests are required for material Showing a specific gravity between 0.36 and 0.38, which must show specified minimum values. Material over a specific gravity of 0.38 is accepted without test.

An investigation with particular reference to specifications for aeroplane construction was commenced to determine the effect of the shape of the test-piece on the strength-value obtained in test. The tests on Sitka spruce included the hour-glass shape and the square shape.

The Effect of Coloration on the Properties of Douglas Fir

The study of the effect of streaky coloration upon the mechanical properties of Douglas fir was extended somewhat, as considerable stained material is found in logs from widely separated areas.

The Strength of Glued Joints

Casein glue has been used almost exclusively in the plywood industry, which is the greatest single consumer of glue in British Columbia. Recently, however, soya-bean glue has come into use. Many tests have been made, chiefly on three ply material, to determine whether the glue meets the requirements of Royal Canadian Air Force specifications in regard to strength and water-resistant properties.

The Holding Power of Nails in British Columbia Species

Tests were completed on Western red cedar, and are proceeding on Douglas fir and yellow cedar.

Tests of Structural Timbers

Work has been completed on air-dried Western hemlock joists.

Miscellaneous Tests

More than 1,200 miscellaneous mechanical and physical tests were made on special problems, one of the most important of which was the development of a box for apple-packing that will reduce the loss encountered in the use of the present box. At the request of one of the large railway companies, and of a wood preservation company, moisture content determinations of creosoted railway ties were made by distilling wood-borings taken from the treated portions of several ties with xylol, to determine the effect of treating methods upon the final moisture content. A series of tests was made on four different types of boxes used for salmon cases, at the request of a large plywood manufacturer; and another series was made on Western hemlock ladder stock at the request of the Pacific Lumber Inspection Bureau, and a hemlock producer. Tests on the comparative holding-power of wood screws in Douglas fir, and in birch plywood were made to determine whether Douglas fir plywood might be substituted for birch in the construction of theatre tip-up chairs. Some preliminary investiga-

tions were made at the request of a box manufacturer, to provide a comparison between one-piece Western hemlock box-ends and two-piece ends, tied with corrugated metal ribbon fasteners. Tests were made in diagonal compression on standard wall sections made up of 2 - by 4 - inch studs with 3/4 - inch shiplap cover, and of 2 - by 4 - inch studs faced with a wallboard, and made up with excelsior and neat Portland cement. Several custom tests were made on the Laboratory machines, as there is no other equipment available in British Columbia for testing many of the materials of construction.

DIVISION OF TIMBER PRODUCTS

Seasoning

The investigation of the equilibrium moisture content of lumber in the lumber-producing districts in the Interior and the Northern Coast regions of British Columbia was continued. Studies were made on the conditioning of selected "knotty" Western white pine to a uniform moisture content of 7 per cent for use in high-grade panelling.

The Shipment of Lumber: Factors Affecting Quality and Moisture Content

Data obtained from thirty-five test shipments of lumber in connection with the change in moisture content of seasoned lumber during ocean shipment were assembled for publication. An investigation was commenced of the effect of exposure to rain on seasoned lumber, bulk-piled and awaiting shipment. Assistance was given to the Association of Marine Underwriters on the problem of rust in fruit cans exported from British Columbia in wooden boxes. Recommendations in regard to stain and discoloration reduction were made on the air-seasoning and shipping of some large orders of Western white pine to the United Kingdom. A study was made to determine the causes of water-staining in a large cargo of Douglas fir V-ceiling shipped from Vancouver to Quebec, and in a cargo of Douglas fir doors shipped to the United Kingdom.

Air-seasoning

The investigation of the air-seasoning rate of Douglas fir structural timbers, and of Western red cedar poles was continued. Special attention was given to the air-seasoning of Western hemlock. A brief study was made to determine the most satisfactory method of piling Sitka spruce oars for air-seasoning. A degrade study was carried out at a local mill on wide, clear Douglas fir. Mainly to prevent the development of stain and discoloration during transit, a large quantity of lumber is now seasoned. For this purpose the surface moisture content rather than the average moisture content is considered of special importance. A study was undertaken to compare these two factors for Western Write pine of various thicknesses. Attention was given also to the surface drying of thick aeroplane spruce, the seasoning of lumber in sling-loads, and the seasoning of fir flagpoles.

Kiln-drying of Lumber

The investigation of the effect of rate of air circulation on the kiln-drying of lumber was continued.

A charge of specially selected Western hemlock was dried in the large experimental kiln at the request of the British Columbia Lumber and Shingle Manufacturers' Association. This material was exhibited at the 1936 Empire Exhibition in South Africa. Assistance was extended to two mills in devising satisfactory drying schedules, and methods of kiln-operation for drying 2 - inch Western hemlock merchantable. Satisfactory drying to a moisture content of 18 per cent was obtained in 8 days.

Preliminary to the devising of satisfactory kiln-drying schedules, the drying of special charges of wide hemlock clears, I by 10 - inch true fir (Abies), was supervised at a local sawmill, equipped with internal - fan kilns, and having accurate control of drying conditions. Work was continued on the cause of cupping in Western hemlock. A kiln-degrade study was made at a local sawmill where abnormally heavy losses occurred in the manufacture of kiln-dried finish from green Douglas fir clears. A study was made at two sawmills to determine the cause of abnormal degrade that was occurring during the kiln-drying of edge-grain Douglas fir.

Charges of 1 - by - 4 - inch, and 3 - by - 3 - inch Douglas fir in 20 - inch lengths were dried in a small chamber to test the feasibility of drying these classes of material, which are salvaged from low-grade shorts. A charge of 4 - by - 4 - inch air-dried white oak was dried in the large experimental kiln in accordance with a drying schedule recommended by the United States Forest Products Laboratory for highland oak. An investigation was made at a local mill of the causes of variable moisture content in. kiln-dried alder, birch, and maple. Assistance was given also to two Fraser Valley mills in problems arising from the kiln-drying of red alder and broad-leaved maple, green from the saw; and to. one sawmill, and two furniture factories in the kiln-drying of black cottonwood for cores for furniture veneers. Visits were made on request to a number of sawmills and woodworking factories in connection with their kiln-drying problems. These included the installation of a commercial kiln having two rates of air circulation; kiln-drying of cedar shorts for furniture core-stock; drying various sizes of lumber to conform to different moisture specifications; cause of discoloration of broom-handles during drying; drying common car material; cause of checking in alder chair-bottoms; design of kiln for drying cones; and causes of cupping and other defects in wide and thick Douglas fir.

Kiln-drying of Shingles

Periodic examination was made of the twenty-six test panels erected in September 1929, in connection, with the investigation of the effect of kiln-drying on the serviceability of Western red cedar shingles. A study wag started on the use of mechanical circulation of air in the kiln-drying of cedar shingles. The causes of slow and uneven drying of Royal shingles were studied.

In the kiln-drying of shingles having an abnormally high moisture content a defect known as "collapse" may occur unless special drying conditions are used. Assistance was given, to a local mill that was experiencing this difficulty.

Moisture Content of Shingles in Service

The study of the effect of different weather conditions on the moisture content of Western red cedar shingles in service was continued.

Effect of Seasoning on Insects Injuring Lumber

One test run was made in the large laboratory kiln at the request of the Entomological Branch, Department of Agriculture, to determine the effect of heat on beetles infesting swamp oak.

Utilization

The increased use of British Columbia woods has opened a wide field of investigations. The following are some of the more important problems dealt with:

Sawmill Waste, and Its Utilization

Work was confined chiefly to: minor studies on the utilization of sawmill waste for fuel; the investigation of new developments affecting waste utilization; and the furnishing of information in reply to inquiries. Among the principal

problems that received attention were: the storage of sawdust; the calorific value of various wood fuels; the manufacture and use of a special fuel for domestic sawdust burners, composed of 50 per cent sawdust, and 50 per cent hogged fuel; the conversion of dry Douglas fir shavings into briquettes; the distillation of sawmill waste; the use of sawdust for insulation; and the use of hemlock mill-waste for fuel, and for pulpwood. Calorific values and moisture content determinations were made at the request of a coast sawmill, and a pulp-mill on samples of Western hemlock and "true fir" (Abies) hogged fuel.

An estimate was made of the quantities of fir and hemlock sawdust produced in the sawmills in the Vancouver and New Westminster areas. Production, based on the log consumption for every sawmill in the areas, amounted to 208,450 units of 200 cubic feet, of which approximately 77 per cent was Douglas fir. Developments in sawdust-burning stoves, and the possibility of devising a special stove to burn hogged fuel were investigated. The possibility of using certain forms of hemlock and Douglas fir for wood flour in the manufacture of linoleum was given attention. The, possibility of using the large volume of wood-dust resulting from the manufacture of plywood is being investigated.

The Use of Wood and Charcoal as a Motor Fuel

The distribution of Forest Service Circular No.47, Wood and Charcoal as a Motor Fuel, resulted in a demand for further information on the use of producer-gas, the manufacture of charcoal, and related problems on this form of wood-utilization

Lumber-manufacturing Studies

A preliminary study was made on lumber-manufacturing methods to determine a satisfactory plan for investigating the effect of diameter and quality of log on lumber manufacture, grades, and costs. Considerable interest has developed in British Columbia sawmills in the use of gang-mills for the manufacture of small round logs. A preliminary investigation of the operation of the one American and the two Swedish gang-mills in the coast region was made.

Timber Pathology

The Effect of Coloration on the Properties of Douglas Fir

The study of the effect of red streaks in Douglas fir on its physical properties and value was continued.

Development of Stain and Decay in Ocean Shipments

The causes of stain and mould development during export shipment of Western hemlock and Western white pine to the United Kingdom were studied.

The Effect of Kiln-drying upon the Sterilization of Lumber

Studies of the sterilizing effect of kiln-drying upon lumber showing incipient or typical decay were continued on Western red cedar, hemlock, and true fir (Abies).

Microscopic Anatomy of Important Woods

Forty-four wood specimens and thirteen sawdust specimens were given species identification.

Reference Collection of Pathological Material

Additions made to the reference collection included 43 cultures of wood-destroying fungi, obtained from the Division of Pathology of the Ottawa Laboratories. The morphology and taxonomy of a singular fungus inhabiting yellow cedar was studied.

Determination of Sapwood

An investigation was undertaken to find a quick method of determining the extent of sapwood in certain species. The use of iodine and potassium iodide as a means of showing the limits of sapwood was studied for Douglas fir, hemlock, and Sitka spruce.

EXHIBITS

Twenty-seven sets of samples of British Columbia woods were distributed, chiefly to educational institutions, to forest research organizations in all parts of Canada, and to China, Switzerland, United States, Japan, and the United Kingdom.

A number of photographs of logging and lumbering scenes in British Columbia were framed for display at the Naguya Pan-Pacific Exhibition in Japan in 1937. Assistance was given the British Columbia Lumber and Shingle Manufacturers' Association in the preparation of materials for its exhibit rooms at the Empire Exhibition in South Africa; to the Canadian Forestry Association in the assembly of exhibit material for their new quarters in Vancouver; and in the Vancouver Jubilee "March of Time" display, featuring forestry in British Columbia. Co-operation was extended to the Canadian Forestry Association, and the British Columbia Lumber and Shingle Manufacturers' Association in the display of forest products, wood specimens, photographs, etc., at the Vancouver Exhibition.

PUBLICATIONS AND REPORTS

Circular 47, Wood and Charcoal as Motor Fuel, was published.

Two reports were submitted for publication as circulars, namely: Utilization of Sawmill Waste and Sawdust for Fuel; and Change in Moisture Content of Seasoned Lumber During Ocean Shipment.

SURVEYS AND ENGINEERING BRANCH

Organization Chart, Surveys and Engineering Branch.

SURVEYS AND ENGINEERING BRANCH

J.M. WARDLE, DIRECTOR

The Surveys and Engineering Branch is charged with the responsibility of undertaking in a correlated manner certain survey, scientific, and engineering work through the agency of the following services or units: the Dominion Observatories; the Dominion Water and Power Bureau; the Engineering and Construction Service; the Geodetic Service of Canada; the International Boundary Commission; the Hydrographic and Map Service.

DOMINION OBSERVATORIES

The Dominion Observatory, Ottawa, and the Dominion Astrophysical Observatory, Victoria, B.C., conduct both research and practical work in the various branches of astronomy, astrophysics, and geophysics. The investigations at both observatories are mainly scientific, and they form Canada's official contribution to research in astronomy and allied sciences. Many of the studies, however, have distinctly practical application.

DOMINION OBSERVATORY, OTTAWA

Opportunity was taken during the process of reorganization to consolidate the work in seismology and terrestrial magnetism throughout the country, which had heretofore been carried on partly by the former Department of the Interior and partly by the Department of Marine. This involved the absorption by the Dominion Observatory of seismological stations at Toronto and Victoria, and of the two permanent magnetic observatories at Agincourt, Ontario, and Meanook, Alberta, together with the staffs involved.

For a number of years past requests for the services of an astronomer, for instructional purposes, have been received from several of the Young Peoples' camps. This year four of these camps were visited during July and August. Each day "star talks" were given, and on clear nights the talks were followed by a study of the constellations. Lectures on various phases of astronomy and geophysics, mostly of a popular character, were also given from time to time as occasion demanded. A series of five technical lectures on seismology was delivered at the University of Toronto in November by the seismologist.

In position astronomy observations for right ascension and declination with the meridian circle were continued on the former list of 1,470 stars, the instrument now being in the reversed position. A total of 2,647 observations of star positions were obtained, and in addition 128 observations of the sun and 857 readings of instrumental constants were made. Observations were also continued with the personal equation machine to determine the value of the observers' personal equations. The computation of the observations is being kept up to date as nearly as possible.

For the determination of correct time, clock corrections and rates for the three primary sidereal clocks were obtained from observations made with the meridian circle on 163 nights, and from observations with a small transit instrument on 87 nights. Comparisons of the primary clocks were made twice daily.

The synchronized time service at the Observatory and in the various Government buildings in Ottawa was continued as usual. It involved the maintenance and use of 17 secondary master clocks, 2 tower clocks, 652 minute dials, 18 second dials, and the various relays, chronographs, and seismograph shutters used for timing purposes. Time signals were sent out by clock beats over the telephone, when required, and also continuously over the branch lines from the Canadian National Railways and Canadian Pacific Railway telegraph companies. Short wave wireless time signals were transmitted from the Observatory on 20, 40, and 90 metres, and through station CRCO on 880 kc. Wireless time signals were received daily from Bordeaux, Rugby, Nauen, Monte Grande, Arlington, and Rio de Janeiro, and the times of reception of these signals were forwarded each month to the International Time Bureau at Paris, and to other co-operating observatories. In addition to the regular work of receiving and sending wireless time signals, considerable time was devoted to improving the methods of receiving time signals, analysing wave-forms, and improving the tone and radius of the short wave signals sent out, so that they may be available to more parties engaged in scientific survey work. As previously, the half-minute beats of the free pendulum Shortt clock were transmitted over special lines to the Canadian Broadcasting Corporation (Engineering Department) and to the Department of Transport (Monitoring Station) for standardization of radio frequencies, and in return the rates of the crystal clocks maintained by these branches were made available to the Observatory. During the year 248 clocks, chronometers, watches, and other timing mechanisms were cleaned, repaired, and rated for the Observatory and other branches of the Department, a, well as for other Government departments. The usual tables of the times of sunrise and sunset, phases of the moon, and differences of standard time, were prepared and supplied to the public on request.

Solar observing conditions were below normal; 140 nine-strip spectrograms were made of centre, midway, and limb points on the solar disk at various position-angles, with standard iodine absorption spectra; and 36 photographs recording sunspots were secured. Measurement and computation of the observations for solar rotation in 1909 and 1910 were completed and prepared for publication. These measurements yielded values of the equatorial velocity of the solar rotation from 5 to 8 per cent lower than the previous observations made at Upsala, Edinburgh, and Mount Wilson observatories. They were, however, in substantial agreement with practically all subsequent measurements. Similar work was continued on the observations for the years 1911 - 1914. Regular records were kept of visibility and cloudiness, and other phenomena. Information concerning the sunspot cycle and related terrestrial phenomena was supplied in response to numerous requests.

Observational work with the 15 - inch equatorial during this period was divided between the spectrograph and the photoelectric photometer. Spectrograms were regularly made of Nova Lacertae until the decreasing brightness of the star made observations impracticable. Plates were also taken of Gamma Cassiopeiae. Alterations to the microphotometer have been made, which have resulted in a great improvement in its performance. As in former years, the telescope was made available for public demonstrations every clear Saturday evening. In this connection, popular descriptions of celestial objects were prepared and issued in pamphlet form for distribution to the public.

In co-operation with the Royal Astronomical Society of Canada, meteor observations were planned for the Perseids in August and the Leonids in November. During August encouraging results were obtained, but unfavourable weather conditions interfered with the Leonid observations. In addition to the usual

meteor counts, photographic records of a meteor trail were secured from two stations a few miles apart, which made possible a computation of the height and direction of motion of the meteor.

With the photographic equatorial, the field of S.W. Bootis was observed for the determination of the magnitudes of comparison stars, and plates were made of the fields of U.X. Aurigae, R. Coronae Borealis, and R.Z. Geminorum for light curve purposes. Observations were made on Nova Herculis, Nova Lacertae, and the two novae in Aquila. Peltier's comet was also photographed on a number of occasions in June and July. Photometer measurements of the novae and of Cepheid variables were continued. The fields of R.T. Scuti, R.Z., Cephei, and Y. Aurigae, were measured and reduced.

The consolidated seismological work is administered from the central station at Ottawa, with auxiliary stations at Halifax, N.S., Seven Falls and Shawinigan Falls, P.Q., Toronto, Ont., Saskatoon, Sask., and Victoria, B.C. Seismic registrations were reported regularly through the medium of a monthly bulletin issued to the principal seismic stations of the world. Reports on the results obtained at the two Quebec stations were prepared regularly each month and forwarded to the officers of the co-operating agency. Progress was made in the research on the Timiskaming earthquake of November 1, 1935. The study of the world records serves to establish the epicentre co-ordinates tentatively assumed after the earlier work, but the focal depth is found to be much less than previously supposed, being probably of the order of 15 kilometers. Further study is being made of the records. Contact has been maintained with progress in seismic surveying, in which connection the seismologist visited prospecting parties in southern oil areas and prepared reports on modern methods of observation and procedure.

Magnetic field work during the year comprised observations at sixteen stations of the three magnetic elements, declination, inclination, and horizontal force. Thirteen of these are repeat stations, results from which will furnish important secular change data, and three are new. The work was confined to the southeastern part of Canada, between latitudes 44° 38' north and 50° 06' north, and longitudes 59° 58' west and 97° 07' west. In addition to the regular field work the usual instrumental comparisons were made at the end of the season, utilizing for the first time two non-magnetic huts which were constructed at a site about 10 miles south of Ottawa. The instruments being used by the British Canadian Expedition, under the leadership of Mr. T.H. Manning, were standardized, and instructions in methods of observing were given to members of the party. The work of compiling the observations for inclusion in a publication covering the work between 1927 and 1936 was completed. At the permanent observatories at Agincourt and Meanook the regular work was continued without interruption. The observatory at Agincourt is equipped with three sets of photographic recording variometers, the elements recorded on each being declination, horizontal force, and vertical force. At Meanook the equipment consists of two sets of photographic recording variometers, each of which records declination, horizontal force, and vertical force, and one additional set for recording the three elements, of which only the horizontal force unit is in operation. In addition to the variometers each observatory is equipped with precise instruments for determining absolute values of declination, inclination, and horizontal force, which are necessary for reducing the photographic records.

The gravity work of 1936 was undertaken mainly for the purpose of determining whether the Timiskaming earthquake of November 1, 1935, had been accompanied by a measurable change in gravity. Redeterminations of gravity were made at the three existing stations nearest to the epicentre, namely, Mattawa, New Liskeard, and Sudbury, at distances of 35, 65, and 95 miles

respectively. Observations were also made at a second group of more distant stations in an area presumably beyond the influence of the earthquake, at Kingston, Ste. Anne de Bellevue, and Montreal, at distances of 215, 265, and 280 miles. A new gravity station was established at Timiskaming. A high order of accuracy was obtained in the observations and it is concluded from the results that no appreciable change in gravity accompanied the earthquake.

PUBLICATIONS

Five numbers of the regular series of publications of the Dominion Observatory were issued, as follows: vol. XI, No.3, Gravity and Isostasy in Canada; vol. XII, Nos. 8, 9, 10, and 11, Bibliography of Seismology (issued quarterly). The usual reports and pamphlets, in mimeographed form, were issued, viz., Seismological Bulletin (monthly); Wireless Time Signals (monthly); Saturday Evening Program (quarterly). In addition, two papers were published in scientific journals: Gravimetric Survey of the Malagash Salt Deposit, Nova Scotia (Technical Publication No. 737 of the American Institute of Mining Engineers); and Timiskaming Earthquake of November 1, 1935 (Journal of the Royal Astronomical Society of Canada).

DOMINION ASTROPHYSICAL OBSERVATORY, VICTORIA, B.C.

Apart from the usual two hours that are reserved each Saturday night throughout the year for the use of visitors, almost the entire time of the telescope at night was devoted to photographing stellar spectra. The observing weather was better than the average, conditions being favourable on 212 nights. During the 1,433 hours devoted to observing 1,319 plates were secured. The eighteen - year average shows 203 nights with 1,260 hours observing and 1,348 plates.

Some alterations and additions were made in equipment. The 26 large wheels supporting the 135 - ton dome became grooved and the flanges were ground off to enable the dome to turn freely. The aluminium coating on the secondary mirror was removed, as it had become badly discoloured. A silver coating has, for the present, been given, though it is hoped in the near future to return to the aluminium, but with a chromium base. For the benefit of visitors to the Observatory, of whom there were approximately 26,000 during the year, twenty transparencies of celestial objects, each 11 inches by 17 inches in size with appropriate captions, were installed on the main floor of the dome building. They axe inset in the walls and illuminated from behind.

A step-slit consisting of 10 steps with a ratio of width of adjacent steps of approximately 1 - 4 was secured and compared with the rotating sector as a plate calibrating device. Although in the region investigated, 4000A to 6500A, the two methods are practically equivalent, it was felt that if there were more divisions to the sector higher accuracy would result from its use. Accordingly such a sector was designed and built. A stellar photometer using a caesium photoelectric cell in conjunction with a valve amplifier was constructed for use with the telescope, and preliminary tests show its suitability for the study of the light variations in stars. A 4 - inch plane grating with 15,000 lines to the inch was ruled for the observatory by Professor R.W. Wood on an aluminium film with a substratum of chromium. The grating, which was ruled to throw as much light as possible in one first order spectrum, is reasonably fast and was designed for use with the stellar spectograph in the visible region. At hydrogen alpha region the dispersion is 2 - 6 times the highest previously available. An adaptation of the conventional measuring micrometer to a projection method has been made. An enlarged view of the spectrum and micrometer head is pro-

jected upon a viewing screen upon which a reticle is ruled. The eye strain involved in the measurement of plates is much reduced through the use of this new measuring engine.

Further work on the reduction tables for obtaining radial velocities was carried out. Tables have now been computed for dispersions formerly used here, so that remeasurements of old plates will give results consistent with determinations by the present equipment. A number of spectra of standard velocity stars of spectra FO to K5 have been secured with high dispersion and are being studied in connection with a proposed wave-length table for radial velocity measures in the region (nn)3930 - 4494.

The orbit of the AO star Boss 2142 was determined from 47 single-prism plates, 30 of which showed both spectra. The component spectral lines are more or less blended during most of the period of 18,772 days, hence high precision is not attained in this orbit. Additional observations of the eclipsing binary star AR Aurigae were obtained and definitive elements determined which do not differ greatly from those of last year. Three other orbits of spectroscopic binaries are essentially complete, namely Boss 5620, H.D. 109510, and H.D. 214652. Progress has been made on the redetermination of several orbits with a view to detecting changes. Using 2 - prism dispersion and fine-grained plates the secondary spectra in alpha and pi Andromedae were obtained for the first time. The orbital elements of the primary component are in both cases identical with those determined 30 years ago. The secondary spectrum of TX Ursae Majoris was measured and the mass ratio of the components deduced therefrom. The star H.D. 199140, upon which a vast amount of time has been spent at different observatories, was found to have a very short period and interesting results are promised from a study of line contours at the different phases. Progress was also made in the study of the relative brightnesses of components of doubleline binaries, mention of which was made in the last report.

For the four novae of 1936 the regular equipment was available and much observational material was secured. The best observed was Nova Lacertae, 75 plates of which were secured during June, July, and August. Forty-seven of these spectrograms were made during the first seven nights after discovery, when rapid changes were taking place, and a detailed study was made of the various expanding shells. The sharply defined lines of interstellar calcium were measured on 50 of these plates, giving a velocity of -11.1 km/sec. From the strength of the interstellar K line the distance of the star was determined as 2,800 light years, and at maximum light the new star was approximately 65,000 times as bright as our sun. Studies were also made of its temperatures, which changed from day to day. A joint publication on the results was prepared and is ready for the press.

A study of the relative intensities of sodium and ionized calcium lines of stellar origin was carried out. Preliminary results show that, although the absolute intensities of both sodium and calcium lines decrease as one goes to earlier spectral types, the intensity ratio Na/Ca+ actually increases to unity in some of the A and B stars. A study of the very diffuse line (n)4430 in O- and B- type spectra, which Merrill has suggested may be interstellar, seems to show a definite correlation with interstellar K. The study of the Swan Bands in R and N stars was continued. In some stellar atmospheres at least it has been found that the relative abundance of C13 and C12 appears to be of the same order of magnitude as that found in terrestrial samples of carbon.

PUBLICATIONS

During the year No. 4 of vol. V, The Motions of the O and B Type Stars and the Scale of the Galaxy, and the following numbers of vol. VI, namely, No. 12, The Re-examination of 64 Orbits; No. 13, The Spectroscopic Orbit of Boss 3102; No. 14, Periods and Light Curves of the Variable Stars in the

Globular Cluster Messier 2; No. 15, The Spectroscopic Orbit of Boss 4745; and No. 16, The Orbit of the Spectroscopic Binary Boss 4217; were printed and distributed. No. 17, The Victoria System of Radial Velocity Determinations, No. 18, The Orbit of the Spectroscopic Components of Boss 2142, and No. 19, The Orbit of the Eclipsing Binary AR Aurigae, were sent to press. Seventeen papers were prepared for presentation at scientific meetings and several articles of a popular nature were written for astronomical journals.

DOMINION WATER AND POWER BUREAU

The Dominion Water and Power Bureau investigates, analyses, and records the water and power resources of Canada in their dominion, provincial, international, and interprovincial aspects and promotes water conservation and power development as a basis for the effective utilization of other natural resources, for the improvement of navigation, for irrigation, and for industrial and domestic requirements. This includes stream flow investigations which are carried out from coast to coast with the co-operation of the provinces.

With the exception of the Yukon and Northwest Territories the water resources throughout Canada are vested in the provinces, and investigatory work is carried on in co-operation with the respective provincial authorities charged with the administration of these resources. The co-operative water resources and hydrometric work is undertaken through district offices located as follows: British Columbia, at 739 Hastings Street West, Vancouver; Alberta and Saskatchewan, at Public Building, Calgary; Manitoba, at 532 Dominion Public Building, Winnipeg; Ontario, the local organization has headquarters at the Ottawa office of the Bureau; Quebec, at 680 St. Catherine Street West, Montreal; the Maritime Provinces, at 193 Hollis Street, Halifax. Investigatory work in Yukon Territory is carried out through the British Columbia district office and in the Northwest Territories through the district office at Calgary.

WATER AND POWER

Lake of the Woods Regulation. - During the fiscal year the run-off throughout the Lake of the Woods watershed was below normal. The demand for water for power purposes was above average and the amount of storage held in the reservoir was considerably decreased. Lake level was at elevation 1059.18 on April 1, 1936, and rose to a peak elevation of 1060.37 on June 5. From this date until November 1, a considerable amount of storage was lost through evaporation from the surface of the lake and this, together with the increased demand for water for power purposes, resulted in lake level being drawn down to elevation 1056.49 on March 31, 1937. Lake level between 1,056 and 1,061 is regulated by the Canadian Lake of the Woods Board.

Lac Seul Regulation. - The direct regulation of Lac Seul has continued temporarily under the control of the Province of Ontario. During the fiscal year the run-off from the watershed was below normal. Conditions with respect to the power output at the Ear Falls power plant made it necessary for Ontario to restrict the outflow so as to maintain the highest possible operating head for the supply of power to the Red Lake mining area, with the result that the lake rose to a new high level. Lake level rose from elevation 1166.39 on April 1, 1936, to elevation 1170.19 on August 2, and was drawn down to elevation 1166.34 on March 31, 1937.

WATER POWER ADMINISTRATION

Applications for sites on Yellowknife, Cameron, and Beaulieu Rivers in the Yellowknife area of Great Slave Lake were received, but no commitments in respect thereto were made pending further investigation of the physical conditions at the sites. No applications for power in Yukon Territory were received.

TECHNICAL ASSISTANCE TO INDIAN AFFAIRS BRANCH

As in previous years, technical assistance was given to the Indian Affairs Branch in connection with the protection of existing Indian water rights in British Columbia and the acquiring of such new rights as have been found necessary. Applications were filed for new licences for irrigation purposes on two reserves in the Kamloops Agency and one in the Lytton Agency. Final licences for irrigation and other purposes were obtained for reserves in the Kamloops, Lytton, Williams Lake, and Nicola Agencies.

NATIONAL WATER RESOURCES INDEX-INVENTORY

The Index-inventory system for recording and collating the water resources data of the Dominion has been in use for many years and has been developed upon the basis of the natural drainage basin areas.

Under the Index-inventory the water resources data, accumulated in the district offices by direct field work and through co-operative effort with provincial and local authorities or interests, are transmitted to Head Office in Ottawa where they are compiled and coordinated in accordance with the principles of the Inventory. All available data with respect to developed and undeveloped power and storage reservoir sites are collated, studied, and summarized, and digests of the individual sites are prepared covering location, accessibility, head, water supply, storage capacity, regulation of flow, possible power, hydropower installation, use of power, municipalities served, market, and sources of data. Summaries of the power and water resources of rivers and river systems as a whole are similarly analysed and compiled. These are revised from time to time as further data are received.

WATER POWER RESOURCES OF CANADA

A detailed study of all existing stream flow records and power data available from federal, provincial, and private sources indicates that the Dominion's waterpower resources total 20,347,400 horsepower under conditions of Ordinary minimum flow or 33,617,200 horse-power ordinarily available for 6 months of the year. These figures will no doubt be augmented from time to time as further data become available concerning possible power sites, diversions and concentrations, or storage facilities, which cannot now be computed due to lack of reliable information.

The power ordinarily available for 6 months of the year represents on a very conservative basis the combined commercial possibilities of the sites already recorded. In fact, a study of the waterpower developments throughout Canada, concerning which satisfactory data are available as to stream flow and turbine installation, shows that the average turbine installation is 30 per cent greater than the ordinary 6 - month flow power. If this ratio is maintained the present recorded water-power resources of the Dominion would warrant a turbine installation of about 43,700,000 horse-power. On January 1, 1937, the total turbine installation in Canada was 7,945,590 horse-power, or only a little more than IS per cent of the recorded water-power resources.

Of the total installation, 6,982,541 horse-power, or 87.9 per cent, was installed in central electric stations for the generation of electricity for general public distribution and this installation produces more than 98 per cent of all electricity generated in Canada for sale. A large part of this power is sold en bloc for the manufacture of pulp and paper, for the mining and reduction of minerals, and for electrochemical production.

CENSUS OF THE CENTRAL ELECTRIC STATION INDUSTRY

The last completed census of the Central Electric Station Industry, that for the calendar year 1935, shows that more than 95 per cent of the generating equipment of central stations consists of hydraulic turbines and that these turbines produce more than 98 per cent of the electricity sold in Canada.

The outstanding position of water power in the central station industry makes an annual revision of all basic central station data desirable. This is effected through the annual census conducted co-operatively by the Dominion Water and Power Bureau and the Bureau of Statistics of the Department of Trade and Commerce. These data are made available through the annual reports of the Bureau of Statistics, and, at longer intervals, a directory of Central Electric Stations, presenting a comprehensive review of the scope and character of all organizations distributing electricity for sale, is published by the Dominion Water and Power Bureau. The latest printed edition of this directory is dated May 1, 1928. The demand for up-to-date data has been met by the publication from time to time of mimeographed supplements to the 1928 edition. The current supplement carries the directory forward to July 1, 1936.

DOMINION HYDROMETRIC SERVICE

The Dominion Hydrometric Service secures and compiles stream measurement records throughout Canada. The records obtained in the field are brought together in one central agency, which undertakes the compilation and dissemination of stream flow data. The most important use of the records is in connection with water-power development and irrigation projects.

RUN-OFF CONDITIONS IN CANADA

The average run-off for the year was below normal in the, Pacific drainage, in the Arctic and Western Hudson Bay drainage, and in the Atlantic drainage; and above normal in the St. Lawrence and Southern Hudson Bay drainage. Several extremes of flow have been recorded. In the Pacific drainage, typical stations showed a range in run-off for the fiscal year from 71 per cent of the long term mean in Capilano Creek in the coastal area to 109 per cent in North Thompson River near Barriere in the interior. In the northern portion of the drainage new flood stages were recorded. In the Arctic and Western Hudson Bay drainage the range was from 36 per cent in Makwa River in central northern Saskatchewan to 90 per cent in Assiniboine River at Headingly, Man. New minimum run-offs were recorded in Belly River in southern Alberta, and in Red River in southern Manitoba. In the St. Lawrence and Southern Hudson Bay drainage there was a range in run-off from 80 per cent in Missinaibi River in northern Ontario to 121 per cent in St. Maurice River in northeastern Quebec. A new minimum run-off was recorded in Grand River in Southwestern Ontario. In the Atlantic drainage the range was from 83 per cent in Lepreau River in southern New Brunswick to 99 per cent in Lahave River in southwestern Nova Scotia.

POWER AND STORAGE INVESTIGATIONS

In British Columbia hydraulic studies were completed in connection with the Bruner application to the International Joint Commission for approval of a land reclamation project on the west bank of Kootenay River between the United States boundary and Kootenay Lake. Other hydraulic studies were continued in the Kootenay drainage in connection with the regulation of Kootenay Lake levels in the interest of both water power and reclamation. Engineering studies, included water supply at the Dominion Experimental Station at Windermere, B.C., and hydraulic problems of the Dominion Public Works Department in connection with the development and maintenance of the permanent ship channels from New Westminster to the Gulf of Georgia. Special flow studies were continued in co-operation with the provincial authorities, the city of Vancouver, the Greater Vancouver Water District, municipal and irrigation districts, and various hydroelectric power companies.

In Alberta the operation of the Lake Minnewanka storage during the filling season from May to October was undertaken by the Bureau.

In Ontario hydraulic investigations were made on Nipigon River and studies were continued on Niagara River with respect to river slopes and discharge. A close inspection was maintained of the work being carried out by the Canadian Niagara Power Company in the construction of a submerged weir at its intake on Niagara River above the falls. Special office studies were continued of hydrometric and hydraulic conditions in the Great Lakes and Ottawa River basins in connection with the investigations of the Interdepartmental Montreal and Ship Channel Water Levels Board.

In Quebec studies included investigation of outflow of lakes for gravity supply of Three Rivers; the hydraulics of Magog River in connection with international matters, and the international aspect of a power development on upper St. John River. Checking of power station ratings was also carried on in co-operation with various power organizations.

In New Brunswick an investigation of the international reach of St. Croix River was made and a report prepared for the information of the International St. Croix River Board of Control covering conditions obtaining during the 1936 season. A further investigation was made of alleged high water levels on East Grand Lake and of storage possibilities in the upper St. Croix watershed. In Nova Scotia investigations were made in connection with power developments on St. Croix River and Paradise Brook.

INTERNATIONAL WATERWAY MATTERS

The Lake of the Woods Convention between Canada and the United States, executed February 24, 1925, provided for the securing of a flowage easement up to elevation 1,064 sea-level datum on the United States shore of the Lake of the Woods, and accorded to Canada the privilege of representation by counsel should the costs be determined by means of the usual United States judicial procedure. In accordance with this provision Canada has been represented by counsel in the proceedings taken before the United States Federal Courts in the State of Minnesota. The earlier proceedings were reviewed in prior annual reports. During the year continuous attention has been given to the flowage easement cases that have been active. An offer for the settlement of all outstanding cases is now receiving consideration.

On February 7, 1936, a reference was agreed upon by the Governments of Canada and the United States calling upon the International Joint Commission to investigate the advisability and cost of the improvement of a waterway from Montreal to Lake Champlain to connect with Hudson River, and to report to

the two Governments with recommendation. During 1936 public hearings on this matter, at which the Bureau was represented, were held by the Commission at New York City November 19, 20, and 21; at Albany, N.Y., November 23; at Burlington, Vt., November 24; at Plattsburg, N.Y., November 25; and at Montreal, P.Q., November 26 and 27. A hearing at Boston, Mass., on April 1, 1937, and a final hearing at Washington, D.C., on April 6, 1937, have been advertised.

During the latter part of the fiscal year the Bureau provided technical assistance in the preparation of the application of the Government of Canada to the International Joint Commission for the approval of remedial works to be constructed in Richelieu River.

Following the reference to the International Joint Commission on the question of storage in Rainy Lake and in the boundary waters above, and of securing the most advantageous use of these waters for various purposes, including that of power, the Commission submitted its final report to the two Governments on May 1, 1934. The compilation and analysis of the hydraulic data upon which the future study of this problem is dependent are being continued.

The international problem of Roseau River, which has been referred by the Governments of the United States and Canada to the International Joint Commission for investigation and report, received consideration during the year. Investigations of flood protection schemes on both sides of the International Boundary were made and the results conveyed to the Commission as outlined in the annual report for the fiscal year 1933 - 34. Pending further action by the Commission, hydrometric records have been systematically secured on Roseau River and its tributaries.

During 1936 complaints were received that the construction of a series of eight dams across Souris River in North Dakota by the United States Department of Agriculture had resulted in the curtailment and stoppage of the flow of Souris River in Manitoba. An inspection and report of the conditions complained of were made through the office of the District Engineer and preliminary studies conducted of the effect of the dams on the available flow. As a result of the complaints and investigation the matter was brought to the attention of the United States authorities through the usual channels.

On April 11, 1936, the State Water Conservation Board of Montana filed an application with the International Joint Commission for the approval of the construction of a dam and reservoir on the East Fork of Poplar River near Scobey, Mont. On August 8, 1936, the Commission issued an Order of Approval of the proposed works subject to satisfactory settlement of the claims of the Province of Saskatchewan.

Arising from the amended application of the West Kootenay Power and Light Company, Limited, to the International Joint Commission, for permission to operate its power dam at Corra Linn to create storage in Kootenay Lake, the Bureau continued to receive regular returns of data sufficient to supervise the operation of the Corra Linn development with a view to checking backwater conditions at the International Boundary. During 1936 complaints of backwater conditions in Idaho were investigated.

On October 30, 1935, Mr. Peter Charles Bruner made application to the International Joint Commission for approval of the reclamation of 3,440 acres of Kootenay Rats on the west bank of Kootenay River between the International Boundary and Kootenay Lake in the Province of British Columbia. The Commission held a hearing at Nelson, B.C., on May 15, 1936, at which were presented the results of studies made in this Bureau to ascertain the effect of the proposals on the river levels at the International Boundary. As a result of preliminary discussion and in order to reduce the effect of the proposals on the river levels the applicant amended his application to include only about

2,270 acres of the original 3,440 acres. As a result of this change, opposition to the project from United States and Canadian interests was removed, and the Commission granted an Order of Approval for the reclamation, by means of dykes, of the reduced acreage.

The International St. Croix River Board of Control continued to exercise its supervision over the discharge of St. Croix River past Grand Falls dam and the dam of Canadian Cottons, Limited, at Milltown, in accordance with the Orders of the International Joint Commission. At the request of the Commission, the Canadian member of the Board, through the district office of the Bureau, investigated and reported upon a complaint as to high-water conditions on East Grand Lake, and the United States member similarly investigated a complaint of flooding on Spednik Lake. Both of these lakes are boundary waters on the East Branch of St. Croix River. The District Engineer of the Bureau also reported upon storage possibilities throughout the St. Croix River watershed.

The International Lake Memphremagog Board's report to the two Governments upon the water levels at which Lake Memphremagog should be maintained was concurred in, and the lake is being controlled in accordance with the recommendations contained therein. The Bureau maintains a gauge at the Canadian end of the lake.

The International Massena Board of Control continued to, exercise its supervision over the conditions obtaining with respect to the submerged weir in the South Sault channel of St. Lawrence River and the regulation of flow through the Massena Canal in accordance with the Order of the International Joint Commission. The Board is in receipt of daily returns from several pertinent gauges in the St. Lawrence as well as a daily report of the amount of water being diverted at Massena. During the open water season of 1936 the maximum mean daily diversion reported was 27,468 second feet, the minimum 19,257 second feet. The mean daily diversion exceeded 25,000 second feet in 113 days. The recorded monthly mean elevations at Lock No. 21 varied from 198.35 to 200.01 during the navigation season, a considerable improvement over the previous year. The monthly mean discharges from Lake Ontario also showed substantial increases over the low flow records established in 1934 and 1935.

The International Niagara Board of Control continued its control over the diversions from Niagara River for power purposes as permitted by Article 5 of the Boundary Waters Treaty. The Board is in receipt of continuous hourly records of the withdrawal of water by all power stations on both sides of the river.

The International Lake Superior Board of Control exercised its responsibilities with regard to the regulation of Lake Superior. Records of discharge through the rapids, navigation canals, and power plants on both sides of the river were systematically reported to the Board. The minimum mean monthly lake elevation of 601.94 feet at Marquette for the calendar year 1936 occurred in the month of March, and the maximum of 602.80 feet occurred in June. The elevation of the lake on January 1, 1936, was 602.280 feet and the elevation on January 1, 1937, was 601.915 feet, a net fall of 0.365 foot during the year. The mean discharge for the year was 75,468 cubic feet a second, or about 13,200 cubic feet a second less than the mean for 1935.

The Lake of the Woods Convention provided for two boards for the control of the lake level and the lake outflow - the Canadian Board and the International Board. The Canadian Lake of the Woods Control Board has continued the regulation of Lake of the Woods between elevations 1,056 and 1,061 sea-level datum, as elsewhere recorded in this report. The International Lake of the Woods Control Board is called upon to exercise certain responsibilities whenever the lake rises above elevation 1,061 or falls below elevation 1,056.

The measurement and apportionment of the stream flow in St. Mary and Milk Rivers and their tributaries in the Provinces of Alberta and Saskatchewan and in the State of Montana - provided for by the Boundary Waters Treaty of 1909 and by the Order of the International Joint Commission of October 4, 1921 - were continued by an engineer of this Bureau in co-operation with an engineer of the United States Geological Survey. The Fifteenth Annual Joint Survey of the snow conditions on the headwaters of St. Mary River, in connection with the apportionment procedure, was completed on May 6.

The natural flow of 415,000 acre-feet of St. Mary River at the boundary during the irrigation season was only two-thirds of the average for the 35 years of record. The river rose steadily from April 1 to its maximum of 4,100 second-feet on June 2, then receded gradually to the minimum of 153 second feet on October 31. The maximum storage reached in Sherburne reservoir was 58,100 acre-feet on June 16. On October 31, 1936, the reservoir was empty. The Canadian share of the natural flow of St. Mary River after July was barely sufficient to meet the requirements on the Lethbridge irrigation section.

The estimated natural flow of 50,000 acre-feet of Milk River at the International Boundary during the irrigation season was about 50 per cent of the average for the years of record, and the total seasonal run-off from its tributaries in Saskatchewan was 48 per cent of the average. The joint report covering the year's operations has been prepared and submitted to the Commission for review upon the occasion of its regular semi-annual meeting in April.

Columbia River, with its principal tributary the Kootenay, crosses the International Boundary three times, consequently accurate records of flow and stage are of the greatest importance in the adjustment of any matters arising between Canada and the United States with respect to these waters. For this reason an international gauging station is being built and is nearing completion on Columbia, River at Birchbank, some 9 miles north of Trail, British Columbia.

PUBLICATIONS

During the year the following Water Resources Papers were published, dealing with the surface water supply of Canada in the provinces named: Nos. 68 and 71, Alberta, Saskatchewan, Manitoba, and western Ontario, for the climatic years October 1, 1929, to September 30, 1933; No. 70, Ontario and Quebec, from October 1, 1929, to September 30, 1931; No. 72, British Columbia, from October 1, 1930, to September 30, 1932; No. 73, New Brunswick, Nova Scotia, and Prince Edward Island, from October, 1, 1930, to September 30, 1932. A Supplement to the Directory of Central Electric Stations in Canada was issued under date July 1, 1936, as well as the regular annual bulletins, Hydro-Electric Progress in Canada during 1936, and the Water Power Resources of Canada, 1937.

ENGINEERING AND CONSTRUCTION SERVICE

The Engineering and Construction Service acts as a general engineering service unit to the various branches of the Department. The work includes the preparation of estimates, plans, and designs covering all construction activities in addition to the undertaking of actual engineering and architectural work relative to both maintenance and construction. The Service undertakes engineering and construction work in the National Parks and Historic Sites and in connection with the various Indian reserves under the Indian Affairs Branch.

The portion of the regular Parks appropriation allotted to this Service was expended mainly on the maintenance and operation of electric lighting, telephone, water supply, and sewerage systems, as well as streets and roads.

The architectural work performed included the preparation of plans, specifications, and estimates for buildings and landscaping work to be undertaken by the Department, together with the examination and approval or revision of plans of buildings proposed to be erected in the National Parks by private individuals. Marking and repair work was carried out at various historic sites.

Funds were also provided under the Special Supplementary Estimates, 1936 - 37, for the completion of projects begun under the Public Works Construction Acts, for new projects, for providing employment for needy permanent park residents during the season when regular work was curtailed, and for closing out the camp for single homeless men in Prince Albert National Park.

Details of the works follow:

COMPLETION OF PROJECTS INITIATED UNDER PUBLIC WORKS CONSTRUCTION ACT

BUILDINGS

Administration and Post Office building, Eastern Gateway registration building and staff quarters, extension to Cave and Basin bath-house, Banff National Park; wardens' cabin and storehouse, Glacier National Park, Superintendent's residence and garage, Gateway registration building, and continuation of work on the Miette Hot Springs bath-house and swimming pool, Jasper National Park; staff quarters, Riding Mountain National Park; Community buildings at the townsite and Cameron Lake camp-ground and an extension to the Administration building, Waterton Lakes National Park; buildings to house road and camp equipment near Field, Yoho National Park; showcases and other equipment for the museums at Fort Anne, Nova Scotia, and at Fort Chambly, Quebec.

LANDING FIELDS

Continuation of grading and improvement of landing field at Banff, Banff National Park.

MUNICIPAL SERVICES

Construction of septic tank and levelling of disposal area for the sewerage system at Lake Louise townsite, Banff National Park; sewer extension on Hazel Avenue, Jasper, Jasper National Park; parking area and sewerage disposal system at Radium Hot Springs, Kootenay National Park; completion of basic portion of water supply system including mains, pumping equipment, hydrants, and house connections; extension of electric power-line to golf course and installation of house connections at Wasagaming, Riding Mountain National Park; completion of installation of electrical distributing system at the townsite, Waterton Lakes National Park.

RECREATIONAL AREAS

Sulphur water-line from Middle Spring to Cave and Basin bath-house and ski jump on Mount Norquay for the Banff winter carnival, Banff National Park; water supply for second nine holes of golf course, Riding Mountain National Park; water supply for second nine holes of golf course, including construction of a dam and reservoir, Waterton Lakes National Park.

TOWNSITE DEVELOPMENT

Completion of parking area and improving of approach road to same at Radium Hot Springs, Kootenay National Park.

PROJECTS CARRIED ON UNDER SPECIAL SUPPLEMENTARY ESTIMATES, 1936 - 37

BUILDINGS

Additions and improvements to central garage, Banff, Chief Engineer's residence at Cascade power plant, and Superintendent's residence, Banff National Park; construction of show cases for museum and improvement of grounds at Fort Anne National Historic Park, Nova Scotia, and at Fort Beausejour National Historic Park, New Brunswick; construction of fire hall at Jasper and toilet buildings at Cottonwood Creek campsite, Jasper National Park; installation of showers at bath-house at Radium Hot Springs, Kootenay National Park; construction of a comfort station, Point Pelee National Park; improvements to Administration buildings, completion of permanent maintenance camp buildings at Waskesiu, addition to Community Hall, and three district warehouses for forest fire-fighting equipment, Prince Albert National Park; gateway building at north entrance and a barn at the buffalo enclosure, Riding Mountain National Park; an addition to the bath-house, Waterton Lakes National Park; new buildings to store road and camp equipment, a caretaker's lodge at the Kicking Horse camp grounds and general workshop, Yoho National Park; museum building at Fort Chambly; installation of lighting plant and museum fittings in the museum at Louisbourg fortress, and further development work and excavation of ruins together with improvements to grounds surrounding the museum; further restoration and repair work to the old military structures at Fort Lennox, Ile-aux-Noix, P.Q.

MUNICIPAL SERVICES

Extension of sewerage system, Banff townsite, Banff National Park; extension of 4 - inch water mains, Jasper townsite, Jasper National Park; construction of storm sewer and drainage at motor camp-grounds, beach improvements, construction of sidewalks and gutters, at Waskesiu, Prince Albert National Park; extension and improvements to sewer system and construction of an incinerator at Wasagaming, Riding Mountain National Park; improvement and extension of water supply system at Waterton Park, Waterton Lakes National Park.

RECREATIONAL AREAS

Development of small pool including new wading pool for children and construction of new parking area at the Cave and Basin bath-house at Banff, Banff National Park; extension of water supply system to Cottonwood Creek auto campsite, construction of road, clearing beach, and general improvement of grounds, Patricia Lake auto campsite, Jasper National Park; improvement to camp-grounds, building retaining wall, filling and grading grounds, Kootenay National Park; improvement and maintenance of first nine holes and levelling and seeding of second nine holes golf course at Waskesiu, Prince Albert National Park; construction of three new greens and extension of one fairway, golf course, Riding Mountain National Park; improvement of tees and fairways and completing reservoir, Waterton Lakes Park golf course.

ROADS

BANFF-JASPER HIGHWAY

Banff Park End. - Maintenance of completed section - 37 miles. New construction - 8.39 miles clearing, 7.84 miles grubbing, 8.34 miles grading, 6.07 miles gravel surfacing, 62 culverts, completion of location surveys to north boundary, Banff Park.

Jasper Park End. - Maintenance of completed section - 55 miles. New construction - 2.12 miles clearing, 3.37 miles grubbing, 7.18 miles grading, 3.92 miles tote road, 6.34 miles gravel surfacing, 80 culverts.

GENERAL ROAD WORK

Construction of approach driveway to Administration building, Banff, and improving, widening, and maintaining Trans-Canada highway (57 miles) including revision near Anthracite, Banff National Park; improving and widening main motor roads, Jasper National Park, Banff-Windermere road, Kootenay National Park, and motor road up Mount Revelstoke, Mount Revelstoke National Park; construction of 0.3 mile of connecting highway south toward Mayview from the Rabbit-Meridian road, construction of 7.46 miles of highway from Waskesiu to Heart Lakes Portage, including surfacing with gravel of 5 miles, and improving, widening, and maintaining main motor roads, Prince Albert National Park; improving and widening motor roads, Waterton Lakes National Park, and Yoho Valley and Emerald Lake roads, and Yoho Park section of the Trans-Canada Highway.

GOLDEN-REVELSTOKE, HIGHWAY

Construction and essential maintenance work were continued in both the eastern and western sections of the Golden-Revelstoke Highway in the 1936 season and satisfactory progress was made. A summary of the work is given herewith.

East Leg - Donald to Columbia River Crossing Maintenance of completed section - 77 miles. New constructional miles grading, 9 miles surfacing, 1 culvert.

Erection of steel bridge over Columbia River at Boat Encampment - 77 miles north of Donald, B.C. This bridge crosses the Columbia in one clear span of 270 feet. Concrete abutments which are on solid rock foundations on each side of the river were constructed by the Engineering and Construction Service. The Service transported all steel, totalling 188 tons, to the site from railhead at Donald. False work material was also supplied at the site. The supplying of the bridge steel, and its erection on the abutments were undertaken by contract. The bridge has a clear width for traffic of 20 feet.

West Leg - Revelstoke to Columbia River Bridge. - Maintenance of completed section - 49 miles, including clearing of 19,300 cubic yards of mud slides. New construction - 24.5 miles clearing, 15.7 miles brushing, 13.2 miles grubbing, 11.2 miles ditching, 28.2 miles grading, 13.8 miles regrading, 24.8 miles gravel surfacing, 17.7 miles tote road, 141 new culverts, and 25 existing culverts lengthened, 1 bridge reconstructed and 6 structurally improved, location surveys between Goldstream and Columbia River bridge.

TOURIST ROUTE IMPROVEMENT

In 1936, an agreement was completed between the Province of British Columbia and the Dominion, as represented by the Department of Mines and Resources, providing for the improvement and permanent surfacing of the main tourist route from the International Boundary at Kingsgate to the southerly entrance of Kootenay National Park. Under this agreement the Dominion contributed to such improvement and paving work as undertaken by the Province and approved by the Dominion to the extent of 50 per cent of the cost of such work but not exceeding $500,000 over a 3 - year period. Periodic inspections were made by engineers of this Service to see that the work undertaken was in accordance with plans and specifications, so that certificates covering the payment of the Dominion contribution could be issued. During the 1936 season about 21 miles of highway was improved and brought up to standard section, which involved the moving of approximately 193,000 cubic yards of material for grading operations. In addition, 17 miles of asphaltic pavement was laid.

Road Construction - Fiscal Year 1936 - 37

Location	Constructed to grade 1936 - 37	Previously constructed	To complete
Banff-Jasper Highway:	...	...	...
Banff Park	8.27	28.93	42.8
Jasper Park	7.76	48.04	4.9
Heart Lakes Portage Road:	...	...	...
Prince Albert Park	7.46	...	...
Golden - Revelstoke Highway:	...	...	...
Donald - Columbia River crossing	1.3	75.2	...
Columbia River crossing - Revelstoke	28.2	21.5	50.3
Donald - Southerly	...	...	5.5

MAINTENANCE AND DEVELOPMENT WORK

Funds were also expended on improvements to townsites, wharfs, beach protection works, and the improvement and extension of trails and forest telephone lines.

TOWNSITE DEVELOPMENT

Extension of existing sidewalks and landscaping of Administration building grounds, Banff National Park; landscaping around Government buildings at Waskesiu, Prince Albert National Park; extension of streets and walks in Wasagaming townsite, Riding Mountain National Park; widening, improving, and gravelling streets in Waterton townsite, Waterton Lakes National Park.

WHARVES AND BEACH PROTECTION WORKS

Improving wharf, laying out walks along beach, and beach improvement at Waskesiu, Prince Albert National Park; repairs to beach promenade and walk along north shore of Clear Lake, Riding Mountain National Park.

FOREST AND GAME CONSERVATION WORKS

Forest telephone lines were extended and improved in the following parks: in Banff National Park, 17 miles along Banff - Jasper road; in Jasper National Park, along Banff - Jasper road; in Prince Albert National Park, Rabbit - Meridian and Rabbit Cabin lines; in Waterton Lakes National Park, new line to Royal Canadian Mounted Police Barracks at Waterton Park; in Riding Mountain and Yoho National Parks, general improvement. Trail construction and improvement: Banff National Park, Bow and Cascade trails; Jasper National Park, Portal and Tonquin Valley trails, and trail bridges constructed at Maligne Cannon and South Indian River; Riding Mountain National Park, Ochre River trail, 7 miles; Waterton Lakes National Park, Bertha Lake trail constructed 2 1/4 miles and Hell-roaring Creek trail improved; Yoho National Park, general trail improvement.

UNEMPLOYMENT RELIEF

Operations for the relief of unemployment were continued during the fiscal year 1936 - 37 as follows:

(1) Single Homeless Men. - No relief camps for single homeless men were operated in National Parks during the fiscal year 1936 - 37 except for a short time in the spring during which the camps at Prince Albert National Park, which had been opened to take care of drafts from relief camps at Dundurn, Saskatchewan, operated by the Department of National Defence, were gradually closed. A total of 407 individuals were afforded relief in the Prince Albert Park

camps, involving 15,133 man-days relief during April and May, 1936.

(2) Permanent Park Residents. - Qualified Park residents with domestic responsibilities, who were in urgent need, were provided with work on a quota basis during the winter of 1935 - 36, in Banff, Jasper, Waterton Lakes, and Yoho Parks, and relief work was continued during April, May, and part of June, until the summer work opening up could absorb these men. The number of individuals given employment during the winter and spring was 225, a total of 4,963 man-days of work having been provided. Dependents of the individuals so employed numbered 530, making a total of 755 permanent park residents assisted during the period. Single permanent residents in need were given an opportunity of joining single homeless relief camps in the vicinity of their domiciles.

In December 1936, it was found necessary again to provide relief for permanent park residents in Banff and Jasper Parks, on a quota basis. Provision was also made for single men in these parks who were given work on a special quota basis. The number of individuals employed during the period December 1936, to March 1937, was 207, a total of 7,168 man-days work being provided. Dependants of the individuals so employed numbered 329, making the total number assisted 536.

Employment was furnished on the following projects:

PERMANENT PARK RESIDENTS
Banff National Park

Stoney Squaw road - construction.

Mosquito areas - clearing and brushing.

Trans-Canada Highway - clearing and brushing right of way and construction of revision.

Golf course - constructing greens and bunkers.

Parks' roads, general - widening and improvement.

Administration building grounds - hauling manure and rock, getting out logs for fencing, flagstones for walks and rookeries.

Animal paddocks - construction of fences.

River protection works - riprapping.

General - operating rock crusher; constructing paths, shelters, and rustic seats; dismantling old Upper Cascade bridge at Anthracite; hauling firewood; thinning lodgepole pine on Sulphur Mountain; clearing and brushing Sundance Canyon trail; making concrete guard posts; demolition of three old buildings at Isolation Quarters; snow removal; contour survey of animal paddock.

Jasper National Park

Pyramid Lake road - improvement and widening.

Jasper town-site - improvement of streets and boulevards.

Cottonwood Creek camp-grounds, clearing.

Forest trails renewing bridge over Miette River on Whistler Mountain trail.

General - cutting wood for camps; making posts for guard rails; Stripping and preparing gravel pit at Cabin Creek for gravel supply.

Waterton Lakes National Park

Akamina road - widening and building rock retaining - wall.

Yoho National Park

Emerald Lake road - widening; grade and curve reduction.

General - snow removal from townsite streets and sidewalling and ploughing main highways of show.

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SINGLE, HOMELESS MEN

Prince Albert National Park (April and May 1936)

Camp establishment - completing 100 - man camp, including bunk-houses, laundry, cookhouse, and other related works.

Permanent camp buildings - completing garage at headquarters, oil warehouse, implement shed, and refrigerator.

Prince Albert Park Highway - spring road maintenance including cleaning out culverts, repairing washouts, grading, and gravelling.

General - ditching; logging; cutting stovewood; storm sewer extension (Waskesiu); completing survey and clearing right of way to Heart Lakes portage from Waskesiu; construction of bridges at Spruce River and Shoal Creek; hauling and storing building stone; maintenance and construction of streets in Waskesiu.

EXPENDITURE SINCE 1930

Annual expenditures since the year 1930 on account of public works carried out in the National Parks (including Historic Sites and the Golden - Revelstoke Highway) to furnish employment and to stimulate economic recovery were as shown in the following table:

Fiscal Year	Relief Acts	P.W.C.A. 1934	Suplementary P.W.C.A.	Special Supplementary Estimates 1936 - 37	Total
...	$	$	$	$	$
1930 - 31	36,996 81	...	...	...	36,996 81
1931 - 32	866,128 82	...	...	...	866,128 82
1932 - 33	656,185 84	...	...	...	656,185 84
1933 - 34	1,115,367 82	...	...	...	1,115,367 82
1934 - 35	515,910 69	894,592 51	...	...	1,410,503 20
1935 - 36	168,145 45	1,037,007 58	1,013,881 53	...	2,219,034 56
1936 - 37	...	...	...	1,536,630	541,536,630 54
Totals	3,358,735 43	1,931,600 09	1,013,881 53	1,536,630 54	7,840,847 59

HISTORIC SITES AND MONUMENTS

Samuel de Champlain Monument, Nepean Point, Ottawa, Ont. - A tablet affixed to the west side of monument.

Thomas McCrae's House, near Chatham, Ont. - A cairn with tablet erected.

Jean Pierre Roma near Georgetown, P.E.I. - A cut stone monument with tablet erected.

Chaudière Portage, Hull, P.Q. - Cairn with tablet erected in Eddy Park.

Roseau Route, Letellie, Man. - Cairn with tablet erected.

Fortress of Louisbourg, near Louisburg, N.S. - Excavation of rooms in the governor's apartments in the citadel building, and of the moat surrounding this structure, was continued. As excavation progressed, restoration of the exposed walls was carried on to a height of 3 feet above ground level. The walls of the small guardhouse, uncovered the year before, were restored. The walls of the convent building were excavated. Restoration work was also carried out on the outer wall of the moat. Additional surfacing was placed on the main entrance road. The surface of all roads was reshaped with a grader. An electric

lighting plant was installed at the new museum and caretaker's quarters. The grounds around the new museum and in the vicinity were graded, terraced, and seeded, concrete walks and gun-bases constructed, and some interior painting done.

Fort Lennox, Ile-aux-Noix, P.Q. - Repair work was carried out on the building located at the rear of the mens barracks, consisting of seven kitchens or storehouses, three large cook-houses, and,one bakery. The interior walls and vaulted ceilings were pointed, entrance steps constructed, and new doors and windows were fitted. The roof of the guard-house building was repainted. General repairs were made to the interior of the officers' quarters building; and the south bridge and east dock. Repairs were made to floor boards and thresholds in the men's barracks, powder magazine and commissary buildings. Approximately 150 feet of embankment in the vicinity of the west dock was rebuilt to repair damage done by a washout in the spring of 1936.

Fort Beausejour National Park. - The main gateway was widened, and two boulder gate-posts erected. The entrance road was gravelled. Two concrete gun-bases were constructed in front of the museum, and one large cannon was transferred from Dorchester Penitentiary. The grounds around the museum were graded, and a concrete walk constructed at the front entrance. Several large signs were placed on the Provincial Highway directing tourists to the Fort.

WORK ON INDIAN RESERVES

Work carried out for the Indian Affairs Branch by the Engineering and Construction Service in co-operation with the Dominion Water and Power Bureau comprised the following:

ADMINISTRATION

New office buildings were erected at the following agencies: Caughnawaga, P.Q.; Saugeen, Ont.; Fisher River and The Pas, Man.; Carlton, Sask.; Athabaska, Edmonton, Peigan, and Saddle Lake, Alta.; and Lytton, B.C. New residences for agents and clerks were erected at the following agencies: Norway House, Man.; Crooked Lake, Duck Lake, and Pelly, Sask.; and Blackfoot, Lesser Slave Lake, and Peigan, Alta. Farm buildings were constructed at Fort Simpson Agency, N.W.T.: Onion Lake Agency, Sask.; and Edmonton Agency, Alta Lighting plants were installed at Pointe Bleue Agency, P.Q.; Fisher River Agency, Man.; and Carlton Agency, Sask.; and a power transmission line was erected from Calgary to the Edmonton Agency. In addition to the above, improvements, alterations, and repairs were effected at practically all of the agencies.

EDUCATION

New day schools were erected at Christian Island and Fort Frances, Ont.; and Kitsalas reserve, B.C. New work in connection with residential schools included laundry buildings at the Cariboo school in British Columbia; laundry buildings and principal's residence at the Ahousaht school in British Columbia; principals residence at the Shingwauk school at Sault Ste. Marie, Ont.; building to house electric lighting equipment at Onion Lake school, Sask.; and a drilled well at the St. Phillips Indian school. Repairs and improvements were made at 18 day schools and at 42 residential schools.

HEALTH

The modern fireproof hospital was completed at Qu'Appelle, Sask.; a cold storage room was added to the Lady Willingdon hospital at Ohsweken, Ont., and alterations were made to the Nurses' residence at the Qu'Appelle Indian hospital, Fort Qu'Appelle, Sask.

ROADS

Construction, repair, and improvement operations were carried out in the following Indian reserves: Whycocomagh, Millbrook, Malagawatch, Sydney, Bed River, Chapel Island, Truro, and Eskasoni, N.S.; Eel River and Tobique, N.B.; Bersimis, Caughnawaga, Maniwaki, Pierreville, St. Regis,'Restigouche, Lorette, and Ouiatchouan, P.Q.; New Credit, Morabian, Rice Lake, Mud Lake, Fort William, Saugeen, Tyendinaga, Manitoulin Island, Thessalon, Alnwick, Shawanaga, Kettle and Stony Point, Sucker Creek, Port Arthur, Walpole Island, Sarnia, Oneida, and Golden Lake, Ont.; Fort Alexander, Brokenhead, and Dog Creek, Man.; Peigan, Alta.; Cheam, Glen Vowell, Lytton, Hartley Bay, Cowichan No. 1, and roads in West Coast Agency, B.C.

BRIDGES

New bridges were constructed in the Millbrook Indian reserve, N.S., over Pocknock Creek in the Maniwaki reserve, P.Q., and over Turkey Creek in the Oneida reserve, Ont. Repairs to bridges were made in various reserves in Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan, and British Columbia.

DRAINAGE AND DYKING

Drainage systems were constructed or repaired in the following reserves: Eel River, N.B.; Oka, Lorette, Abenakis, and Caughnawaga, P.Q.; and Sarnia, Tendinaga, Kettle and Stony Point, Ont. Dyking for the protection of reserve lands was constructed on the Musqueam reserve No. 2 and Cowichan reserve, B.C.

IRRIGATION AND WATER SUPPLY

Irrigation systems were constructed and improved, or surveys in this connection were made in the following reserves in British Columbia: Cayoosh Creek No. 1, Lytton, Dog Creek Nos. 1 and 2, Nicola, Deadman Creek, Tobacco Plains, Alexis Creek, Canim Lake, Cooks Ferry, Lower Nicola Nos. 2 and 11, Fountain No. 10, Niskonlith No. 3, Shuswap, and Columbia Lake. A water supply system was constructed for the Kitimat Indian reserve No. 2 in British Columbia. The systems serving the Tahltan village and the Squamish Indian reserve No. 3 in British Columbia were repaired and the system for the Skidegate reserve was completed. Artesian wells were drilled at Caughnawaga, P.Q.; Kahkewistahaw Indian reserve, Sask.; and Stoney Indian reserve, Alta.

BREAKWATERS

Work on the extension of the breakwater at the McIntyre Bay Indian reserve, Port Arthur Indian Agency, Ont., was continued.

GEODETIC SERVICE OF CANADA

The Geodetic Service of Canada provides a national system of precise levels and triangulation surveys of the highest precision as a basis for all other surveys. The Geodetic Service also determines the latitude and longitude of triangulation stations across Canada, which are coordinated with similar stations in the United States and Mexico, and provides scientific data regarding horizontal and vertical movements of the earth's crust.

Geodetic control data for surveying and engineering are supplied as required by federal and provincial departments and by the engineering and surveying public. These control data are made available by means of permanent marks, set in the solid rock, or in concrete piers suitably constructed and designed for the purpose. Publications containing the final geodetic values and full descriptions of these marks are issued at intervals.

The geodetic longitude and latitude of triangulation station marks and the precise elevation above sea-level of benchmarks are determined by geodetic triangulation and precise levels. The marks of the former are inscribed "Triangulation Station, Geodetic Service of Canada", and of the latter, "Bench Mark, Geodetic Service of Canada". Important data are also furnished for the study of isostasy and for the size and shape of the earth.

The various operations required to carry out the functions of the Geodetic Service are organized in the following divisions: geodetic triangulation, precise levels, geodetic astronomy and isostasy, geodetic research, mathematical triangulation adjustment, mathematical levelling adjustment. The Geodetic Service of Canada contributes to the publications of the International Association of Geodesy of the International Geodetic and Geophysical Union, the sixth triennial conference of which was held at Edinburgh in September 1936.

TRIANGULATION

Field work was carried on in three areas in 1936. Primary triangulation was continued on the net through central British Columbia, a local secondary net was laid down and completed covering Port Arthur harbour for the control of a resurvey of the harbour line, and work was continued on the geodetic survey of Newfoundland, for which the technical officers were supplied by the Geodetic Service of Canada.

Table 1 gives a tabular statement of the triangulation operations carried out during the season of 1936:

TABLE 1
Triangulation Operations

...	Miles
Completed primary triangulation; axial length	445
Completed secondary triangulation; axial length	10
Primary reconnaissance, observing not yet started; axial length	380

Excluding the Newfoundland triangulation, 7,892 miles of primary triangulation, 1,131 miles of secondary triangulation, and 503 miles of precise traverse have been completed by the Geodetic Service to date.

TRIANGULATION IN CENTRAL BRITISH COLUMBIA

Two operations were completed in central British Columbia during the 1936 season. One operation was the completion of the remaining link of a circuit of triangulation some 2,500 miles in circumference along the coast and through the centre of the province. Work on this concluding link consisted of a

small amount of revision of reconnaissance, together with angular measurements in the triangulation net roughly following Fraser River from a point a short distance north of Ashcroft as far as Prince George, a distance of about 250 miles, thence the reoccupation of several 1928 stations west of Prince George for A distance of 100 miles. The other operation was an aerial reconnaissance for a projected net eastward from Williams Lake towards Yellowhead Pass, a distance of 150 miles.

Results Obtained. - Reconnaissance: sites of 4 primary stations revised in the Williams Lake-Quesnel area, 3 stations selected in the Prince George base net, 10 stations selected from the air in a net eastward from Williams Lake towards Yellowhead Pass; axial length of latter net 150 miles. Station preparation: 14 stations permanently marked and prepared for observing, including section of 3 towers of average height of 27 feet. Angular measurements: 19 new primary stations occupied, 5 primary stations reoccupied that, had been previously partly or wholly completed, 4 supplementary or tertiary stations located; axial length of net 350 miles; area within new triangulation lines, 5,600 square miles.

Reconnaissance in connection with the net along Fraser River consisted of revision of the previous reconnaissance, by which four more readily accessible stations were selected and the net considerably strengthened. In August an aerial reconnaissance was undertaken to select stations on a projected net eastward from Williams Lake to Yellowhead Pass, a distance of about 150 miles. This is an exceedingly rugged area with mountains over 9,000 feet in elevation, to which several lakes provide reasonable access. It is a valuable potential mining area and is partly covered by a provincial tertiary triangulation net which requires primary control. The net will also connect with an isolated secondary net of the Alberta - British Columbia boundary and will eventually form part of a connection with Alberta triangulation nets. In eleven flying hours on August 19 and 20 the area was covered and ten stations provisionally selected, subject to ground checking in 1937. By ground methods alone at least two seasons would have been required to cover the same area.

TRIANGULATION OF PORT ARTHUR HARBOUR

At the request of the Department of Public Works, a triangulation system was laid down in 1936, covering the harbour of Port Arthur, Ontario. Its primary purpose was to provide a series of permanently marked, accurately positioned points at intervals along the harbour line of from 1/2 mile to 1 mile, to check and control a resurvey of the harbour line which was to be made during the winter of 1936 - 37. Several details of the original harbour line survey had been found considerably in error.

The triangulation executed in 1936 was an extension of a net laid down in 1935 covering the harbour of Fort William. In the 1935 work the net covering Port Arthur had been kept in mind when selecting the Fort William net: this proved advantageous, as only 2 new main stations had to be established which, with 5 main stations of the Fort William net, permitted the fixing of 14 stations along the Port Arthur water front. In addition to the work strictly pertaining to the Port Arthur net a base-line was measured along a breakwater in the Fort William net to control the lengths of the combined net, and an azimuth was observed at a Fort William station as a basis for the bearings of the lines. Angular measurements were made on daylight signals of a type especially designed to eliminate phase. As a criterion of the precision secured in the angular measurements the average misclosure of 84 triangles was only 0".75. The lengths of lines varied from slightly over 1,000 feet to a maximum Of 14 miles.

TRIANGULATION OF NEWFOUNDLAND

In 1935 the Government of Canada agreed to assist in carrying out a geodetic survey of Newfoundland by furnishing the technical officers and the instrumental equipment, and by calculating and publishing the mathematical data. In that year an aerial reconnaissance was made of the whole scheme, some 700 miles in length; ground checking a portion of the air reconnaissance, and the preparation of stations ready for the angular measurements in 1936 were begun; and a base-line near one end was also selected and partly cleared.

In 1936 the work was continued and angular measurements were carried on in the section that had been prepared in 1935. Ground checking of the aerial reconnaissance was carried on in two areas - on the primary net from Bay of Islands, as far north as Port Saunders, and on the secondary net eastward from Howley as far as Gander Lake. Altogether 32 stations were checked, covering a distance of 230 miles. A station preparation party completed.clearing of the base-line selected in 1935 and built 3 towers in the base net. This party then proceeded to the secondary net eastward from Howley and prepared 19 stations in a distance of 160 miles, including the erection of 2 towers. The angular measurements on the primary net were commenced at Corner Brook by a double observing party (two observers working in conjunction with one another). During the season this party worked southward towards Port aux Basques and completed 19 primary stations, 5 supplementary stations, and 11 intersection points over a distance of 95 miles. Unusually bad weather conditions - fog, wind, and rain - seriously delayed the progress of this party. Tide gauge readings were continued at Port aux Basques and St. John's during the whole year except for slight interruptions due to ice conditions.

LEVELLING

ONTARIO

The precise level line along the Canadian National railway from Longlac towards Sudbury, which had been carried as far as Tionaga in the 1935 season, was completed to Sudbury. A new line to extend along the Canadian Pacific railway from Sudbury to Franz was then commenced, and at the close of the season early in November had reached a point some 142 miles northwest of Sudbury, or 4 miles southwest of Nemegos. Both these lines pass through a country plentifully supplied with rivers and lakes, and many determinations of water-levels were made, as well as the establishment of the usual number of benchmarks. Most of the benchmarks were placed in surfaces of bedrock.

QUEBEC

Secondary levelling for general control purposes was carried out in the counties of Argenteuil, Terrebonne, Montcalm, Two Mountains, and L'Assomption, the lines selected following provincial highways. This levelling was a continuation of the program of the years 1929 and 1930, which had been suspended since that time. In the course of the season's levelling fundamental benchmarks were constructed at Ste. Agathe and Lachute, these being tied in directly with precise level benchmarks nearby.

INSPECTION OF BENCHMARKS

The work of inspecting and redescribing benchmarks of the Department of Public Works, which has been proceeding year by year since that Department's levelling records were taken Over by the Geodetic Service in the spring

of 1931, was completed during the summer of 1936. The lines covered this season extended from St. John, N.B., to Moncton, Campbellton, and Levis, also around the coastline of the Gaspe Peninsula. The absorption of the levelling of the Department of Public Works has added slightly over 3,000 benchmarks to the levelling system of the Geodetic Service. The field inspection disclosed that some 21 per cent of the number originally established had been destroyed.

Detailed Statement of Levelling Run in 1936

...	Miles	Benchmarks
Precise:	...	...
Tionaga to Sudbury, Ont	143.1	71
Sudbury to Nemegos, Ont	143.8	67
Fundamental benchmarks at Ste. Agathe and Lachute, P.Q.	...	2
Total precise	286.9	140
Secondary:	...	...
Terrebonne to St. Donat, P.Q.	75.3	40
St. Donat to Lachute, P.Q.	62.0	29
Lachute to Charlemagne, P.Q.	66.1	44
Lachute to St. Jovite, P.Q.	51.2	26
Total secondary	254.6	139
SUMMARY	...	...
Precise:	...	...
Prior to 1936	25,445	8,960
1936	287	140
Total	25,732	9,100
Secondary:	...	...
Prior to 1936	11,454	3,980
1936	255	139
Total	11,709	4,119

The total mileage of levelling, distributed by provinces, at the end of the year 1936, was as follows:

...	Precise	Secondary
...	Miles	Miles
Nova Scotia	729	0
New Brunswick	1,096	0
Quebec	3,418	895
Ontario	6,719	1,324
Manitoba	2,548	368
Saskatchewan	4,113	5,098
Alberta	2,866	3,799
British Columbia	3,690	225
Yukon	458	0
Minnesota (U.S.A.)	89	0
Vermont (U.S.A.)	6	0

...	25,732	11,709

GEODETIC ASTRONOMY AND ISOSTASY

The astronomical field work of this Division consisted in the making of Laplace observations at four triangulation stations of the British Columbia net between South Base at Salmon Arm and Beaverley near Prince George; in the determination of astronomical longitudes and latitudes at 18 geodetic triangulation stations in the Provinces of Nova Scotia, New Brunswick, and Quebec;

and in the observing of longitudes and latitudes at a number of ports of call along the route of the steamer R.M.S. Wascopie on her annual expedition to the islands of the Eastern Arctic.

The Laplace stations observed in the British Columbia triangulation net are South Base near Salmon Arm, Swakum north of Nicola, Spokin near 150 - Mile House in the Cariboo, and Beaverley near Prince George. From South Base the astronomical azimuth of the line to the triangulation station Ida was measured, from Swakum that to Missezula, from Spokin that to Big Camp, and from Beaverley that to North Base (Prince George). These Laplace determinations are for the purpose of controlling the direction of the triangulation. The 18 geodetic triangulation stations occupied for longitude and latitude in Nova Scotia, New Brunswick, and Quebec are as follows: in Nova Scotia, Londonderry, Dean, Dalhousie East, Aspen, Advocate, Ardois, and Boyle Hill; in New Brunswick, Rogerville, Harvey, Doaktown, Gaspereau Forks, Alma, Plaster Rock, and St. Fabien; in Quebec, Dusable, St. Simeon, Gosse Cape Light House, and St. Fereol. The results of these observations combined with the geodetic values give the deflections of the vertical, and also provide materials for the continuation of the research into the shape of the geoid and its dimensions.

WORK IN THE EASTERN ARCTIC

During the season of 1936 an astronomical field party was engaged on the fixation of coast-line at several of the trading posts in Ungava Bay district. Disembarking from the Nascopie at Port Burwell, this party accompanied the Hudson's Bay Company's motor schooner, Fort Garry, on her annual trip to Fort Chimo, Payne Bay, and Diana Bay, returning to Port Burwell on August 21. Precise astronomical determinations of latitude and longitude were secured at Port Burwell, Fort Chimo, and Payne Bay. At each place the observation station was marked by a bronze tablet cemented into solid rock. At Diana Bay, an approximate position was determined on the sun.

After returning from Ungava Bay, this party went 25 miles around the coast to Lady Job Harbour, which is situated on Killinek Island, 2 miles to the west of Cape Chidley. An excellent determination of position was secured here and the point marked as usual. On September 1 the party embarked on the Nascopie on her second call to Port Burwell and accompanied the patrol on the northern leg of the voyage. Observations were secured at Craig Harbour, Dundas Harbour, Arctic Bay, and Clyde River. Permanent survey tablets were placed at each of these places to mark the observation stations. The results from this work will warrant corrections of considerable extent in the map of northern Canada.

BASE-LINE

One base-line located near Prince George, B.C., was measured during the summer of 1936. This base is to control the scale of the triangulation of this net. The invar base-line tapes used in measuring this base-line were standardized before and after the measuring of the base.

TRIANGULATION ADJUSTMENTS

The work of this Division was confined largely to the adjustments of the completed work in Eastern Canada. The immediate object has been to furnish to the engineering and surveying public, in published form, the adjusted results of all triangulation executed by the Geodetic Service of Canada for the area in Eastern Canada east of the Great Lakes. This has now been accomplished.

Tables have been prepared in extension of those in Publication No. 7 and are now made to embrace the extent from 42 degrees to 70 degrees north latitude.

This range is just sufficient to cover the continental extent of Canada. Useful odetic tables, other than those required in the computation of geographic coordinates, have been computed either partly or entirely and are included for ready reference. The complete manuscript for this revised and enlarged edition of No. 7 is being submitted for printing, as the stock. of the original publication is exhausted.

LEVELLING ADJUSTMENTS

During the year three adjustments were completed on the combined level net of Canada and the United States: first, leaving out the tidal stations Old Point Comfort, Annapolis, and Baltimore; second, including these stations; and third, leaving out the above-mentioned tidal stations, together with Atlantic City a nd Fort Hamilton. The object of these adjustments was to see how the new elevations of the various benchmarks compared with those of the United States - Canada adjustment of 1929 and with those of our own all - Canadian net. The results of these adjustments are now being investigated and tabulated. In addition to this, two lines - 175 and 176 - levelled during the summer season, were adjusted to the published elevations of existing benchmarks. Line 175, Longlac Oba-Sudbury, begun in 1935, was completed, 278 miles being levelled in 1936. Line 176, Sudbury - Franz, was run as far as Tophet, a distance of 141 miles.

GEODETIC RESEARCH

The chief problem that has occupied the attention of this Division has been that of finding a suitable means whereby triangulation results may be transferred from one ellipsoid to another. In this connection it may be said that a differential formula has been developed for the change in latitude. This problem has been presented as a result of a recommendation of the International Union of Geodesy and Geophysics that all countries should use the same ellipsoid of reference. At the present time there are in use throughout the world several ellipsoids. Of these, the Clarke ellipsoid of 1866 is in use in North America, whereas in Europe the Bessel ellipsoid and the Clarke ellipsoid of 1880 are in common use. The ellipsoid recommended for universal adoption is known as the International ellipsoid.

PUBLICATIONS

Publications of the Geodetic Service of Canada printed during the year are as follows: No. 57, Bench Marks in Ontario East of Toronto and North Bay; No. 58, Bench Marks in Ontario West of Toronto and North Bay; No. 61, Triangulation in Northern Quebec; No. 69, Geodetic Operations in Canada, January 1, 1933, to December 31, 1935. Reports of the International Association of Geodesy. The International Geodetic and Geophysical Union, Sixth General Conference, Edinburgh, 1936.

INTERNATIONAL BOUNDARY COMMISSION

The function of the International Boundary Commission is to perform the treaty obligation of maintaining in a state of effective demarcation the entire International Boundary between Canada and the United States and between Canada and Alaska.

The commissioners held a conference in Toronto on June 9 and 10, 1936. At this conference they signed their Tenth Annual Joint Report for submission to the two Governments for the year ended December 31, 1935, and agreed upon details of field work to be undertaken during the season of 1936.

INSPECTION

In July and August an engineer of the Canadian section of the Commission, co-operating with an engineer from the United States section, inspected the boundary range marks in Passamaquoddy Bay and cleared away any trees or brush obscuring the ranges. These engineers also determined and marked the exact position of the boundary on the, international highway bridges across St. Croix River at St. Stephen, Union Mills, and Milltown, N.B.

MAINTENANCE OF THE BOUNDARY

Operations by survey parties of the Canadian section of the Commission were on the New Brunswick - Maine, the Quebec - Vermont, and the British Columbia Washington sections of the boundary. On the New Brunswick - Maine section of the line 20 miles of boundary vista were recleared, and 27 monuments were repaired. On the Quebec - Vermont section 25 miles of boundary vista were recleared, four monuments were repaired, and the position of the boundary oil the international highway bridge across Missisquoi River at East Richford, Vt., was determined and marked. In addition surveys were made from which large scale plans can be prepared showing the position of all buildings on or near the boundary at eleven points where highways cross the boundary. On the British Columbia - Washington section through the extremely rugged area between Vedder Mountain and Skagit River, 37 miles of boundary vista were recleared and one new monument was erected and located. In addition four new monuments were erected at Blaine, Washington, following the necessary location surveys. The lights on the range.marks ranging the first course of the boundary through the Strait of Georgia were maintained. Boundary monument No. 50 on the north bank of Porcupine River at Rampart House, Yukon Territory, was repaired by a patrol from the Old Crow detachment of the Royal Canadian Mounted Police.

The adjustment was completed of the surveys made during several previous field seasons on the British Columbia section of the 49th parallel, also the computation of the geographic positions of the monuments located thereby. This data will be included in a joint report upon the survey and demarcation of the 49th parallel International Boundary from the Strait of Georgia to the northwesternmost point of Lake of the Woods. Other material for a joint report upon the Cape Muzon - Mount St. Elias section of the boundary was prepared.

Two copies of their Tenth Annual Report for the Year ended December 31, 1935, as required by Article IV of the Treaty of 1925, were submitted by the commissioners to each government.

HYDROGRAPHIC AND MAP SERVICE

The Hydrographic and Map Service undertakes all hydrographic and tidal and current surveys of navigable waters; prepares, prints, and distributes, charts, and tide and other tables for navigation purposes. It also conducts all legal surveys required by this and other departments, including those in the Northwest and Yukon Territories, National Parks, Ordnance Lands, and, Indian reserves; maintains the, central office for indexing, filing, and recording survey returns And plans; compile and prepares from existing base maps or from published maps, electoral maps, general maps for use of various Government departments, air navigation maps, natural resources and railway. maps, and general maps of Canada. The Service also distributes all departmental maps except those relating to mines and geology.

HYDROGRAPHIC SERVICE

During the year the main hydrographic operations conducted by this Service consisted of charting, the investigation of tides and tidal currents, the recording of lake and river fluctuations, the preparation of Coast Pilots and Sailing Directions, special marine investigations, and the supplying of diverse nautical information to the shipping trade. On the Atlantic, charting operations were conducted with the use of the hydrographic steamers Acadia and Cartier, and on the Pacific by the Wm. J. Stewart and the houseboat Pender. Small parties equipped with motor launches were also employed in hydrographic work on both coasts. To facilitate the investigation of currents in the lower St. Lawrence River, this Service was afforded the use of the C.G.S. Gulnare.

HEADQUARTERS DIVISION

This Division carried out, in addition to administrative work, the planning of new and special surveys, investigation and research relating to chart revision and hydrographic publications, preparation of Coast Pilots and Sailing Directions, and various researches in hydrographic and navigational subjects. With this was involved the collecting and disseminating of general and special marine information for the benefit of Canadian shipping and mercantile and transportation concerns.

International Exchange of Hydrographic Data. - Many new charts and hydrographic publications were received, examined, and filed for reference and library purposes, principally from the British Admiralty Hydrographic Department, United States Hydrographic Office at Washington, United States Coast and Geodetic Survey at Washington, United States Lake Survey Office at Detroit, and the International Hydrographic Bureau at Monaco. There were also received certain related publications from the Hydrographic Services of France, Germany, Japan, Italy, and other countries. On a co-operative basis the Hydrographic Service of Canada furnishes these foreign Government services with copies of all new or revised charts and new editions of Canadian publications dealing with the Dominion's coasts and waters.

Sailing Directions and Emergency Surveys. - Emergency surveys and investigations in connection with reported dangers to navigation, ice, currents, or changes in aids to navigation, were carried out from headquarters as occasion arose.

At the request of the Harbour Commissioners, and with the assistance of personnel and equipment of the C.G.S. Bellechasse of the St. Lawrence Ship Channel Branch, the currents in Montreal Harbour were charted during both the high-water stage from June 10 to 22 and low-water stage from September 20 to October 2. As a result of this work there are now available special charts showing the directions and velocities of the currents. These charts show in contrasting colours the various gradations of current velocities and indicate the complicated movements of the river currents as they affect a ship of ordinary draught. These new charts are a valuable supplement to the standard nautical chart of the harbour.

From November 1 to 7, sounding and ship-sweeping operations were conducted in Lake St. Louis to locate reported shoals that had caused damage to shipping. In addition, the position of some 80 buoys and other aids to, navigation on the lake were checked and a report containing recommendations was submitted. Charting operations and examinations of shoal areas were conducted at various places in the upper and lower St. Lawrence and Saguenay River, the details of which are contained in the report of work conducted with the launch Boulton.

In connection with the publication of Coast Pilots and Sailing Directions, the following were revised and compiled or issued:

Supplement to St. Lawrence River Pilot (Below Quebec) (Published); Supplement to British Columbia Pilot, vol. I (Published); Supplement to St. John River Pilot (Published); Supplement to St. Lawrence River Pilot (Montreal to Kingston) (Published); Supplement to Canadian Shores of Lake Superior (Published); Supplement to Sailing Directions for Hudson Bay Route (Published); Supplement to Gulf of St. Lawrence Pilot (Compiled).

The great improvement during the year in maritime trade was reflected in the increased demand for charts, Coast Pilots, and Sailing Directions, and also in the large number of inquiries relating to depths, water levels, routes, berthing accommodation, and harbour facilities in various ports all over Canada. A number of requests were received and dealt with in connection with sailing distances and routes between Canadian and foreign ports. Many Canadian coastal waters are still covered only by original Admiralty charts and, for the correction of these, information was supplied from time to time to the Admiralty.

HYDROGRAPHY

The Acadia was fitted out at Halifax and left that port on May 22 for the north shore of the gulf, where charting on the Belle Isle route and inside passage was continued. Working in conjunction with the ship was the 36 - foot auxiliary cabin-launch Henry Hudson which was outfitted at Quebec and used throughout the season by a subsidiary shore party. Coastal triangulation was extended from Harrington to Blanc Sablon. Aerial photographs were used to advantage in delineating the tortuous, island-fringed coast-line. Sounding and extensive shoal examinations were carried on. In the same district three harbours were charted. An important phase of this season's work was the charting of an inside steamer route for the benefit of coastal traffic. This passage along the north shore from Harrington to Greenly Island is, for the greater part, sheltered from the sea by the protective barrier of islands that fringe the coast. For the further assistance of shipping in these passages, seven sets of navigation range beacons were established.

The Henry Hudson was wintered at Bonne Espérance on the north shore and the Acadia returned to Halifax on October 29 and laid up in that port for the winter.

Summary of Season's Work

Ship sounding	1,650 linear miles
Boat sounding	3,408 linear miles
Coast-line surveyed exclusive of inlets and islands	115 linear miles
Area charted	1,500 square miles
Shoals examined	260

Gulf of St. Lawrence and Cabot Strait. - To improve and modernize the aids to navigation and assist shipping frequenting these waters, the Hydrographic Service has for several years pursued a vigorous program of charting this area. The C.G.S. Cartier was fitted out at Charlottetown from March 23 to June 6 and sailed on the latter date to examine a shoal about 22 miles east of Old Harry Head, Magdalen Islands. From June 10 to 13 a search was made to locate a shoal reported to lie 25 miles west - northwest from Cape St. George, Newfoundland. From June 15 to September 23 the previous years' coastal charting of the northern portion of Cape Breton Island was extended southward to Cape Smoky and Cheticamp Island on the east and west coasts, respectively. A detailed survey was made of Ingonish Harbour and approaches, and at the close of this season, from September 24 to 29, ship sounding was carried on off Hillsborough Bay, P.E.I. The ship was laid up at Charlottetown on September 30.

As a result of the season's work there will be published, on a scale of 1 mile to an inch, two coastal chart Cape Smoky to St. Paul Island and Cheticamp to Cape St. Lawrence; also a harbour chart of Ingonish Harbour on a scale of 1,500 feet to an inch.

Summary of Season's Work

Ship sounding	1,347 linear miles
Boat sounding	749 linear miles
Coast-line surveyed	86 linear miles
Area charted	614 square miles
Shoals examined	12

Hillsborough Bay and Approaches. - From May 25 to October 17, the previous season's charting of Charlottetown Harbour was extended to include Hillsborough Bay and approaches. The bay was closely sounded, some 45 shoals were examined, and the delineation of the coast-line was compiled from aerial photographs. A gasoline explosion occurred on board the hydrographic motorboat Discovery and it sank in the harbour. Three of the crew were injured. This accident, however, caused but a short delay in charting operations. A hired craft was procured, and subsequently the Discovery was raised and reconditioned and added to the complement of auxiliaries of the Acadia and taken to Halifax. At the close of the season the Cartier was used for a few days to ship sound an offshore area with her echo-sounding equipment.

Summary of Season's Work

Boat sounding	1,075 linear miles
Coast-line surveyed	75 linear miles
Area charted	74 square miles

St. Lawrence River. - The C.G. motor-launch Boulton was fitted out at Prescott, Ont., and equipped with a new type of Admiralty echo-sounding gear, specially designed for shoal examination and large-scale work of a like nature. The Boulton left Prescott on June 8 and, until June 23 was engaged in sounding and sweeping operations in Telegraph Narrows (Bay of Quinte) where ships had reported touching bottom. As a result of this work numerous shoal spots were located and the information obtained was placed on the charts. The party then proceeded to the head of Lake St. Louis and there examined, sounded, and swept an auxiliary channel, below Soulanges canal, that was reported to be generally ice-free in the early part of the season when the main ship channel in the vicinity is unnavigable due to heavy ice conditions. To lead through the auxiliary channel, a pair of temporary range beacons was erected on Ile Perrot. The work was completed on July 14 and during the next few days information for chart use was obtained at Sorel. Proceeding from there to Saguenay River, charting operations were carried on in the lower reaches of this river from July 22 to September 1. From that date until September 20, charting operations, in connection with pulpwood shipping developments, were carried on near Papinachois River (Outardes Bay) and at Baie Laval, both in the Lower St. Lawrence.

The Boulton returned to Prescott on September 30 and laid up there for the season.

Summary of Season's Work

Boat sounding	340 linear miles
Coast-line surveyed	30 linear miles
Area charted	12 square miles

Pacific Coast District. - The principal scene of operations in the season of 1936 was the west coast of Queen Charlotte Islands. The C.G.S. Wm. J. Stewart was commissioned at Victoria and left on April 15. The following work was carried out, prior to coaling at Comox on April 22 - 23: locating a reported rock off the Government wharf at Lyall

Harbour; investigating a low water spit off Millstream Creek in Nanaimo Harbour; surveying the property of the Stan-

dard Oil Company and wharves east of the Second Narrows, Vancouver Harbour investigating the approaches to Buckerfields wharf, Vancouver Harbour; examination of a reported shoal off Texada Island; sweeping off the entrance to Esquimalt Harbour; examination and sweeping of two shoals in Boundary Pass.

The ship then returned to Victoria and on April 30 left with the boats of the houseboat Pender and proceeded to Kyuquot Sound where the houseboat had been laid up in winter quarters. The ship then towed her to Nasparti Inlet, about 20 miles northward. With one party from the ship located at Klaskish Inlet, and one party from the Pender, the coast triangulation was carried over the mountainous Brooks Peninsula. Between May 1 and June 26 the ship engaged in charting operations between Esperanza Inlet and Quatsino Sound, carrying on boat-sounding, coast-lining, ship station triangulation, ship-sounding, and ship-topography. On May 28 the Wm. J. Stewart towed the houseboat from Nasparti Inlet to Holberg Inlet, Quatsino Sound, and on June 26 again moved her to Rivers Inlet on the mainland coast. From the latter place the ship continued south for coaling and supplies, and on July 4 proceeded to the west coast of the Queen Charlotte Islands. Here four camp parties were established between Englefield Bay and Port Louis to carry on charting operations.

In accordance with instructions, on July 10 the ship proceeded south to prepare for an inspection trip of British Columbia waters by the Minister of Fisheries, which terminated on August 10 when the ship reached Victoria. Here she was obliged to undergo certain boiler repairs and returned to Queen Charlotte Islands on August 28. Charting operations were here resumed and continued until the break of the weather on September 15 when, with all parties aboard, the ship returned to Rivers Inlet and carried on charting operations in conjunction with the Pender party. On September 26 the Wm. J. Stewart with the water-tender scow Fraser in tow, left Rivers Inlet for her headquarters at Victoria where she arrived on September 30.

Summary of Season's Work

Ship sounding	1,239 linear miles
Boat sounding	1,918 linear miles
Coast-line surveyed	167 linear miles
Shoals located or examined	193 linear miles

On Vancouver Island the hydrographic work accomplished by the houseboat Pender consisted of the coast-lining and sounding of Nasparti Inlet and approaches, the topography between Ououkinsh Inlet and Cape Cook, and the completion of the charting of the western portion of Holberg and Rupert Inlets of Quatsino Sound. The Pender was then towed by the Wm. J. Stewart to Rivers Inlet in the mainland coast. Here, from June 26 to September 26, the party completed the charting of the eastern and western portions of the inlet and practically all the necessary topography.

Summary of Season's Work

Boat sounding	410 linear miles
Coast-line surveyed	305 linear miles
Topography completed	140 square miles
Shoals located or examined	16

TIDES AND CURRENTS

The work of preparing the different issues of the tide tables for a year in advance was carried out as usual. The total number printed of all editions for the year 1937 was 109,100. These are classified as follows:

Atlantic Coast Tide Tables. - Atlantic Coast, complete (10,500); Quebec and Father Point (abridged) (8,500); Charlottetown and Strait of Canso (abridged) (3,100); Halifax and Sydney, N.S. (abridged) (3,000); Saint John and Bay of Fundy (abridged) (23,000).

Pacific Coast Tide Tables. - Pacific Coast, complete (37,000); Vancouver and Sand Heads (abridged) (14,000); Prince Rupert and Northern B.C. (abridged) (10,000).

The complete editions are required for shipping interests generally, and the pocket or abridged editions meet the needs of fishermen and others of our seacoast population. The contents of the complete edition of the Tide Tables for the Atlantic Coast are being re-arranged for the 1938 edition, placing the tables for slack water and the information on currents separately from the tide tables, instead of in the former geographical order.

The principal tidal stations kept in operation are:

Atlantic Coast. - Quebec, Father Point, P.Q.; Charlottetown, P.E.I.; Saint John, N.B.; Halifax, N.S.; and Port Churchill, Man.

Pacific Coast. - Vancouver, Caulfields, Victoria, Clayoquot, and Prince Rupert, B.C.

Seasonal Tidal Stations and Tidal Observations. - A tide gauge was installed at Tadoussac, P.Q., for the reduction of soundings of the hydrographic party working in Saguenay River and also to correlate the turn of the tidal streams in the vicinity. The gauge at Charlton Island in James Bay was again operated during the open season, its purpose being to obtain sufficient tidal records for a basis of prediction. It is proposed that this station be used as a reference port for the entire bay when the time comes to determine the relation of the tides in the whole region. The tide gauges established in 1935 at St. John's and Port aux Basques, Newfoundland, for the determination of mean sea-level, have been kept in operation and the records prepared for tabulation. The tidal data obtained, besides being used as a basis of the system of levels to be extended over the island, will afford a valuable addition to our Atlantic Coast Tide Tables in the interests of shipping.

Investigation of Currents. - The investigation of the currents in the Lower St. Lawrence, in the section between Murray Bay and Bic Island, was continued with the Department of Marine steamer Gulnare. Most of the localities where observations were previously obtained were visited a second time and some on a third occasion, to obtain information under different tidal conditions, and the stations were extended as far as time permitted. An interim report, in the form of a "Notice to Mariners", is being issued covering the results so far obtained.

Reductions, Reports, and Information Service. - The tidal records from both principal and secondary station were inspected, datum lines determined, and such abstracts were made as were required for tide tables, nautical charts, or for other purposes. Tabulations of hourly ordinates of the records for harmonic analysis were carried on as time permitted.

The following reports on tidal currents, in pamphlet form, are available on request: Currents in the Entrance to the St. Lawrence; Currents in the Gulf of St. Lawrence; Currents in the St. Lawrence Estuary, Ste. Anne des Monts to Father Point; Currents in the Bay of Fundy.

These deal with the currents to be met with in the outer areas of the main steamship routes. Predictions for the turn of the tidal streams at places in St. Lawrence River, in the Strait of Canso, and other straits or passes are given in the Atlantic Coast Tide Tables. The Tide Tables for the Pacific Coast Include similar information with regard to the passes and narrows there. Information on tidal matters has been furnished in response to many requests from engineers in the Government service and in private practice, as well as to other interests. in addition to the Tide Tables the following other publications are mailed on request: Tide Levels and Datum Planes in Eastern Canada; Tide Levels and Datum planes on the Pacific Coast; Tides at the Head of the Bay of Fundy; Tides and Tidal Streams in Canadian Waters (descriptive); Temperatures and Densities, Canadian (Atlantic) Waters.

PRECISE WATER-LEVELS

The precise recording of the various fluctuations that occur in water-surface elevations was carried on continuously by self-registering automatic gauges. These operations extend over the Great Lakes and St. Lawrence waterway system from Port Arthur to within 20 miles of Quebec, from which point seaward the rise and fall of the waters are principally of a tidal nature.

Field Activities. - During 1936 continuous water-level observation stations were maintained on the Great Lakes, St. Lawrence River, and lower Ottawa River, at fifty-four locations. This was the same number as in 1935. Five hundred and seventy-two months of continuous records were registered, an increase of 3 months as compared with 1935. The regular annual and semiannual inspections again had to be curtailed owing to the extensive field and office work made necessary by the requirements of the Water Levels Board. In addition to the permanent field activities, extensive correlation of data, precise levelling, and special investigations, were again carried out in the field for the Interdepartmental Montreal and Ship Channel Water Levels Board. The eleven self-registering gauges operated in 1934 and 1935 for the Board were again installed and maintained in 1936.

Office Activities. - Compilations totalled approximately 900,000 deductions and entailed the use of approximately 1,850,000 sets of figures. The twenty-eight regular "Water Level Bulletins" were issued; one hundred and fifty-four profiles, graphs, and curves, were prepared or extended; and a total of 26,092 sheets of data were issued during the year. As a result of the continued low water-cycle in the Great Lakes - St. Lawrence system the requests for general information and specific data exceeded normal years, and to comply with such requests approximately 1,580,400 water surface elevations were furnished. The Canadian Press Association was furnished with a concise synopsis of each monthly bulletin, and the engineering journals of Canada as a rule incorporated the monthly bulletins verbatim in their publications. Close co-operation was continued with, and extensive data supplied to, the various Government departments for scientific research, engineering and construction services, and navigation interests in general.

Hydrograph No. 207, Monthly Mean Elevations of the Great Lakes, 1860 to Date, Hydrograph No. 38 - B - 1, Yearly Means, With Maximum and Minimum Monthly Means of Each Year, 1860 to Date, of the Great Lakes, and six hydrographs, Yearly Mean Elevations From 1860 to Date, one for each of the Great Lakes and two for Montreal Harbour, were all extended to include the 1936 data. The Monthly Water Level Bulletins, five Annual Bulletins of 1936, water-levels, and the five Annual Hydrographs of comparative monthly mean water-levels, 1860 to 1936 inclusive, one for each of the Great Lakes and Montreal Harbour, were issued during the year. The six General Data Bulletins, one for each of the Great Lakes and two for Montreal Harbour, were revised and extended to incorporate the 1936 water-level statistics.

Extensive research was conducted to obtain the relative values of the precipitation, evaporation, and run-off factors in the local watershed of each of the Great Lakes and Ottawa River;,of the full drainage area of the Great Lakes; and of the entire Great Lakes and Ottawa River drainage basin. Covering the 45 years, 1890 - 1934 inclusive, the average values derived show that of the precipitation in the full drainage area of the Great Lakes, 66 per cent is lost to evaporation, and 34 per cent goes to run-off. In the Ottawa River drainage area, 45 per cent is lost to evaporation, and 55 per cent goes to run-off. For the entire Great Lakes - Ottawa River drainage basin 62 per cent is lost to evaporation and 38 per cent finally runs off. The fact that the loss to evaporation in the reap Lakes drainage area is 21 per cent greater than in the Ottawa 47398 - 12

River drainage area, can be attributed to the large water surface areas of the Great Lakes which are exposed to evaporation during practically 100 per cent of the time.

Values of sunspot numbers, of precipitation on the Great Lakes drainage area, and of the Great Lakes and Montreal water-levels, during the last four sunspot cycles, were compiled into massed curves of four sunspot cycle weight. The massed curve of sun-spots shows a minimum of seven followed by an almost straight line increase, in 4 years, to a maximum of eighty-three, then an almost straight line decrease, in 6 years, to the minimum of seven, which holds for 2 consecutive years. The massed curve of precipitation shows a maximum of 32.5 inches, coincident with the maximum of sunspots, followed by a decrease, in 2 years, to a minimum of 28.2 inches, then an increase, in 2 years, to 31.2 inches, and a decrease in 1 year, to 29.8 inches, followed by 6 years of fairly constant increase to the maximum of 32.5 inches. The water levels are, in the main, primarily dependent upon precipitation, and each massed curve shows a maximum and minimum quite constant with the high and low of the sunspot curve.

CHART CONSTRUCTION

The work of this Division is confined almost entirely to the draughting, compiling and revising, and preparation for the engravers and printer's of the results of the work of the hydrographic field parties. In addition, assistance was rendered during the year to the field parties in completing their fair sheets, to the Tidal and Current Division in their reports on current work, and to the Meteorological Service in compiling weather maps.

During the year 56 charts, maps, prints, and correction patches were printed. Hand corrections to published charts have totalled 95,709, also corrections to 16,831 copies of 141 different charts.

List of Nautical Charts Issued 1936 - 37 and in Hand on March 31, 1937

Province	No.	Issued 1936 - 37	Scale, Inch to Nautical Mile	Remarks
...	...	Title	...	...
Ontario	79	Lake Huron (general)	0.2	(a) (d) Reprint
Ontario	86	Georgian Bay to Clapperton Island	0.8	(a) (d) Reprint
...	...	Killarney Harbour	3.0	...
Ontario	88	St. Joseph Channel	2.0.	(a) (d) Reprint
...	...	Wilson Channel	6.0	...
Ontario	96	Cape Hurd to Gull Island	0.8	(a) (d) Reprint
...	...	Tobermory Harbour	6.0	...
...	...	Club Harbour	6.0	...
...	...	Rattlesnake Harbour	4.1	...
Quebec	212	Anticosti Island (West Point) to Bic Island	0.2	(a) (d) Reprint
...	...	Egg Island	1.5	...
...	...	Cawee Island	1.5	...
...	...	Shelter Bay	6.0	...
...	...	Ellis Bay	1.5	...
...	...	Matane Harbour	12.0	...
...	...	Current diagram	...	...
British Columbia	317	Quatsino Sound	1.5	(a) (d) Reprint
British Columbia	320	Idol Point to Ocean Falls	2.0	(a) (d) Reprint
...	...	Gunboat Passage	6.0	...
...	...	Ocean Falls	6.0	...

British Columbia	324	Caama¤o Sound and approaches	1.0	(a) (d) Reprint
British Columbia	328	Milbanke Sound and approaches	1.0	(a) (d) Reprint
...	...	Channels east of Milbanke Sound	4.0	...
Nova Scotia	410	Bedford Basin	6.0	(a) (d) Reprint
Quebec	4	Ile Marie to Ile Bouchard	6.0	(a) (f) Reprint
British Columbia	351	Discovery Island to Beaver Point	2.0	(a) (f) Reprint
British Columbia	352	Swiftsure Bank to Esteban Point	0.5	(a) (f) Reprint
Nova Scotia	461	Cabot Strait to Magdalen Islands	0.33	(a) (f) Reprint

Province	No.	Issued 1936 - 37	Scale, Inch to Nautical Mile	Remarks
...	...	Title	...	...
Quebec	462	Grand Lake and Salmon River to Chipman	2.0	(a) (f)
...	...	Douglas Harbour	6.0	...
...	...	Salmon Bay to Camp Wisegam	6.0	...
...	...	Camp Wegesegum to Chipman	6.0	...
Nova Scotia	P - 1005	Dingwall Harbour	15.2	(b) (f)
Prince Edward Island	P - 1460	Charlottetown Harbour	6.0	(b) (f)
British Columbia	P - 3353	Cape St. James to Tasu Harbour, Q.C.I.	0.5	(b) (f)
British Columbia	P - 3355	Houston Stewart Channel	4.0	(b) (f)
British Columbia	P - 3356	Skidegate Channel	2.0	(b) (f)
...	...	Anchorages in Skidegate Channel	4.0	...
British Columbia	P - 3357	Louscoone Inlet	4.0	(b) (f)
British Columbia	P - 3358	Flamingo Inlet	4.0	(b) (f)
British Columbia	P - 3359	Tasu Sound	3.0	(b) (f)
British Columbia	P - 3361	Rennel Sound and Shields Bay	1.0	(b) (f)
British Columbia	P - 3363	Port Chanal	4.0	(b) (f)
British Columbia	P - 3364	Gowgaia Bay	4.0	(b) (f)
British Columbia	P - 3365	Englefield Bay and vicinity	2.0	(b) (f)
...	...	Security Inlet anchorage	4.0	...
Quebec	P - 1004	Mutton Bay	6.0	(b) (c) Reprint
Quebec	P - 1027	Sorel Haxbour	15.0	(b) (c) Reprint
New Brunswick	P - 1423	Miramichi Bay	2.0	(b) (c) Reprint
New Brunswick	P - 1426	Dalhousie Harbour	10.0	(b) (c) Reprint
Quebec	P - 1504	Mouth of Moose River	1.3	(b) (c) Reprint
Quebec	P - 1508	Erik Cove to Nuvuk Harbour	1.0	(b) (c) Reprint

...	...	Erik Cove	3.0	...
...	...	Port de Laperriere	6.0	...
...	...	Nuvuk Harbour	2.0	...
Ontario	P - 2030	Thames River (sheet	15.0	(b) (c) Reprint
Ontario	P - 2031	Thames River (sheet 2)	15.0	(b) (c) Reprint
Ontario	P - 2032	Thames River (sheet 3)	15.0	(b) (c) Reprint
Ontario	P - 2052	Oshawa Harbour	30.4	(b) (c) Reprint
Ontario	P - 2065	Toronto Harbour	6.0	(b) (c) Reprint
Ontario	P - 2070	Harbours in Lake Ontario	...	(b) (c) Reprint
...	...	Port Whitby	15.4	...
...	...	Cobourg Harbour	12.3	...
...	...	Port Hope	12.2	...
...	...	Frenchman Bay	15.3	...
...	...	Port Credit	15.3	...
...	...	Port Dalhousie	7.7	...
Ontario	P - 2073	Oakville Harbour	15.0	(b) (c) Reprint
Ontario	P - 2080	Port Colborne Harbour	12.0	(b) (c) Reprint
Ontario	P - 2081	Harbours in Lake Erie	...	(b) (c) Reprint
...	...	Entrance to Rondeau Harbour	15.1	...
...	...	Port Stanley	15.0	...
...	...	Port Burwell	15.1	...
Ontario	P - 2114	Port Arthur and Fort William	4.0	(b) (c) Reprint
Northwest Territories	P - 2172	Tuktoyaktuk Harbour	12.0	(b) (c) Reprint
British Columbia	P - 3205	Malaspina Inlet	6.0	(b) (c) Reprint
British Columbia	P - 3205	Nass Bay	6.0	(b) (c) Reprint
British Columbia	P - 3228	Lawn Point to Selwyn Inlet	1.0	(b) (c) Reprint
British Columbia	P - 3233	West Coast Queen Charlotte Islands an's and Queen Cove	...	(b) (c) Reprint
British Columbia	P - 3237	Birthday Channel	6.0	(b) (c) Reprint

British Columbia	P - 3244	Entrance to Portland Inlet	2.0	(b) (c) Reprint
British Columbia	P - 3251	Laredo Inlet	1.0	(b) (c) Reprint
British Columbia	P - 3253	Nanaimo Harbour	24.0	(b) (c) Reprint
British Columbia	P - 3255	Khutze Inlet	2.0	(b) (c) Reprint
British Columbia	P - 3258	Gillam (Middle Channel) Queen Cove	5.0	(b) (c) Reprint
British Columbia	P - 3268	Kyuquot Sound	6.0	(b) (c) Reprint

[(a) Printed in full colours.] [(b) Printed in black only.] [(c) Vandyke, photostat, blue or similar print, temporary edition.] [(d) From engraved plates.] [(e) Photolithographed from originals.] 47398 - 12 1/2

Province	No.	Title	Scale, Inch to Nautical Mile
Quebec	33	Quebec to St. Antoine	2.0
...	...	Quebec Harbour	6.0
Quebec	34	St. Antoine to Ste. Emelie	2.0
Quebec	35	Ste. Emelie to Champlain	2.0
Quebec	36	Champlain to Pointe du Luc	2.0
...	...	Three Rivers	6.0
Quebec	37	Lake St. Peter	2.0
...	...	Sorel	11.3
Ontario	120	Kingston to Brewers Mills	2.5
Ontario	121	Seeley Bay to Narrows look	2.5
British Columbia	344	Dixon Entrance	0.3
New Brunswick	400	Gulf of St. Lawrence	0.07
Quebec	405	Hudson Bay and Strait	0.03
British Columbia	...	Traffic chart	...
Newfoundland	...	Ice track, Strait of Belle Isle	...

Miscellaneous -

Computations for and construction of Ice Track chart of approaches to Strait of Belle Isle; 6 tracings for report on currents in lower St. Lawrence for Tidal and Current Survey Division; 1 tracing of ice conditions in Lake St. Louis; 1 tracing of Killinek Island; 1 tracing of currents in Montreal Harbour; revisions of text for 1937 edition of the Catalogue of Nautical Charts, etc.; revisions of 5 index maps for insertion in above Catalogue, preparation of copy for 2 index maps for editions of Pilots in preparation; preparation of correction patch for Chart 405, Hudson Bay and Strait.

ENGRAVING SECTION

Charts Completed and in Hand 1936 - 37

Province	No.	Title	Scale, Inch to Nautical Mile
British Columbia	343	Clayoquot Sound, main channels	4.0
...	...	Matilda Inlet	4.0
...	...	Tsapee Narrows	4.0
...	...	Dawley Pass	4.0
Quebec	455	Washtawouka Bay to Piashti Bay	1.0
Quebec	...	East Point to S.W. and Carleton Points	0.5
...	...	**In Hand March 31, 1937**	...
British Columbia	348	Clayoquot Sound, N.W. portion	2.0
...	...	Sydney Inlet	2.0
...	...	Hayden Pass	4.0
British Columbia	...	Refuge Cove	4.0
British Columbia	352	Swiftsure Bank to Esteban Point	0.5
British Columbia	351	Discovery Island to Beaver Point	2.0
Nova Scotia	461	Cabot Strait to Magdalen Islands	0.33

CHART DISTRIBUTION

The total number of standard Canadian nautical charts and related navigation and hydrographic publications distributed in the calendar year 1936 was considerably in excess of that of the previous year, as shown in the following table:

...	Year 1936	Year 1935
Catalogue of charts, sailing directions, and tidal information with index maps	1,000	1,000
Standard navigational charts	11,317	9,353
Special charts and process prints	1,559	879
Pilots and sailing directions	620	590
Tide tables	109,100	99,000
Water-level 5 bulletins, graphs, etc	26,092	25,985

There are now available for issue to the public, 494 Hydrographic Service of Canada charts of Canadian waters, comprising general charts, coast sheets, river and lake charts, harbour and roadstead plans, and charts for special purposes. They are made up as follows:

Atlantic Coast (including the St. Lawrence River to the head of ocean navigation at Montreal; and Hudson Bay and Strait)	198
Great Lakes and inland waters	141
Pacific Coast (including Vancouver Island)	118
Charts for special purposes	37

There were 79,284 copies of charts in stock at the Hydrographic Office on January 1, 1937. There has now been provided, for the convenience of shipping, a distribution service through local chart dealers, merchants, or Government officers, where these charts and other hydrographic publications may be procured at the official list prices, in the following ports: St. John, N.B.; Yarmouth, N.S.; Quebec, St. Jean, and Montreal, P.Q.; Kingston, Toronto, Port Colborne, Killarney, Sault Ste. Marie, Little Current, Port Arthur, and Kenora, Ont.; Seattle, Wash.; Prince Rupert, Vancouver, and Victoria, B.C.

MAP SERVICE

SPECIAL SURVEYS

Ontario - Manitoba Boundary. - During the year the Provinces of Ontario and Manitoba decided to proceed with the survey of the interprovincial boundary through the area of mining development immediately northeast of Island Lake. The participation of the Dominion Government was enlisted in this work, and the Surveyor General of Dominion Lands acted as Chairman of the Interprovincial Boundary Commission. The part of the interprovincial boundary in question is defined by the Statutes as a "right line" joining a point at the northeast corner of Island Lake which point had been previously determined to the point where the 89th meridian of longitude intersects the shore of Hudson Bay. The distance between these two points is approximately 282 miles. Because of the nature of the ground over which the boundary runs, it was decided to do as much of the boundary work as possible during the winter. The necessary arrangements were made with the provinces, and 115 miles of line was run. Aircraft were used for transporting men and supplies to and from the work, and also for moving camp.

Computations. - Besides the various computations necessary in reducing the field astronomic observations and in computing the azimuths of the survey for the Ontario - Manitoba boundary, considerable mathematical and computational work was performed in connection with the preparation and publishing of the astronomical field tables and of the field observing lists required to facilitate the work of the field observers. The field observing lists for astronomical work, with the recently acquired British Admiralty pattern astrolabes were completed for all latitudes from latitude 45 degrees to latitude 70 degrees, which covers, the whole of the mainland of Canada.

Magnetic Work. - More than 31,000 observations for magnetic delineation have been received, reduced to International Magnetic Standard, tabulated, and filed. During the past year the results of 420 magnetic declination observations were received as follows: 246 observations from surveyors of this Service, 33 observations from surveyors of other Federal Government offices, and 141 observations from various provincial land surveyors. All the magnetic declination observations thus obtained are coordinated and used as a base for the compilation of the magnetic declination map published from time to time by this Service. This map, the only one of its kind issued in Canada, is essential for purposes of air navigation, and is of value to surveyors, Prospectors, and explorers.

Electoral Maps. - The stock of electoral maps as based on the Representation Act, 1933, was kept up and distributed to Government offices on request. The base maps are kept up-to-date in regard to county and municipal boundaries in order to facilitate the preparation of maps for the next redistribution.

LEGAL SURVEYS

Interprovincial boundaries received considerable attention during the year. The boundary between Manitoba and Saskatchewan is governed by lines of the Dominion Lands System of Survey. Part of it is marked by confirmed surveys, part by unconfirmed surveys, and part is undefined. The provinces desired to deal with the latter two sections of the boundary. Inasmuch as the Dominion had made all existing surveys along this line and the survey organizations of both provinces desired the advice of the Dominion in dealing with the boundary, it was decided to set up a boundary commission of three with the Surveyor General of Dominion Lands as chairman of the commission. Reports on all the unconfirmed surveys affecting the boundary were prepared for submission at the first meeting of the commission, which decided, as the first work, to retrace the unconfirmed surveys between the seventeenth and eighteenth base-lines and to define the boundary in the vicinity of the Hudson's Bay Mining and Smelting Company's property at Flinflon. The instructions to the surveyor for this work were prepared for the signature of the commissioners. The final returns of survey were subsequently examined for the approval of the commissioners, their final report was prepared in triplicate for signature, and drafts of Bills for the approval of the survey by concurrent Acts of the two Provincial Legislatures were prepared.

Correspondence was entered into relating to the prospective Survey of the Alberta - Saskatchewan boundary and the Alberta - Northwest Territories boundary. Inquiries necessitated research into the papers relating to the boundary between Ontario and Quebec in the St. Lawrence and Ottawa Rivers, whereas other inquiries regarding the location of Cape Chidley and the jurisdiction at Port Burwell led to a research of, and report on, the Labrador

boundary, from which the Department of Justice ruled that the part of Killinek Island at the northern end of Labrador Peninsula, which is not in Labrador, belongs to the Northwest Territories and not to Quebec as existing maps indicate.

Arrangements were made for the survey of the boundaries of New Westminster Harbour, as extended to where it crosses Fraser and Pitt Rivers, and an amended description was prepared for insertion in a Bill to amend the New Westminster Harbour Commissioners Act in these cases. The plan of survey was examined and description prepared for insertion in a lease of the bridgehead in Stanley Park, Vancouver, to the First Narrows Bridge Company. Continuing the work for the Department of Justice undertaken some years ago, a complete survey of the Dorchester Penitentiary Reserve in New Brunswick was made, and plans, both legal and topographical, were prepared for their use, together with descriptions by metes and bounds. For the Department of National Defence two aerodromes were surveyed in Quebec and two in Ontario. A number of surveys were made in connection with Indian lands.

Ninety-five descriptions for legal titles and seventeen Orders in Council were prepared, and eighty legal titles that were submitted to this office were also examined and amended where required. A very considerable number of memoranda, mostly technical, were furnished other branches of the Department relative to matters pertaining to ditches, pipe-lines, power-lines, oil leases, telephone lines, rights of way, roads, location tickets, and gravel leases, which existed or were proposed, affecting Indian reserves. In addition the usual administration work relative to legal surveys was carried on, such as furnishing copies of plans of surveys, descriptions, and technical advice generally.

The returns of survey of an extension to Wasagaming in Riding Mountain National Park were received, examined, and the preparation of a new plan was begun. This extension comprised twenty-eight blocks containing 383 lots and seven reserved areas. Instructions were issued for a further extension of four reserves and seven blocks containing 124 residential lots. Instructions also were prepared for the survey of the boundaries of the new Prince Edward Island National Park, and the descriptions of the lands selected for insertion in the legislation to create the park were checked against the plans of survey for acceptance. A new description by metes and bounds of Banff National Park, conforming to the recent boundary surveys of the passes, was prepared and submitted for inclusion in an amendment to the National Parks Act. One historic site at Brudenell Point, Prince Edward Island, and one parcel of Ordnance land at Joe Point near St. Andrews, New Brunswick, were surveyed and a plan prepared of the latter to facilitate the sale of this lot.

In the Northwest and Yukon Territories the surveys of 154 lots, mostly mineral claims, were examined for approval, and the reduction of 26 excessive sized mineral claims in the Northwest Territories was dealt with in compliance with the regulations for the disposal of quartz mining claims. When the field notes of surveys in Manitoba and Alberta were sent to the provinces some years ago the original plots of stadia traverse of water areas were retained. It was found that these could now be released and 850 plots for Manitoba and 2,675 plots for Alberta were assembled, indexed, and forwarded to the respective governments. Descriptions for Caroussel Bird Sanctuary in the Gulf of St. Lawrence, Quoddy Bird Sanctuary in the Bay of Fundy, and Big Glace Bay Bird Sanctuary in Cape Breton Island were prepared for insertion in Orders in Council. Numerous other descriptions in connection with the administration of Dominion lands were prepared or examined, and many inquiries from western officials or owners of land relating to surveys made by the Dominion Government were dealt with.

SURVEY RECORDS AND DISTRIBUTION

This Division has charge of the registration and recording of all survey notes and plans affecting Dominion, lands, and interprovincial boundaries. Up to the end of the fiscal year 22,015 books and 39,312 plans had been placed on record. The number of copies of official plans of townships, townsites, and settlements distributed during the year was 3,863.

During the past twelve months there were distributed 100,882 maps and 2,961 publications. Of the maps issued during the year, a few that have aroused special interest might be mentioned. The Chibougamau and Gouin Reservoir sheets of the National Topographic Series, on a scale of 4 miles to 1 inch, in Northern Quebec, have had a large demand from those interested in that mining area. The Nipigon sheet in northwestern Ontario and the Fort Coulonge and Ste. Agathe sheets north of the Ottawa River, have also filled a long felt want. Another map that was much needed was the new edition of the map of Yukon Territory.

BOARD OF EXAMINERS FOR DOMINION LAND SURVEYORS

The Board of Examiners for Dominion Land Surveyors held one meeting during the year. This was the regular annual meeting called for by section 9 of the Dominion Lands Surveys Act. It began on February 8, 1937, and lasted until March 11, 1937. During this meeting examinations were held at Ottawa, Kingston, Winnipeg, Edmonton, and Vancouver. The total number of candidates who presented themselves at the examination was thirty-five. Of these, thirty-four tried the preliminary examination and one tried the final examination.

Thirteen candidates were successful at the preliminary examination as follows:

Bird, D.A.G.
Bowering, R.
Brown, L.H.
Dykes, C.P.J.
Hargrove, P.
Hopkins, P.M.
Kihl, T.H.
Malby, G.T.
McCutcheon, R.
Nation, P.T.
Rice, J.D.
Ross, J.H.
Roy, M.

One Dominion standard measure of length was issued during the year.

MAP PUBLICATION

This division of the office makes the finished drawings of maps and plans for reproduction, photographs these drawings to the scale of publication, makes the photolitho zinc plates for the printing room, and prints the editions. The maps published during the year and those in course of preparation are shown in a separate list. The total number of copies of maps printed was approximately 208,000, necessitating nearly 750,000 impressions as nearly all of them were in several colours.

A detailed statement of the work performed in the photo-mechanical office includes: wet plate negatives, 1,803; photolithographic plates, 406; line and halftone cuts, 101; brass name plates, 16; grids, 140; enlargements, 466; contact prints, 1,405; vandyke prints, 2,981; vandyke printing, 13,583 square feet; blue and blue-line printing, 126,285 square feet; photostat printing, 6,375 sheets.

List of Map Sheets of the National Topographic Series and of the Sectional Map Series Issued 1936 - 37, and in Hand on March 31, 1937

ISSUED 1936 - 37

Prov.	No.	Series	Name	Scale in (Miles to 1 inch)	Latitude	Longitude	Remarks
N.B	21 - I/NW	N.T.	Newcastle	2	46° 30' to 47° 00'	65° 00' to 66° 00'	(b)
Que	31 - F/NE	N.T.	Fort Coulonge	2	45° 30' to 46° 00'	76° 00' to 77° 00'	(a)
...	31 - J/SE.	N.T.	Ste. Agathe	2	46° 00' to 46° 30'	74° 00' to 75° 00'	(a)
...	31 - N/NE.	N.T.	Vimy	2	47° 30' to 48° 00'	76° 00' to 77° 00'	(b)
...	31 - O/SW.	N.T.	Petewaga	2	47° 00' to 47° 30'	75° 00, to 76° 00'	(b) Reprint
...	32 - B/SW.	N.T.	Oskelaneo	2	48° 00' to 48° 30'	75° 00' to 76° 00'	(b)
...	32 - C/SE.	N.T.	Doucet	2	49° 00' to 49° 30'	76° 00' to 77° 00'	(b)
...	32 - B	N.T.	Gouin Reservoir	4	48° 00' to 49° 00'	74° 00' to 76° 00'	(b)
...	32 - G	N.T.	Chibougamau	4	49° 00' to 50° 00'	74° 00' to 76° 00'	(b)
Ont.	31 - D/NW	N.T.	Orillia	2	44° 30' to 45° 00'	79° 00' to 80° 00'	(b) Reprint
...	52 - B	N.T.	Quetico	4	48° 00' to 49° 00'	90° 00' to 92° 00'	(b) Revised edition
...	52 - H	N.T.	Nipigon	4	49° 00' to 50° 00'	88° 00' to 90° 00'	(b)
Man.	52 - L	N.T.	Pointe du Bois	4	50° 00' to 51° 00'	94° 00' to 96° 00'	(b) Reprint
...	63 - H	N.T.	Norway House	4	53° 00' to 54° 00'	96° 00' to 98° 00'	(b) Reprint
...	21	Sect.	Turtle Mountain	3	49° 00' to 49° 43'	100° 00' to 102° 00'	(d) Reprint
Sask	218	Sect.	Saskatoon	3	51° 47' to 52° 30'	105° 00'to 108° 00'	(d) Reprint
...	269	Sect.	Prince Albert South.	3	52° 29' to 53° 12'	101° 00' to 106° 00'	(f) Reprint
...	320	Sect.	Carrot River	3	55° 11' to 55° 54'	102° 00' to 104° 00'	(f) Reprint
...	367	Sect.	Meadow Lake	3	53° 53' to 54° 36'	109° 00' to 110° 00'	(f) Reprint
Alta.	82 - O/1	N.T.	Calgary Northwest	1	51° 00' to 51°	114° 00' to	(a) Reprint

					15'	114° 30'	
...	214	Sect.	Rocky Mountain House	3	51° 47' to 52° 30'	11 4° 00' to 116° 00	(f) Reprint
...	215	Sect.	Red Deer	3	51° 47' to 52° 30'	112° 00' to 114° 00'	(d) Reprint
...	216	Sect.	Sullivan Lake	3	51° 47' to 52° 30'	110° 00' to 112° 00'	(d) Reprint
...	366	Sect.	Saddle Lake	3	53° 53' to 54° 36'	110° 00' to 112° 00'	(f) Reprint
...	464	Sect.	Giroux	3	55° 17' to 55° 59'	116° 00' to 118° 00'	(f) Reprint
...	513	Sect.	Shaftsbury	3	55° 59' to 56° 41'	118° 00' to 118° 00'	(f) Reprint
B.C.	92 - L/7	N.T.	Nimpkish	1	50° 15' to 50° 30'	126° 30' to 127° 00'	(a)
...	11	Sect.	Yale	3	49° 00' to 49° 42'	120° 00' to 122° 00'	(e)
IN HAND MARCH 31, 1937							
P.E.I.	S. 1/2 11 NW.	...	...	...	...	...	...
...	N. 1/2 11/SW.	N.T.	Charlottetown - Sydney	8	45° 00' to 47° 00'	60° 00' to 61 00°	(b)
N.S	11 - K/NE	N.T.	Nova Scotia Park	2	46° 30' to 47° 00'	60° 00' to 61° 00'	(b)
...	21 - H/16	N.T.	Amherst	1	45° 45' to 46° 00'	64° 00' to 64° 30'	(a)
...	21 - A/SE.	N.T.	Bridgewater	2	44° 00' to 44° 30'	64° 00' to 65° 00'	(b)
N.B.	21 - G/SE.	N.T.	St.John	2	45° 00' to 45° 30'	66° 00' to 67° 00'	(b)
Que	31 - 1/NE.	N.T.	Grand Mère	2	46° 30' to 47° 00'	72° 00' to 73° 00'	(b)
...	31 - O/NW.	N.T.	Choquette	2	47° 30' to 48° 00'	75° 00' to 76° 00'	(b)
...	32 - F	N.T.	Waswanipi	4	49° 00' to 50° 00'	76° 00' to 7° 00'	(b)
...	21 - NW.	N.T.	Quebec - Edmundston.	8	46° 00' to 48° 00'	68° 00' to 72° 00'	(a)
...	31 - NW.	N.T.	Upper Ottawa River.	8	46° 00' to 48° 00'	76° 00' to 80° 00'	(b)
Ont	31 - F/7	N.T.	Renfrew	1	45° 15' to 45° 30'	76° 30 to 77° 00'	(a)
...	52 - A/SW.	N.T.	Fort William, Port Arthur	2	48° 00' to 48° 30'	89° 00' to 90° 00'	(b)
	52 -				48° 30' to 49°	89° 00' to 90°	

...	A/NW.	N.T.	Kaministikwia	2	00'	00'	(b)
...	42 - E	N.T.	Long Lac	4	49° 00' to 50° 00'	86° 00' to 88° 00'	(b)
...	31 - SW.	N.T.	Toronto - Ottawa.	8	44° 00' to 46° 00'	76° 00' to 80° 00'	(b)
...	52 - NE.	N.T.	Sioux Lookout - Armstrong	8	50° 00' to 52° 00'	88° 00' to 92° 00'	(b)
...	52 - SW.	N.T.	Kenora - Fort Frances.	8	48° 00' to 50° 00'	92° 00' to 96° 00'	(b)
Man	53 - K	N.T.	Stull Lake	4	54° 00' to 55° 00'	92° 00' to 94° 00'	(b)
...	53 - L	N.T.	Oxford House	4	54° 00' to 55° 00'	94° 00' to 96° 00'	(b) Revision
...	53 - M	N.T.	Knee Lake	4	55° 00' to 56° 00'	94° 00' to 96° 00'	(b)
Sask	64 - E	N.T.	Reindeer Lake North	4	57° 00' to 58° 00'	102° 00' to 104° 00'	(b)
...	74 - F	N.T.	Clearwater	4	57° 00' to 58° 00'	108° 00' to 110° 00'	(b)
...	74 - G	N.T.	Cree Lake	4	57° 00' to 58° 00'	106° 00' to 108° 00'	(b)

Prov.	No.	Series	Name	Scale in (Miles to 1 inch)	Latitude	Longitude	Remarks
B.C	92 - G/2	N.T.	New Westminster	1	49° 00' to 49° 15'	122° 30' to 123° 00'	(a)
...	92 - G3	N.T.	Vancouver South	1	49° 00' to 49° 15'	123° 00' to 123° 30'	(a)
...	92 - G/6	N.T.	Vancouver North	1	49° 15' to 49° 30'	123° 00' to 123° 30'	(a)
...	92 - L/1	N.T.	Schoen Lake	1	50° 00' to 50° 15'	126° 00' to 126° 30'	(a)
...	92 - L/2	N.T.	Woss Lake	1	50° 00' to 50° 15'	126° 30' to 127° 00'	(a)
...	92 - L/ 6	N.T.	Alice Lake	1	50° 15' to 50° 30'	127° 00' to 127° 30'	(a)
...	92 - L/8	N.T.	Adam River	1	50° 15' to 50° 30'	126° 00' to 126° 30'	(a)
...	92 - L/10	N.T.	Alert Bay	1	50° 30' to 50° 45'	126° 30' to 127° 00'	(a)
...	93 - A/11	N.T.	Spanish Lake	1	52° 30' to 52° 45'	121° 00' to 121° 30'	...
...	93 - A/12	N.T.	Hydraulic	1	52° 30' to 52° 45'	121° 30' to 122° 00'	(a)
...	93 - A/13	N.T.	Swift River	1	52° 45' to 53' 00'	121° 30' to 122° 00'	...
...	93 - A/14	N.T.	Cariboo Lake	1	52° 45' to 53° 00'	121° 00' to 121° 30'	...
...	82 - O/NW.	N.T.	Barrier Mountain	2	51° 30' to 52° 00'	117° 00' to 118° 00'	(a)
...	92 - B/NW.	N.T.	Victoria	2	49° 30' to 49° 00'	123° 00' to 124° 00'	(a)
...	93 - K/SE.	N.T.	Fraser Lake	2	54° 00' to 54° 30'	124° 00' to 125° 00'	(b)
N.W.T.	75 - K and L.	N.T.	Fort Reliance	4	62° 00' to 63° 00'	108° 00' to 112° 00'	(c)
...	85 - I	N.T.	Hearne	4	62° 00' to 63° 00'	112° 00' to 114° 00'	(b)
...	85 - J	N.T.	Rae	4	62° 00' to 63° 00'	114° 00' to 116° 00'	(c)
...	85 - O	N.T	...	4	63° 00' to 64° 00'	114° 00' to 116° 00'	(c)

List of Miscellaneous Map Sheets and Plans Issued 1936 - 37, and in Hand March 31, 1937

ISSUED 1936 - 37

Province	Map	Scale (in miles to 1 Inch)	Remarks

P.E.I	Plans of Malpeque Bay showing areas for oyster leases	1,000 feet to 1 inch	8 sheets - Reprints.
...	Plans of Covehead and Brackley Bays, Foxley River, Rustico Bay, Savage Harbour, and Tracadie Bay	1,000 feet to 1 inch	6 sheets.
Que	Chicoutimi	2	Advance prints.
...	Harricanaw	7.89	Reprint with revision.
...	Tadoussac	7.89	Reprint with revision.
Ont	Belleville	3.95	Reprint with revision.
...	Cornwall	3.95	Reprint with revision.
...	Guelph	3.95	Reprint with revision.
...	Parry Sound	3.95	Reprint with revision.
...	Windsor	3.95	Reprint with revision.
...	Renfrew	1	Advance prints in black and blue.
...	Longlac, 42 - E	2	Advance prints of four quarters.
Man	Oxford House, 53 - L	2	Advance prints of four quarters.
...	Knee Lake, 53 - M	2	Advance prints of four quarters.
Sask	Cree Lake, 74 - G	2	Advance prints of four quarters.
Alta	Jasper Park, South	3	Advance prints of four quarters.
B.C.	Kootenay	3 - 95	Reprint without revision.
...	Okanagan	3 - 95	Reprint without revision.
N.W.T	Cameron Bay	1	...
...	Northwestern Canada	50	Reprint.
...	75 - L	2	Advance prints of four quarters.
...	Hearne, 85 - I	2	Advance prints of four quarters.
...	Rae, 85 - I	2	Advance prints of four quarters.
...	85 - N	2	Advance prints of four quarters.
...	85 - 0	2	Advance prints of NW. and SW. quarters.
Yukon	Yukon Territory	10	...

Province	Map	Scale (in miles to 1 Inch)	Remarks
General	74 township plans	1/2	30 were reprints.
...	Index to Old Geographic Series	...	...
...	Index to National Topographic Series -	...	...
...	Manitoba and Saskatchewan	...	...
...	Index to National Topographic Series -	...	...
...	Quebec and Maritimes	...	...
...	Index to National Topographic Series -	...	...
...	Ontario	...	...
...	World Map to 60 degrees south latitude	...	...
Miscellaneous	Eastern Canada showing progress of triangulation and levelling	...	...
...	...	...	For Geodetic Service of Canada
...	Western Canada showing progress of triangulation and levelling	...	For Geodetic Service of Canada
...	Map of Northwest Territories	...	For Dominion Water and Power Bureau.
...	14 charts	...	For Hydrographic Service.
...	Gravity Map of Canada and United States	...	For Dominion Observatory.
...	6 maps and charts	...	For Dominion Forest Service.
...	Map of Southern Ontario	...	For Department of Agriculture.
...	Map of Prairie Provinces showing areas likely to be infested with grasshoppers	...	For Department of Agriculture.
...	3 maps of portions of Quebec showing peat and muck soils	...	For Department of Agriculture.
...	Map of County of Kent showing soils	...	For Department of Agriculture.
...	Charts showing coal costs	...	For Dominion Fuel Board.
...	Tourist Map of Canada (Western Sheet)	...	For Canadian Travel Bureau
...	Orographical Map of Canada	...	For Bureau of Statistics.
...	Map of Southern Saskatchewan showing municipalities	...	For Saskatchewan Government.
IN HAND MARCH 31, 1937			
Que	Chicoutimi	2	...
Man	Manitoba, North	16	...
...	Manitoba, South	16	...
Sask	Saskatchewan, North	16	...

Alta	Alberta, South	16	...
General	Resources Map of the Dominion	100	...
...	Map of the World	750	...
...	Political Map of Canada	...	For Canada Year Book.
...	Forest Classification Map	...	For Lands, Parks, and Forests Branch.
...	Soil Survey Map of Apple Orchards	...	For Department of Agriculture.

NOTES. - Work performed on the sheets marked "In Hand" ranges throughout the various stages from the commencement of the compilation in the office to the preparation of the final lithographic plates for printing. Some sheets upon which very little work has so far been done are not included in the above list.

Where a map sheet extends into more than one province, it is listed under one province only.

Under the column of "Remarks" the following are the meanings attached to the symbols used:

(a) National Topographic Series - Standard Edition - Topographical information complete.

(b) National Topographic Series - Provisional Edition - Topographical information complete or nearly so (except for contours), over all or greater part of sheet.

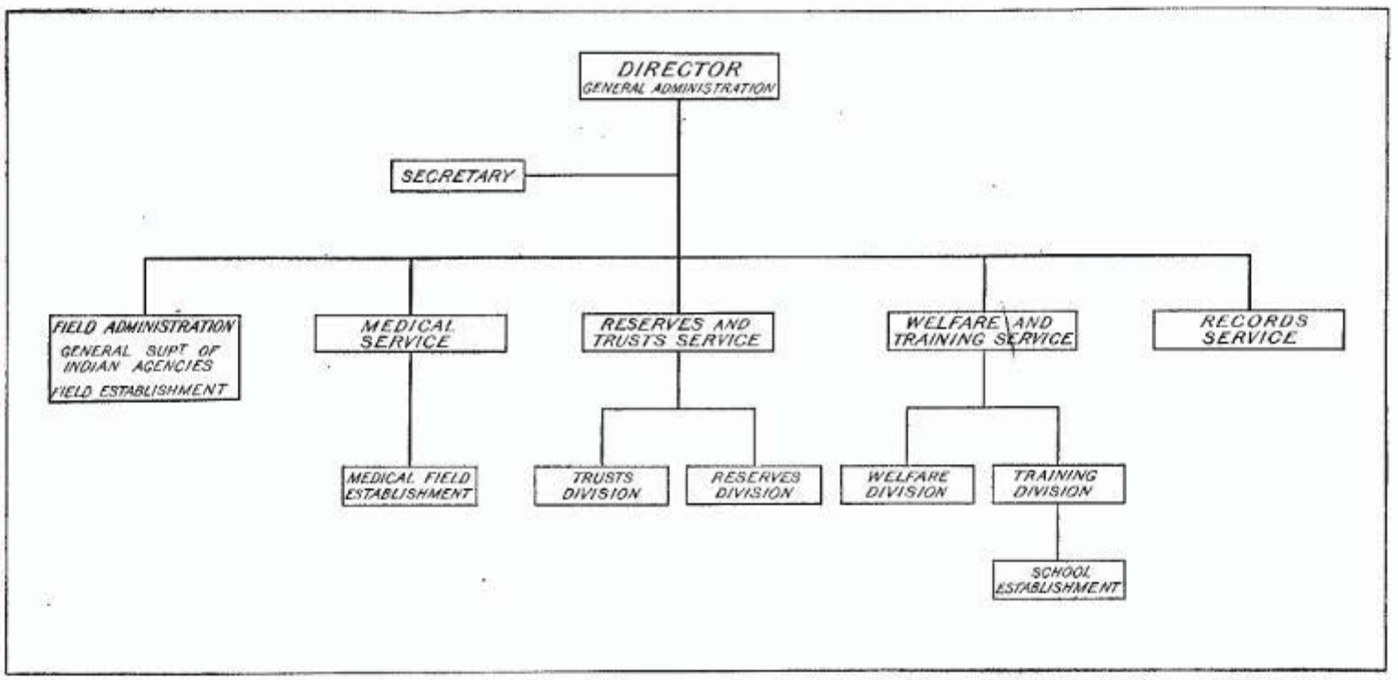
(c) National Topographic Series - Exploratory Edition -Topographical information from exploration surveys, or where control is inadequate, no contours or contours conjectural only.

(d) Sectional Map Series - New Series Edition - Detailed topographical information in eight colours, including contours.

(e) Sectional Map Series - Intermediate Series Edition - Topographical information in five colours not so complete, contours, when shown, usually approximate only.

(f) Sectional Map Series - Old Series Edition - General topography only, in from one to four colours.

DIRECTOR
Organization Chart, Indian Affairs Branch.



Organization Chart, Indian Affairs Branch.

INDIAN AFFAIRS BRANCH
Dr. H.W. McGILL, DIRECTOR

The Department of Indian Affairs became a Branch of the Department of Mines and Resources by the Department of Mines and Resources Act of June 23, 1936. The Indian Affairs Branch now functions under the Director of Indian Affairs, and has the following divisions:

Field Administration. - This consists of four inspectorial officers and one Indian Commissioner with 115 Indian agents. This service is charged with agency administration, special investigations, agency buildings, and equipment, and general local governmental administration on Indian reserves.

Medical Service. - This Service is conducted under the Superintendent of Medical Service through a small headquarters staff and a Dominion-wide staff of physicians, nurses, field-matrons, and dispensers; and is responsible for medical attendance and hospitalization, child welfare, field nursing, and general health services.

Welfare and Training Service. - The Welfare Division supervises Indian industrial assistance and advancement, including employment projects, agricultural and livestock activities; furthers development of marketing of handicraft; renders assistance to ex-pupils of residential schools, and generally supervises the social welfare of the Indians.

The Training Division, through a Dominion-wide field staff, administers 262 day schools and the grants given in aid of 79 residential schools administered by the churches.

Reserves and Trusts service. - The Reserves Division has charge of land surrenders, sales and leases, location tickets, and land patents; issues permits to trade and hunt on reserves, and deals with questions of rights of way, removal of Indians, boundaries, reclamation, and development; compensation for flooded areas, and disposal of timber on reserves.

The Trusts Division is responsible for the administration of trust funds, annuities and interest, and Soldier Settlement Act; it is also concerned with band membership, estates, and enfranchisement of Indians.

Records Service. - This Service has custody of manuscripts, some of which are dated prior to Confederation. It also deals with the reception, distribution, and filing of all current correspondence.

The field administration of Ontario was changed by the abolition of the New Credit Agency and the inclusion of the Missisaugas of the New Credit reserve in the Six Nations Superintendency.

The Rice and Mud Lakes Agency, which was first established as a separate agency in 1883, comprising two bands, the Missisaugas of Mud Lake and the Missisaugas of Rice Lake, has a population of 361 located on three reserves. The Alnwick Agency, first established in 1883, and comprising one band, the Missisaugas of Alnwick, has a population of 262 located on two reserves. As a measure of economy, these two agencies were amalgamated under one agent with the consequent abolition of the position of agent of the Alnwick Agency.

PROBLEMS OF THE HUNTING INDIANS

The Department of Indian Affairs (now Indian Affairs Branch) was represented at interprovincial and Dominion game conferences held from time to time during the past fifteen years and consistently advocated special protection for Indian hunters and trappers, and particularly the setting aside of hunting preserves. At the 1928 conferences a resolution was passed subscribed to by all provinces approving a policy of setting aside, as far as practicable, in unsettled regions, certain suitable and reasonable areas whereon Indians only may be allowed to trap.

The subject was again to the fore at the Provincial - Dominion Wild Life Conference held in Ottawa January 5, 1937, and the discussions there evidenced general and sympathetic interest in the welfare and future of the hunting Indians.

In keeping with the conclusions reached at these conferences, negotiations have been conducted with the provincial authorities and definite progress has been made. In certain provinces large tracts have been set aside as Indian hunting preserves where only Indians are permitted to hunt and trap, and efforts are being made to have this policy extended wherever feasible, having regard to the interests both of the Indians and wild life conservation.

In British Columbia, where the individually owned trap-line system is in vogue, this Branch is endeavouring to increase the quota held by Indians by purchasing for them vacated lines wherever such become available.

Trapping by Aeroplane. - It was brought to the attention of the Branch that trappers were using planes in the Northwest Territories for the purpose of extending their trapping operations and as a consequence the game supply upon which the Indians depend for their livelihood was in danger of being depleted. The Indians pointed out that they might be heading for a certain lake at a distance of many miles, where they had trapped the previous year, only to find upon reaching it that a trapper had flown in. They said: "If there was a man with a dog-train ahead of us, we would know by the tracks that someone had gone in, whereas the man with the plane goes. through the sky and we do not know anything of his whereabouts until he comes in, probably just ahead of us." A remedial measure, by an Order in Council passed on February 15, 1937, amended Section 5 of the Regulations for the Protection of Game in the Northwest Territories by adding, "Aircraft shall not be used in trapping operations except as a means of transportation between the settlement where a trapper is outfitted and his principal base camp. Every trapper applying for a licence shall designate the settlement where he will be outfitted and lis principal base camp."

Beaver Colonies. - In 1935 the Indian Affairs Branch was advised by the Department of Natural Resources, Saskatchewan, of a surplus of beaver at the Cypress Hills Provincial Park, and it was suggested that some of these might be taken to establish beaver colonies on Indian reserves. When the question was put before them, the Indians on some of the reserves in the Onion Lake and Pelly Agencies were very keen to undertake the project. The Inspector of Indian Agencies submitted an estimated cost of taking about 75 beaver and during the summer he was authorized to make necessary arrangements. Six Indians from the Pelly Agency were sent to the Provincial Park and the Field Officer there reported, "I find your men excellent in manners and deportment, reasonable in all demands, exceptional live trappers." They caught 75 beaver and maimed only one. Some casualties occurred in transporting the beaver and finally 40 were supplied to the Pelly Agency and 12 to Onion Lake.

With beaver colonies established in the Onion Lake Agency and on the Keys and Cote Reserves in the Pelly Agency, the Inspector of Indian Agencies the following year submitted a similar proposal to the Mistawasis band in the

Carlton Agency. They were unanimously in favour of the project and voted their band funds to defray expenses. There were several old beaver dams on Snake Creek in this reserve, with a heavy growth of poplar and willow on the banks, making an ideal place for beaver. Although no recent report has been received respecting the development of the scheme, it is assumed that with the care and protection promised by the Indians a successful outcome may be expected.

Muskrat Farming. - During the past year particular attention has been directed towards the economic condition of the Indians. An intensive effort has been made towards assisting and encouraging them in all lines of endeavour, with the immediate aim of reducing relief costs among them and the ultimate goal of making all able-bodied Indians self-supporting.

With this end in view investigations are being made for the purpose of securing more definite information as to the possibility of increasing the production of muskrats and other fur-bearing animals in the northern parts of Canada; particularly in the areas around The Pas in Manitoba; at Chipewyan in northern Alberta; and in the areas around Slave River between Fort Smith and Resolution. Following such investigations arrangements can then be made with a view to developing and protecting the most favourable areas.

MEDICAL SERVICE

Throughout the winter of 1937 influenza was prevalent among the Indians, scarcely any part of the country escaping. The epidemic, on the whole, was not of a severe nature, but, like all widespread epidemics, was virulent in a few places. Influenza together with measles at one residential School and with whooping cough at another resulted in high mortality.

This was the first widespread epidemic in 10 years, and it is interesting to observe the change in the attitude of the Indians during that period of time toward such visitations and toward the measures taken to deal with them. In this,respect at least, the Indian point of view has changed remarkably. He used to accept such afflictions and the resulting loss of life as inevitable, and to look upon the counsel of his medical and other supervisors as worthless, or at least not applicable to Indians. Whole groups have been known to die, not So much from the disease as from resignation to fate.

Today it is doubtful if any section of the Canadian population is more obedient to quarantine regulations, if they are understood, or more anxious to attend to instructions in the treatment of acute communicable disease. This applies, of course, more especially to the settled Indian populations of the South than to the primitive groups in the northern forest.

It is also worth observing that the organization built up to deal with emergencies in health functioned satisfactorily. The few and simple regulations for control of epidemics, and the authority to act in such matters vested in local officers, enabled them to meet the situation without delay and without resorting to the Branch for detailed instructions.

During the year the new Indian hospital at Fort Qu'Appelle, Saskatchewan, was opened. Primarily designed to replace the old frame hospital at the File Hills Agency, this new institution is large enough to accommodate many long-

term problem cases from various other agencies, besides the Qu'Appelle and File Hills groups, which are close by. The hospital is under the medical direction of the Qu'Appelle Indian Health Unit.

The new hospital is of modern, fireproof, reinforced concrete construction, faced with brick, and is located in one of the most beautiful spots in Qu'Appelle Valley, just outside the town of Fort Qu'Appelle. It has abundant light, and is built throughout on sanatorium principles. It can easily accommodate 50 patients, and an additional 10 without overcrowding.

A senior medical superintendent for British Columbia has been appointed to supervise all Indian medical work in that province. His primary duties are to convey professional advice and assistance to doctors in remote places, and where no local doctor is available, to provide medical services also. It was hoped, moreover, to secure a degree of financial and general control such as could not be maintained from Ottawa in such a large and distant province. Though the service has been in existence only a little over a year it would appear that these objectives are being accomplished.

The condition of health among the Indians and other natives of Mackenzie River basin has been the subject of much discussion during the year. Between McMurray and Aklavik on the main river route, and around the large lakes of the region there are some sixteen or seventeen main groups of Indians and a large number of subsidiary groups. To reach them all would probably involve a journey of not less than 1,500 miles. The largest community numbers about 800.

These Indians live a hunting life during 9 months of the year, and are to be found collected at their reserves or homes during only a short period in summer. Their standard of health and sanitation is primitive and their means of living precarious, so that many suffer from tuberculosis. They are barely holding their own in population, and in some groups the deaths exceed the births. In spite of every effort the Indian Affairs Branch is finding it difficult to extend effective aid to these people. Church Missionary Societies have established hospitals at three widely separated points, and at these places and at two others, physicians are maintained. However the number of Indians within their immediate reach is small. Other Indians live at great distances, even in summer when they are collected at central points. In view of the high cost of transportation an attempt to provide these people with adequate medical and health services such as are available to more favourably situated Indian communities, would involve an expenditure of money and effort completely out of proportion to their numbers. The whole situation is being carefully studied.

TUBERCULOSIS

The situation as regards tuberculosis among Indians has not greatly changed during the year under review. Although it has not been found possible to.admit many more tuberculous Indians to sanitoria, some advance has been made in other directions. A preventorium unit was opened at the Indian Residential School at Mission, B.C. The church authorities in charge of the school kindly contributed the entire capital cost of making the space available. The new Qu'Appelle Indian hospital has provided space for a considerable additional number of tuberculous Indians, particularly children.

At the end of the year preparations were being made for the assembly, under the authority of the Honourable the Minister, of a joint committee of the Department and the Canadian and allied Tuberculosis Associations, to be held at Ottawa in the month of June.

TRACHOMA

If, as may be hoped, tuberculosis can be brought under reasonable control within 10 years, trachoma will probably be the most serious health problem still remaining. It is not getting worse. On the contrary, the situation is now known, and some progress is being made toward eradication. The process, however, will be long, and many city people will be exposed to trachoma before it disappears from among Indians.

At the request of the Indian Affairs Branch, in 1930, a survey to determine the existence of trachoma in the Indians of the Prairie Provinces was undertaken by Dr. J.J. Wall. Examination of many reserves and various areas of Manitoba, Saskatchewan, Alberta, and certain parts of interior British Columbia showed that 25 to 30 per cent of the Indian population were afflicted with trachoma in its various stages. Pupils of the residential schools showed a high incidence of the disorder. Up to that time no organized effort had been undertaken to eradicate the disease.

Many of the schools at that time, unknown to the school authorities, were serving as centres for the spread of this eye disease. The principals and other officials were entirely unaware even of its existence. Casual observation of the external appearance of the eye certainly did not suggest anything amiss with the lids, which had to be everted for proper examination. Most of the corneal ulcers and other eye diseases in the children were attributed largely to tuberculosis. No suspicion was aroused at that time that the greater number of these disorders were due to extension of a trachomatous process from the lids into the transparent portion of the eye. This extension is most insidious and slow in character.

Grossly impaired vision in adults of 30 years and over, together with the high incidence of blindness in the Indians examined, was mostly due to the ravages of trachoma. Opaque areas in the corner were due, in most cases, to the trachomatous extension and to old scars resultant from healed trachomatous ulcers.

The first organized effort to eradicate and control this serious condition was undertaken late in 1932. Little, if any, importance had been attached to the diagnosis of trachoma in the various medical faculties of Canadian universities. Patients demonstrating the condition were rarely seen in the larger centres. Trachoma was considered to exist only among a small number of citizens of foreign extraction, and it was held that the disease was of interest mostly to Immigration Medical Officers. Very few of the medical officers attending the Indians had beet aware of the existence of trachoma until the survey was made. To combat the problem intelligently it was necessary to give individual instructions to the physicians and medical attendants for the early objective signs in the everted eye lids, together with the appearance of certain changes in the corner due to extension from the primary site. Methods of treatment of the disease and its complications were demonstrated.

Treatment was organized first in the residential schools where all pupils were examined and classified. Precautions, which to date have proved most satisfactory, were instituted to protect the non-infected children. Primary methods of treatment have proved so satisfactory that few changes have been instituted. The measure of success in each institution can be accurately gauged by the number of recessions in the first classification, including those pupils becoming "arrested" and "cured."

The residential school offers excellent facilities for treatment and education along anti-trachoma lines. The principals and various members of staffs are to be commended for their co-operation and the excellent results obtained under the direct supervision of the attending physicians.

Reserves and smaller settlements offer a much more difficult problem. Certain areas, fortunate in having a resident medical attendant or nurse, have

shown excellent results. In such localities, propaganda as to the necessity of continuous treatment over a prolonged period can be constantly stressed and the facilities for treatment provided.

In contrast there are isolated areas, quite distant from adequate care and medical attention, where few results are obtained. If some improvement occurs, the patient usually abandons treatment under the misconception that all is now well. For such areas, it is most desirable that frequent visits be made by the oculist to check progress, vary medication if necessary, and encourage positive cases to persist in treatment.

In Canada severe cases of trachoma have been encountered as far east as the Peterborough area of Ontario. Continuing westward the incidence rises very sharply on crossing the Manitoba border and continues high through the other two Prairie Provinces. The greatest incidence is reached in the dry, higher areas of central and northern British Columbia and recedes rapidly in the moist Pacific Coastal regions.

WELFARE AND TRAINING SERVICE

It is recognized, in the creation of this Division, that a worth-while welfare program must be basically educational in character; that education is not something injected into a child during his sojourn at school, but a process that should continue throughout life. The activities of the Division, therefore, are independent and complementary, directed toward clearly defined objectives. These objectives, for a generation or two at least, will be the training of pupils to make the most of their available resources, with talents consecrated to the service of the bands to which they belong, and an adult Indian population proud of their racial origin and cultural heritage, adjusted to modern life, progressive, resourceful, and self-supporting.

The Indians of Canada have suffered acutely in recent years; unemployment, drought in agricultural areas, and inadequate returns from steadily diminishing fur and game resources have contributed to the demoralization and disintegration of their economic and social life. It is estimated that during the year one-third of the Indian population was dependent, in whole or in par, on relief allowances.

The welfare program organized toward the end of the fiscal year consists in the main of the creation and cultivation of subsistence gardens and the extension of agricultural operations; the purchase of live stock and equipment; encouragement of arts and crafts and sale of handicraft products; the survey and development of territory suitable for the propagation of muskrats and other fur-bearing animals; purchase of trap-lines and leasing of timber limits, housing construction, administration of relief, and the care of the aged and physically incapacitated.

The program is designed to encourage the Indian to support and sustain himself. It is sufficiently comprehensive, when supported by the Parliamentary appropriations necessary, to enable him, whether he be farmer, trapper, or fisherman, to obtain and utilize the tools necessary to provide sustenance for himself and those dependent upon him.

A summary of Indian welfare expenditure during the last 8 - year period follows:

Fiscal Year	Amount	Fiscal Year	Amount
1929 - 30	$711,523	1933 - 34	$853,362
1930 - 31	823,343	1934 - 35	845,428
1931 - 32	988,340	1935 - 36	895,162
1932 - 33	935,734	1936 - 37	983,537

TRAINING

All Indian day and residential schools, with the exception of two residential schools destroyed by fire, were open and in operation throughout the year. New Indian day schools were built at Christian Island, Ont., Seine River, Ont., and Kitsalas, B.C.

A table of pupil enrolment and attendance follows:

Fiscal Year	Residential Schools		Day Schools		Total		
...	Enrolment	Average Attendance	Enrolment	Average Attendance	Enrolment	Average Attendance	Percentage of Attendance
1927 - 28	6,795	6,043	8,223	4,823	15,018	10,866	72.35
1928 - 29	7,075	6,282	8,272	4,976	15,347	11,258	73.35
1929 - 30	7,302	6,476	8,441	5,103	15,743	11,579	73.55
1930 - 31	7,831	6,917	8,584	5,314	16,415	12,231	74.51
1931 - 32	8,213	7,400	8,950	5,707	17,163	13,107	76.36
1932 - 33	8,465	7,613	8,960	5,874	17,425	13,478	77.40
1933 - 34	8,596	7,760	8,852	5,592	17,448	13,352	76.52
1934 - 35	8,709	7,882	8,851	5,560	17,560	13,442	76.54
1935 - 36	8,006	8,061	9,127	5,788	18,033	13,849	76.79
1936 - 37	9,040	8,176	9,257	5,790	18,297	13,966	76.34

An attempt has been made during the year to bring the educational policy of the Indian Affairs Branch into closer conformity with the actual life needs of Indian children. Steadily increasing emphasis has been placed on the importance of manual training. Material has been supplied, in an attempt to encourage gardening and carpentry work among boys, and dressmaking, crochet work, and elementary domestic science among girls. Plans have been prepared for the construction of day schools, equipped to provide an educational program designed to meet the needs peculiar to the reserves on which such schools are established. It is not too much to hope that these schools will become the focal points in community life - centres to which children and adults will turn for guidance, instruction, and inspiration.

An encouraging feature of educational effort during the year was discovered in the increasing demands for agricultural and homemaking short courses and in the tendency and willingness of the Indians to recognize the value and distinctiveness of their arts and crafts. Consideration has been given to ways a.nd means whereby the Indian population can be encouraged to conserve still, further their ancient values and skills and thus contribute to the cultural life of the nation.

The expenditure for Indian education for the fiscal year ended March 31, 1937, amounted to $1,820,977.80 and is analysed in the following table:

Indian Education Vote - Expenditure for Year 1936 - 37

...	Day Schools	Residential Schools	Stationery	Tuition and Assistance to Ex-pupils	Miscellaneous	Total
...	$	$	$	$	$	$
Prince Edward Island	1,006 41	...	76 77	799 34	...	1,882 52

Nova Scotia	10,009 86	29,381 49	795 48	756 83	...	40,943 66
New Brunswick	15,211 79	...	551 77	823 03	842 67	17,429 26
Quebec	54,540 59	6,676 38	2,597 51	5,668 09	40	69,482 97
Ontario	105,374 89	242,287 63	10,238 89	12,323 61	176 33	370,401 35
Manitoba	51,003 77	161,094 36	4,672 67	1,357 18	168 22	218,296 20
Saskatchewan	31,736 09	291,487 98	5,372 24	2,102 66	111 80	330,810 77
Alberta	1,863 21	308,087 42	4,661 45	1,849 41	154 46	316,615 95
British Columbia	59,380 71	323,301 46	9,389 39	769 77	3,639 82	396,481 15
Yukon	2,998 25	16,100 87	540 79	...	...	19,639 91
Northwest Territories	1,579 55	36,285 61	1,128 90	...	...	38,994 06
...	334,705,12	1,414,703 20	40,025 86	26,449 92	5,093 70	1,820,977 80

GRANTS TO AGRICULTURAL FAIRS

For some years it has been the practice of the Department to offer encouragement to Indian agricultural societies or organizations by offering grants of various amounts for the purpose of giving prizes at their autumn fairs and other gatherings. In 1936 these grants amounted to $6,050 and were as follows:

New Brunswick	...
Fredericton Exhibition	$25
Ontario	...
Agricultural Society, Sarnia	200
Oshweken Agricultural Society, Brantford	300
Garden River Agricultural Society, Sault Ste. Marie	100
Caradoc Fair and crop competition	300
Chemong Fair, Rice and Mud Lakes	70
Manitoulin Island Unceded Agricultural Society	100
Snake Island Agricultural Society, Georgina Island	50
Ploughing matches	650
Field prizes, standing crop competitions	360
Garden prizes, standing crop competitions	250
Thunder Bay Agricultural Association	250
Manitoba	...
Rossburn Agricultural Society, Rossburn	20
Manitoba Provincial Exhibition, Brandon	200
Saskatchewan	...
Prince Albert Agricultural Society	350
Regina Agricultural and Industrial Exhibition Association, Limited	350
Alberta	...
Calgary Exhibition, Calgary	350
Edmonton Exhibition Association, Limited	350
British Columbia	...
Bulkley Valley Fall Fair, Smithers (Babine)	100
Farmer's Institute, Bella Coola	25
Cowichan Agricultural Society, Duncan	150
International Handicrafts Festival, Vancouver	100
North and South Saanich Agricultural Association (Cowichan)	50
Windermere District Fall Fair (Kootenay)	150
Cranbrook Agricultural Association (Kootenay)	100
Northern B.C. Agricultural Indian Association (Skeena)	200
Vanderhoof Ploughing Association (Stuart Lake)	50
Field crops, Stuart Lake	100
Chilliwack Fair (New Westminster)	100

Vancouver Fall Pair	350
Armstrong Fall Fair (Okanagan)	250
Colt and Calf Show (Stuart Lake)	50
...	$6,050

CONSTRUCTION, SURVEYS, AND ENGINEERING WORKS

Details in regard to the construction, surveys, and engineering works carried out by the Indian Affairs Branch during the fiscal year will be found in that part of the report covered by the Surveys and Engineering Branch.

RESERVES AND TRUSTS SERVICE

RESERVES DIVISION

In the administration of Indian lands during the fiscal year 1936 - 37, there were, fortunately, evidences of recovery in an upward trend of prices for farm lands and an increase in the number of inquiries in connection with both sales and leases. In the three Prairie Provinces, Manitoba, Saskatchewan, and Alberta, the improvement in general conditions has been most noticeable through the advance in grain prices.

The care and administration of the large acreage of reserve lands continued to require an ever-increasing interchange of correspondence between the Branch and the inspectors and agents directly concerned. In those reserves where the Location Ticket system prevails and in those where "recognized ownership" is the guiding factor, occupational rights are constantly changing, necessitating a vigilant supervision and a vast amount of detailed office routine, and with the improvement in administrative methods, and procedure this work increases proportionately.

The activity during the fiscal year in connection with Indian land sales and leases is indicated by the following figures: value of lands sold - $78,664.98; payments received on current contracts - $89,557.07; revenue from leases of Indian lands - $137,069.42.

TIMBER

The quantity of timber cut for sale from Indian reserves throughout the Dominion was 60 per cent more during the 1936 - 37 season than in the previous year. In the Province of British Columbia a brisk demand for export lumber caused marked activity in the logging business, and to some extent increased production was evident in the eastern section of the country.

The kinds and quantities of timber cut for sale during the season 1936 - 37, on which royalty and dues were collected, were as follows:

Pine (white)	110,572 f.b.m
Spruce	1,941,029 f.b.m
Hemlock (Western)	2,726,712 f.b.m
Hemlock (Eastern)	762,485 f.b.m
Cedar (red)	766,431 f.b.m
Fir (Douglas)	424,848 f.b.m
Fir (balsalm)	2,016,743 f.b.m
Maple	969.340 f.b.m
Birch	866,317 f.b.m
Beech	115,899 f.b.m
Elm	58,586 f.b.m
Oak	400 f.b.m
Poplar	79,560 f.b.m
Cottonwood	490,980 f.b.m
Christmas trees	5,100 bales
Cordwood (mixed)	7,237 cords
Pulpwood (spruce and balsam)	49,285 cords

Shingle bolts	785
Ties	134,219
Poles	1,267
Posts	963
Piling	29,915 L.F.

The above quantities expressed in terms of board measure feet represent a cut of about 36,000,000 feet. The Indians also cut a quantity of about 8,000,000 feet free of dues, for sale, and an additional quantity of 10,000,000 feet was cut by them for building, fencing, and fuel purposes.

Revenue During Year

Revenue receipts during the year were as follows:

Bonus payment of timber	$250 00
Licence royalties and dues	31,198 30
Permit dues	12,951 04
Rentals of timber berths	1,838 60
Licence fees	149 00
Interest payments	362 25
Trespass dues	374 44
Total	$47,123 63

Sales of timber during the year were as follows:

Dickson Island reserve, B.C., deposit	$400 00
Dokis reserve (Berth No.7), Ontario, deposit	2,000 00
Big Island (Lake of the Woods), deposit	300 00
Weymontachi reserve, Que., deposit	500 00
Quattishe reserve, B.C	750 00
Total	$3,950 00

There were twenty timber licences current on April 1, 1937, being one more than in the previous year. Three new licences have been issued and two terminated.

MINING ON RESERVES

The revenue derived from mining activities on Indian reserves, including the removal of sand and gravel for road construction, was about the same as in the previous year, and is summarized as follows:

Royalty on mining and gravel permits	$1,816 65
Rentals from mining leases	500 00
Rentals from mining permits	3,089 95
Prospector fees	595 00
Compensation for Indians	300 00
Total	$6,301 60

FOREST PROTECTION

The number of forest fires reported on Indian reserves during the year 1936 was 51, being more than twice the number that occurred in the previous year. The particularly long spell of dry weather experienced in the Province of Ontario was the contributory cause of this large increase, there being no less than 33 fires on reserves in that province.

A summary of the salient features with respect to forest fires during 1936 is shown hereunder:

Total number of fires	51

Total area burned over	11,224 acres
Merchantable timber area burned	2,201 acres
Quantity of merchantable timber burned	118,500 f.b.m.
and	3,005 cords
Estimated stumpage value of timber lost	$2,776.00
Area of young growth burned	36 acres
Estimated value of young growth burned	$300.00
Area of cut-over lands burned	986 acres
Estimated value of timber burned on cut-over lands	$500.00
Non-forested area burned	8,000 acres
Value of other property burned	$3,500.00
Actual cost of fire-fighting	$6,049.89

Fire Classification

SIZE OF FIRES		
A	Less than 1/2 acre	3
B	1/4 acre to 10 acres	25
C	10 acres to 500 acres	20
D	Over 500 acres	3
...	...	

MONTHLY OCCURRENCE		
Month	No.	Area
...	...	Acres
May	2	154
June	7	294
July	20	2,518
August	18	199
September	3	8,040
October	1	20
...	51	...

CAUSE OF FIRES	
Unknown	18
Lightning	10
Smoking	8
Campers	7
Indians	4
Brush burning	3
Incendiary	1
...	51

LOCALITY	...
Ontario	33
British Columbia	13
Sasketchewan	4
Quebec	1
...	51

No actual fire-fighting organization is maintained by the Branch, other than as represented by a few Indian fire rangers, but arrangements have been made with the various provincial governments whereby forest fires on Indian reserves are extinguished by the Provincial Forest Service, with the assistance of the Indians.

LOCATION TICKETS

During the fiscal year 1936 - 37 one hundred and thirty-two location tickets, granting title under the provisions of the Indian Act to individual owners, covering lands on reserves were issued, and at the present time 3,122 such location tickets are current.

INDIAN ENFRANCHISEMENTS

Under the provisions of Section 114 of the Indian Act there were carried out during the past fiscal year 43 enfranchisements, comprising 112 men, women, and children.

TRUSTS DIVISION

INDIAN TRUST FUNDS

These are funds belonging to the various Indian bands in Canada, invested with the Dominion Government, which allows interest annually that goes to augment these funds. These moneys are derived from the sale of land and timber, from rents, etc., and from capitalized annuities. These funds are credited to 475 accounts belonging to Indian bands throughout Canada. Bands having sufficient funds to carry on necessary reserve expenditures, and showing a surplus, have cash distributions of interest money paid to them twice a year, in the spring and in the autumn.

These funds at the close of the last fiscal year amounted to $13,997,644.13. During the year collections, including Government interest, to $1,184,797.26 and the expenditure was $1,073,784.80.

ANNUITIES

The usual arrangements for the payment of Indian treaty annuities were made, funds being sent to forty-two Indian agents throughout Ontario, Manitoba, Saskatchewan, Alberta, and the Northwest Territories. In addition to these the annuities due under Treaty Nine in Kenora District (Patricia Portion), Ontario, were paid by an officer from headquarters, who made the trip by aeroplane from Ottawa. This officer also made an inspection of several Indian settlements in Quebec where treaty is not paid. The distance covered was approximately 3,000 miles in a total of 35 1/2 flying hours and the trip occupied 39 days.

The total amount expended on annuities during the year was $262,083, which includes casual amounts paid direct by cheque from Ottawa and payments made on commutations and enfranchisement.

INDIAN SOLDIER SETTLEMENT

The administration of this Act to Indian veterans has been carried out by the Department of Indian Affairs,and is now administered by the Indian Affairs Branch. Loans have been made to 265 Indian settlers throughout Canada, entailing an expenditure of over $500,000. The granting of these loans has enabled a large number of Indians to become established on the land where they and their children will become an asset to the country. The total amount of loans outstanding is $212,980; collections during the year amount to $8,268.

MOTHERS' ALLOWANCE

The Indian women, with dependent children, in the Province of Ontario, have been allowed the benefits of the Mothers' Allowance and approximately 100 Indians are being assisted in this manner. The Indian Affairs Branch assumes responsibility for 50 per cent of the allowance. It has been of great assistance and has enabled mothers to keep their children with them and to provide for them in a way that ensures their proper upbringing physically, morally, and intellectually.

FINANCIAL

At the close of the twelve months ended March 31, 1937, capital of the Indian Trust Fund, which at the end of the preceding year amounted to $13,877,868.60, had increased to $13,997,644.13.

The amounts expended from the Consolidated Revenue Fund were as follows: voted by Parliament for the purposes of the Branch, $4,665,182.12, and annuities by statute $245,063.

On March 31, 1937, the balance to the credit of the Indian Savings Account for the funding of the annuities and earnings of pupils at industrial schools was $230,700.65. Deposits and interest during the twelve months aggregated $53,416.23, and withdrawals, $67,411.19.

SUMMARY OF INDIAN AFFAIRS BY PROVINCES AND TERRITORIES

PRINCE EDWARD ISLAND

Agency. - There is only one agency in the province. A large number of Indians live on Lennox Island, and other parts of the province where the Indians can be found are at Rocky Point, near Charlottetown, Morell, St. Andrews, and Scotch Fort.

Tribal Origin. - The Indians in this province belong to the Micmac tribe which is of Algonkin stock.

Occupations. - On Lennox Island several of the Indians engage in farming on a small scale. Most of them own a few head of cattle and horses, but their main occupations are basket-making, fishing, and working around the different towns and villages, wherever they can find employment.

Dwellings. - A number of the Indians have fairly good homes. However, there is room for improvement as many shacks are still to be found in the different settlements. In this connection, the Branch is making an effort to improve the situation as funds become available.

NOVA SCOTIA

Agencies. - There are nineteen Indian agencies in the Province of Nova Scotia, namely: Yarmouth, Digby, Shelburne, Lunenburg, Annapolis, Kings, Queens, Windsor, Shubenacadie, Halifax, Cumberland, Colchester, Pictou, Antigonish - Guysborough, Richmond, Inverness, Victoria, Sydney, and Eskasoni.

Tribal Origin. - The Indians of Nova Scotia are of Algonkin stock, and bear the distinctive name of Micmac.

Occupations. - Very few of the Indians in this province engage in farming to any extent, but a decided effort is being made by the Indian Affairs Branch to encourage the Indians in all agencies in Nova Scotia to put in better gardens. Liberal amounts of seed, potatoes, and fertilizer have been supplied. Opportunities for employment have increased and here and there throughout the province the Indians are finding work in the lumber woods, sawmills, or as stevedores. A number of them also find work with the farmers, especially in the Annapolis Valley orchards. With increased tourist trade during the summer, the Indians are engaged as canoemen and as guides. In all agencies they manufacture baskets of all descriptions, wooden handles, hockey sticks, butter tubs, churns, barrels, etc. However, they have had great difficulty in the past in disposing of their products, but with improved economic conditions in the last year, there has been an increased demand for Indian handicraft.

Dwellings. - The homes of the Indians in most of the reserves in Nova Scotia consist of one and one-half story frame buildings, fairly well finished on the outside but not on the inside. Many shacks are to be seen at practically every agency. As few of the Indians own any live stock, barns are to be found only here and there, and these are also of frame construction.

NEW BRUNSWICK

Agencies. - There are three agencies in the Province of New Brunswick: the Northeastern, located at Richibucto; the Northern, located at Perth; and the Southwestern, located at Fredericton.

Tribal Origin. - Most of the Indians of New Brunswick belong to the Micmac race, which is of Algonkin stock. In addition to these there are some banks of Malecites, also of Algonkin stock.

Occupations. - The Indians of New Brunswick are among the least progressive in the Dominion. Their farming operations are restricted mostly to the growing of potatoes for their own use. Formerly they derived a substantial income from hunting and trapping, but in later years this has dwindled to an almost negligible amount owing to the scarcity of fur-bearing animals. A considerable number find employment in the lumber camps and others as day labourers. In the southern part of the province the Indians are engaged commercially in the manufacture and sale of Indian wares.

Dwellings. - The dwellings of the Indians in New Brunswick for the most part are small, of poor construction, and indifferently kept. In recent years, however, the Branch has been endeavouring to improve the situation, both by assisting in the repair of existing houses and, in some cases, providing new ones.

QUEBEC

Agencies. - The following agencies are included in the Province of Quebec: Bécancour, Bersimis, Caughnawaga, Gaspe, Pointe Bleue, Lorette, Maria, Mingan, Oka, Maniwaki, Restigouche, Seven Islands, St. Augustin, St. Regis, Pierreville, Timiskaming, and Cacouna.

Tribal Origin. - The principal tribes found in Quebec are: Iroquois at Caughnaw aga, Lake of Two Mountains, and St. Regis; the Hurons of Lorette are also of Iroquoian stock; the Montagnais, who are of Algonkin stock, at Bersimis, Mingan, Lake St. John, Seven Islands; the Abenakis, also of Algonkin stock, at Bécancour and St. Francis; the Micmacs, also of Algonkin stock, at Maria and Restigouche; and the Malecites, also of Algonkin stock, at Viger.

Occupations. - In the agricultural districts of the province the Indians engage in mixed farming. In Gaspe Peninsula they find employment in the lumber camps and mills, but,on the north shore of the gulf, fishing, hunting, and trapping are still the principal sources of income. In the northern part of the province lumbering is the chief pursuit. One of the principal industries of the Indians of Quebec is making baskets, and many of them spend the summer months at the resorts in order to dispose of the baskets, lacrosse sticks, racquets, moccasins, and other articles to the tourists. Some of them, particularly in the Saguenay district, act as guides and canoemen. The Indians of the large Caughnawaga reserve situated near Montreal are expert steel workers and find highly profitable employment when building operations are active.

Dwellings. - In the older settled districts of the province many of the Indians own stone, brick, or frame houses of good construction, comfortable and sanitary. In the more remote districts, where hunting and trapping are still the principal occupations, the Indians necessarily live in tents during a great part of the year.

ONTARIO

Agencies. - The Indian agency offices in Ontario are located as follows: Brantford (Six Nations), Cape Croker, Chapleau, Chippawa Hill (Saugeen), Christian Island, Deseronto (Tyendinaga), Fort Frances, Core Bay, Highgate (Moravians), Kenora, Longford Mills (Rama), Manitowaning, Moose Factory, Muncey (Caradoc), Parry Sound, Peterborough (Rice and Mud Lakes), Port Arthur, Port Perry (Scugog), Golden Lake, Sarnia, Sault Ste. Marie, Sutton West (Georgina and Snake Island), Sturgeon Falls, Thessalon, and Walpole Island.

Tribal Origin. - Most of the Indians of Ontario are Ojibwas, and are of Algonkin stock. The Oneidas of the Thames, the Mohawks of the Bay of Quinte, the Mohawks of Parry Sound district, and the Six Nations of Grand River, are of Iroquoian stock. There is a band of Pottawattamies at Walpole Island, and Delawares at the Caradoc (Muncey) Agency; these are of Algonkin stock.

Occupations. - The Indians in the southern, western, and central parts of Ontario engage largely in farming. The reserves are generally well suited for this purpose. During the years of depression, owing to the lack of funds, very little new equipment was purchased. For that reason the Branch has been unable to start beginners in farming and stock raising. However, some extra assistance has been given to all agencies and a start has been made with good results at the Muncey Agency where an experienced farming instructor has been engaged. Many horses and implements have also been supplied to the Indians. An experienced farming instructor has been appointed at the Six Nations Reserve at Brantford and some equipment has been supplied to beginners to bring more land under cultivation. Wherever assistance is given, the Indians respond extremely well.

A special representative of the Indian Affairs Branch supervises the farming operations of the Indians n central and western Ontario. He organizes Indian agricultural societies wherever farming is carried on, and holds a short course in agriculture; and also in domestic science and dietetic work for girls and young women. These courses are well attended and have proved very popular among the Indians, and great interest is shown by the young people, as well as by the old people. At the annual meeting of the different agricultural societies, as well as during the time the courses are held, there are lectures by outside speakers, who have voluntarily given their services, especially from the Agricultural College at Guelph and from the Provincial Department at Toronto. This work has stimulated the interest of the Indians a great deal.

During the summer months Indians find a profitable source of income as guides and canoemen. Others are employed at various industries, and trades. The Indians are proficient bushmen and many find employment in the various lumber camps. There is still a market for snow-shoes, canoes, and moccasins, and these are usually manufactured by the older members of the community, although in some areas successful efforts have been made to engage the younger generation in these distinctive Indian pursuits.

The women also find sources of income; some are employed as domestics; others support themselves by making baskets and fancy Work. In certain districts berry-picking is an important item and furnishes considerable income. In the more settled districts many of the Indians own houses of brick, stone, or modern frame construction, and on some reserves both houses and farm buildings are comfortable and well built. In the outlying and more remote parts the old type of log house still predominates and tents and tepees are Used during the summer months.

New Ontario. - In the remote parts of Ontario hunting and fishing are still the chief sources of livelihood. Acting as guides and canoemen during the summer months adds considerably to the income of the Indians. Although agriculture is, not carried on to any extent, most of the bands grow considerable crops of potatoes and vegetables. They are of necessity, more or less nomadic and, consequently, live in tents most of the year.

MANITOBA

Agencies. - The following agencies are included in the Province of Manitoba: Birtle, Clandeboye, Fisher River, Griswold, Portage la Prairie, Manitowapah, Norway House, The Pas, Fort Churchill, York Factory, and Port Nelson.

Tribal Origin. - Most of the Indians of Manitoba belong to the Ojibwa race, which is of Algonkin stock. Bands of Swampy Crees are found at the Norway House and Fisher River Agencies and in the York Factory district; these are also of Algonkin stock. The Indians located at the Griswold Agency are Sioux; there are also Sioux at the Birtle and Portage la Prairie Agencies. There is a band of Chipewyans at Churchill; this tribe is of Athapaskan stock.

Occupations. - The reserves in Manitoba suitable for extensive agriculture are mainly within the Birtle, Griswold, Portage la Prairie, and Clandeboye Agencies.

In the northern agencies the chief occupations of the Indians are hunting, trapping, and fishing. Many of the northern Indians are expert guides and canoemen. They are employed by sportsmen and to some extent by the transport and fur companies, but their main source of revenue is from trapping and fishing.

A great many of the Indians from around Lake Manitoba and Lake Winnipeg come south in the summer and work in the harvest fields in the farming communities in this province. The women also derive considerable revenue from the sale of moccasins and gloves, which are made from tanned moose and deer hides. The women do the tanning, and most of them are expert needlewomen.

Farming and Stock Raising. - The Indians in the southern part of the province, wherever the land is suitable, are engaged in farming and stock raising. They also own a great many cattle on the reserves around Lake Manitoba. The farming Indians, however, have had many disappointments in the last few years from partial crop failures owing to drought.

Dwellings. - On most reserves in Manitoba fairly good log homes are to be found. They are one and one-half stories high with shingle roof. Most of these homes are whitewashed every year, which improves the sanitation. There are. also quite a number of houses of frame construction to be found on all the reserves. In the extreme north, of course, the homes are more primitive.

SASKATCHEWAN

Agencies. - The following agencies are included in the Province of Saskatchewan: Battleford, Carlton, Crooked Lakes, Duck Lake, File Hills, Onion Lake, Pelly, Qu'Appelle, and Touchwood.

Tribal Origin. - The most numerous tribes among the Saskatchewan Indians are the Ojibwas, Swampy Crees, and Plains Crees, which all belong to the Algonkin stock. In addition to these, Sioux Indians are found at the Crooked Lakes, Qu'Appelle, and Carlton Agencies, and on the Moose Woods reserve. In the Onion Lake Agency there is a band of Chipewyans, who are of Athapaskan stock. There are also a few Chipewyan Indians in the Ile h la Crosse district.

Occupations. - The principal occupations of the Indians of Saskatchewan are farming and stock raising, and farming instructors are employed on most of the reserves in this province to instruct the Indians in agricultural pursuits. There is quite a large acreage under crop in practically every agency. Many of the Indians also own a number of cattle of a very good type, principally of Shorthorn breed. They are well equipped with implements and own a number of horses

as farming is carried on by horse-power. Their crops, however, have suffered greatly from drought in the last few years. Last autumn most of the agencies had fair crops, although not heavy, with the exception of Battleford where everything was destroyed by hot winds and drought.

Other Occupations. - Wherever there are fur-bearing animals to be found the old Indian still carries on his former pursuit, and the Indians in the extreme north still make their living from hunting and fishing.

Dwellings. - On most of the reserves in this province the Indians are fairly well housed, the homes being usually of log construction with shingle roof. These houses are very comfortable if properly cared for. Here and there are also to be found a few homes of frame construction and also the old Indian hut, but there are not very many of this type as the Branch has endeavoured to replace them with better homes in the last few years. The Indians in the extreme north move about and their homes when they are out on the hunting grounds consist in winter of an old log cabin with a sod roof, and tents in the summer.

ALBERTA

Agencies. - The following agencies are included in the Province of Alberta: Blackfoot, Blood, Edmonton, Hobbema, Peigan, Saddle Lake, Sarcee, Stony, Lesser Slave Lake, and Athabaska.

Tribal Origin. - The Alberta Indians are of Algonkin stock, with the exception of the Sarcees near Calgary and the Beavers and Slaves in the Lesser Slave Lake Agency, who are Athapaskan, the Paul's band in the Edmonton Agency, who are Iroquoian, and the Stonies, who are of Siouan stock. The Algonkin Indians of Alberta are subdivided into Blackfoot Nation, comprising the Indians of the Blackfoot, Blood, and Peigan Agencies; Plains Crees found in the Lesser Slave Lake, Saddle Lake, Edmonton, and Hobbema Agencies.

Occupations. - The principal occupations of the Indians in Alberta are farming and stock raising. The farming Indians in this province are very well equipped with machinery and horses to carry on their work, as the Indians in the south own large herds of horses. There has been a great improvement in their method of farming in the last 10 years. It has always been difficult to get the Indians to do their summer fallowing properly, but the last few years have taught them that if they expect a crop the following year the land must be summer fallowed properly to eradicate weeds and preserve moisture.

The Indian cattle herds in this province are of a very good type and many bring a premium on the market. The breeds are principally Shorthorn and Hereford with a few Aberdeen Angus. The Indians, also, in good years, derive a considerable revenue from the sale of hay, especially in the north. The summer of 1936 was very disastrous to the Indian farmers and stockraisers in Alberta. The reserves, south of Calgary were completely dried out and to meet the situation a special grant was provided by the Government to purchase feed for cattle and food and clothing for the Indians, where it was found necessary. It is of interest to note that all the hay required was purchased from the Indians in the Hobbema Agency.

In the northern portions of the Athabaska and Lesser Slave Lake Agencies the Indians are still hunters and make their living from that source. The Indians in other parts of the province derive considerable revenue also from fishing, working for white farmers and stockmen, and from the sale of wood. The Blackfoot Indians, during the winter, derive a large revenue from their coal mines which they operate themselves under the supervision of a white miner.

Dwellings. - The Indians in this province practically all own good homes. On the Blackfoot Reserve every family has a fair house of good construction and good barns. Frame houses and barns are also to be found on the Sarcee reserve south of Calgary and on the Edmonton reserve. On the other reserves the homes are mostly of log construction with shingle roofs, but there are also quite a number of frame houses belonging to more prosperous Indians. On the whole, the homes are good and fairly well kept, many of them being well furnished.

BRITISH COLUMBIA

Agencies. - The following agencies are included in the Province of British Columbia: Babine, Bella Coola, Cowichan, Kamloops, Kootenay, Kwawkewlth, Lytton, New Westminster, Nicola, Okanagan, Queen Charlotte, Skeena, Stikine, Stuart Lake, Vancouver, West Coast, Williams Lake, and Fort St. John, the latter agency having been established to serve the needs of the Indians of the Peace River Block.

Tribal Origin. - The Indians of the Bella Coola, Cowichan, Kamloops, Lytton New Westminster, Nicola, Vancouver, and Okanagan Agencies belong to the Salish tribes. The Kootenay tribe is located in the agency of the same name. The Kwakiutl - Nootka tribe is located at the Kwawkelth and West Coast Agencies; the Haidas, in the Queen Charlotte Islands; the Tlingits, in the Stikine; and the Tsimshians in the Skeena Agency. The Indians of the Babine, Stuart Lake, and Williams Lake Agencies belong to the Athapaskan race.

The Indians of the Peace River Block are Athapaskan, with the exception of a small group of Saulteaux and Crees at Moberly Lake who are Algenkin.

Occupations. - Most of the Indians of Vancouver Island and the mainland coast derive their living by fishing. Many of them own power-boats and up-to-date fishing equipment and either fish independently or by contract with the canneries. The main source of their annual revenue is from the summer salmon fishing. The fishing season at Rivers Inlet and other points along the coast was completely lost to the Indians during the year because of a strike of the white fishermen, engineered from Vancouver, over 100 Indian boats being affected. The Indians sensibly decided that they did not wish to participate in the strike as they would lose more by the loss in catch than they could make up by any forced advances in prices. The Indians informed the cannery authorities of their decision and asked to be allowed to fish. The canneries, however, would not issue nets to the Indians, which had been the custom for some years, because they were afraid the strikers would devise some means of destroying them. As the nets usually cost $130 apiece, the caution of the canneries in the issuing of nets can be understood. Unfortunately the usually heavy run of salmon last year was lost to many of the Indians who had to be assisted home from the fishing grounds. Steps have been taken to provide police protection for our Indian fishermen now congregating at the fishing grounds.

Generally speaking, the year was not marked by much progress in farming, indeed the results were less encouraging than in 1935. This was mainly due to the exceptionally low prices for cattle during the greater part of the selling period. In December prices showed more improvement, but as the winter had set in, it was then impossible to get the cattle to the railhead because of the long drives over snow-covered roads. The unusually long and severe winter added to the difficulties of the Indian farmers and although the Branch was prompt and generous in considering assistance, the losses among the cattle from undernourishment were considerable.

The policy of the Indian Affairs Branch in assisting the Indians to improve their herds through the purchase of high-grade breeding stock has been productive of good results and is reflected in the more ready acceptance of Indian cattle for the market by the larger cattle buyers.

Progress is being made in the extension of fruit growing and the cultivation of a greater acreage for the production of garden crops.

The re-employment of Indians in industrial activities showed some improvement, and although preference largely continues to be given to unemployed whites, it is encouraging to note the increasing number of Indians securing employment.

Dwellings. - The best Indian houses in British Columbia are found on the northwest coast among the Haidas of Queen Charlotte Islands, the Tsimshians of Port Simpson, Metlakatla, and Port Essington, and the Kwakiutls of Bella Bella. These Indians appear to have a natural bent for carpentry and housing architecture. Without departmental assistance, they build from their own plans commodious bungalows of the most modern type, well finished inside and out, that would be a credit to a prosperous suburb of any large city. The Indians of the west coast of Vancouver Island also have roomy, well-ventilated, and well kept houses, although of a less pretentious character than in the first-mentioned locality.

These Indians were accustomed to dwell in large community houses and this may account for the unusual size and height of the rooms in their modern homes. The women of these more northerly coast villages are experienced housekeepers and maintain a high standard of neatness and cleanliness.

Strangely the Salish Indians of the southern British Columbia Coast in the vicinities of the larger cities of Vancouver and Victoria, and who have been ill closer touch with civilization, are backward and unprogressive in their housing conditions in comparison with the north coast Indians above mentioned. Indeed the houses of the Indians of the south coast are for the most part little better than shacks and show little evidence of care or good housekeeping. There are, of course, exceptions in the case of a few progressive Indians who have good homes. The general standard, however, is low.

In the farming districts of the central and lower mainland, housing conditions among the Indians are fairly good, although even here their dwellings are not to be compared with those on the north coast.

In the northern interior the Indians still dwell in primitive shacks and tepees.

NORTHWEST TERRITORIES

Agencies. - The Indian Affairs Branch now has three agencies in the Northwest Territories, namely: Fort Simpson, Fort Resolution, and Fort Good Hope.

Tribal Origin. - The principal tribes found in the far north are the Slave, Hares, Loucheux, Sekani, Dogribs, Yellow Knives, Chipewyans, and Caribou Eaters. All these tribes are of Athapaskan stock. The most northerly tribes are the Takudah, who extend to the Mackenzie Delta; and the Copper Mines, who are located along Coppermine River. The territory occupied by these two last-named tribes is contiguous to that inhabited by the Eskimos.

Occupations. - The Indians depend almost entirely upon hunting and trapping for a livelihood. Here and there some cultivate small plots of potatoes. They own no cattle or horses, their mode of transportation being by boat, usually, along the great waterways in the summer, and with dogs in the winter. They catch and preserve large quantities of fish for their own use and for food for the dogs during the winter. They also pick and dry large quantities of different kinds of berries for winter use.

The Church of England, during the last year, erected a boarding school, hospital, and church at Aklavik. These were of frame construction, and it might be of interest to outsiders to know that all the work performed on these buildings was done by Indians from McPherson, in the Fort of Good Hope Agency. An experienced carpenter was sent up by the Church of England authorities from the east and under his supervision the Indians were trained to do the necessary labour. From information received by the Branch, the Indians quickly became expert carpenters. Most of the furniture, as well, was manufactured by the Indians.

Dwellings. - The Indians live in log cabins in winter, using tents and tepees during the summer.

YUKON

Tribal Origin. - The Forty-Mile, Blackstone, and Moosehide bands belong to the Takudah tribe. There is a band of Slaves at Lancing Creek who migrated from Good Hope on Mackenzie River; another band of Slaves, called Nahani, is located at the headwaters of Pelly River. All these Indians are of Athapaskan stock. At Mayo, Selkirk, Little Salmon, and Carmacks there are bands belonging to the tribe known as Stick Indians. Bands belonging to the Tlingit tribe are found at Whitehorse, Teslin Lake, Champagne Landing, and Carcross.

Occupations. - Hunting, trapping, and fishing are the chief occupations of the Yukon Indians. The women also derive some revenue from the sale of moccasins and curios of various kinds, and the men are expert at making toboggans and snowshoes. Practically no farming is carried on owing to climatic conditions, but some of the Indians cultivate patches of potatoes and other vegetables for their own use.

Dwellings. - The Indians of the Yukon live in log cabins.

TABLE 1

Recapitulation: Census of Indians - Arranged under Provinces, 1934

...	Number in Province	Religions							Under 7 Years		From 7 to 16 Inclusive		From 17 to 21 Inclusive		From 22 to 65 Inclusive		From 65 Years Upwards	
...	...	Anglican	Baptist	United Church	Presbyterian	Roman Catholic	Other Christian Beliefs	Aboriginal Beliefs	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
PROVINCES	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Alberta	10,900	1,607	...	1,440	...	7,718	...	135	1,116	1,238	1,277	1,221	601	513	2,333	2,124	259	318
British Columbia	23,598	4,761	...	4,495	...	13,492	701	149	2,148	2,260	2,762	2,755	1,023	1,024	5,213	4,803	807	803
Manitoba	12,958	4,511	52	3,881	574	3,510	239	191	1,212	1,134	1,497	1,345	851	742	2,667	2,785	322	403
New Brunswick	1,734	...	...	...	...	1,734	...	...	165	173	208	193	92	89	401	333	39	41
Northwest Territories	3,854	632	...	...	...	3,222	...	...	355	428	439	408	262	183	812	888	31	48
Nova Scotia	2,093	...	1	...	...	2,091	1	...	178	177	210	235	134	117	466	427	83	66
*Ontario	30,631	9,995	1,170	5,530	261	10,308	714	2,653	2,012	2,046	2,618	2,576	1,868	1,857	5,898	5,923	829	842
Prince Edward Island	224	...	...	...	...	224	...	...	21	27	26	29	5	10	46	48	7	5
Quebec	13,281	2,546	...	555	...	9,885	183	112	1,334	1,252	1,406	1,441	753	732	2,940	2,696	350	377
Saskatchewan	11,878	3,904	...	1,111	165	5,637	...	1,061	1,288	1,347	1,313	1,330	575	502	2,351	2,507	289	376
Yukon	1,359	1,282	...	...	...	12	...	65	121	173	134	150	87	87	273	239	47	48
Total Indian population	112,510	29,238	1,223	17,012	1,000	57,833	1,838	4,366	9,950	10,255	11,890	11,683	6,251	5,856	23,300	22,773	3,063	3,327

[*No details as to religion of 4,162 Indians available.]

NOTE: - 2,500 Nomadic Indians in British Columbia and 609 Nomadic Indians in Northwest Territories, formerly shown, have been omitted from this census as they have now become absorbed in the different agencies of these provinces. 47398 - 14

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937

School	Reserve	Agency	Teacher	Number on Roll Average			Average Attend-ance	Grades								
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
Prince EDWARD ISLAND																
Lennox Island	Lennox Island	Prince Edward Island	Mr. J. J. Sark	7	12	19	14	9	1	3	2	3	-	1	-	-
Nova Scotia																
Afton	Afton	Antigonish	Miss J. Forbes	14	8	22	15	8	2	6	2	3	-	-	1	-
Eskasoni	Eskasoni	Cape Breton	Mrs. M. A. Duane	16	18	34	22	23	8	-	3	-	-	-	-	-
Sydney	Sydney	"	Miss C. Gallagher	12	2	34	19	9	5	3	14	2	1	-	-	-
Milibrook	Millbrook	Colchester	Mr. F. B. McKinnon	13	10	23	17	3	7	1	-	8	-	4	-	-
Bear River	Bear River	Digby	Mrs. R. L. Ford	9	10	1	11	5	3	-	2	3	3	2	1	-
Malagawatch	Malagawatch	Inverness	Mr. C. Kennedy	8	7	15	14	5	2	2	2	2	-	-	2	-
Whycocomagh	Whycocomagh	"	Mr. A. MacDonald	17	24	41	23	19	8	6	5	2	-	-	1	-
Indian Cove	Fishers' Cove	Pictou	Miss G. McGirr	21	10	31	24	16	9	1	4	1	-	-	-	-
Salmon River	Salmon River	Richmond	Miss H. Bissett	19	16	35	22	19	2	4	4	3	3	-	-	-
Middle River	Middle River	Victoria	Miss M. E. McLean	14	17	31	19	17	9	2	3	-	-	-	-	-
Total Nova Scotia	-	-	-	143	142	285	186	124	55	25	39	24	7	6	5	-
NEW BRUNSWICK																
Big Cove	Big Cove	Northeastern	Mr. A. L. Fraser Mrs. A. L. Fraser	29	25	54	42	18	10	4	9	3	4	3	3	-
Burnt Church	Burnt Church	"	Miss V.A. Hogan Miss C. J. Hogan	27	23	50	42	14	12	9	3	2	5	5	-	-
Eel Ground	Eel Ground	"	Miss I. Fitzgerald	12	15	27	21	13	1	1	-	4	8	2	-	-
Indian Island	Indian Island	"	Mrs. C. E. F. Savage	4	10	14	11	7	2	-	4	1	-	-	-	-
Red Bank	Red Bank	"	Mrs. S. M.	2	11	13	9	5	-	4	-	1	3	-	-	-

			Kehoe													
Eel River	Eel River	Restigouche	Miss B. L. Arsenault	13	8	21	18	5	4	2	3	3	1	3	-	-
Kingsclear	Kingsclear	Southwestern	Miss E. M. O'Brien	10	7	17	11	4	1	2	-	4	4	2	-	-
Oromocto	Oromocto	"	Miss M. E. Scott	9	8	17	12	7	-	2	2	3	-	3	-	-
St Mary's	St Mary's	"	Mrs R. McElligott	17	25	42	32	7	7	7	6	7	2	3	3	-
Woodstock	Woodstock	"	Sister M. Annette Sister Catherine	11	14	25	15	9	6	2	4	2	1	-	1	-
Tobique	Tobique	Northern	Sister M. Francis Joseph Sister M. Dolorosa Sister M. Electa	23	35	58	49	10	12	13	8	5	5	5	-	-
Total, New Brunswick	-	-	-	157	181	338	262	99	55	46	39	35	31	26	7	-
QUEBEC																
Bersimis	Bersimis	Bersimis	Sister Ste. Jeanne Sister St. Marc Sister M. des Seraphine	38	47	85	38	69	13	3	-	-	-	-	-	-

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937—Cont.

School	Reserve	Agency	Teacher	Number on Roll Average			Average Attend-ance	Grades								
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
Prince EDWARD ISLAND																
Caughnawaga Bush.	Caughnawaga	Caughnawaga	Mrs. M. K. Phillips Sister M. Cleophas Sister M. Leander Miss V. Snow Sister M. George Sister M. Rose Miss T. Jacobs Sister M. Sebastia Sister Marie	11	9	20	15	6	2	5	5	1	1	-	-	-
Caughnawaga R.C	"	"	Sister M. Jeanne Sister M. John Sister M. Alma Sister M. Mechtilde Sister M. Leocadie Sister M. Florina Sister M. Anysie Sister M. Laurence Sister Jacqueline	189	164	353	303	129	-	57	64	45	19	18	19	2
Caughnawaga St. Isidore	"	"	Miss M. Stacey	9	14	23	17	3	2	8	3	-	5	-	2	-
Caughnawaga United Church	"	"	Rev. C. C. Dean Miss V. Daly	24	21	45	32	14	9	6	8	5	2	1	-	-
[1]Fort George	At Fort George	James Bay	Miss B. A. Nesbitt	2	6	8	3	4	-	-	-	2	2	-	-	-

[1]Rupert's House	At Rupert's House	"	Mr. G. Morrow	28	15	43	10	38	1	2	2	-	-	-	-	-
Lorette	Lorette	Lorette	Sister St. Vincent-Ferrier Sister Ste. Aimee de Sacre Coeur	36	27	63	57	18	11	8	16	10	-	-	-	-
Maria	Maria	Maria	Miss D. Gideon	26	17	43	32	17	8	9	9	-	-	-	-	-
Congo Bridge	Congo Bridge	Maniwaki	Miss M. McSheffrey	6	12	18	10	8	-	6	2	-	2	-	-	-
Maniwaki	Maniwaki	"	Miss F. White	13	32	45	31	14	13	6	8	4	-	-	-	-
Oka Country	Oka	Oka	Mr. A. E. Smith	18	17	35	19	17	5	6	1	3	2	1	-	-
Oka Village	"	"	Mr. M. J. Oke	15	23	38	23	14	6	4	3	4	3	4	-	-
St. Frances C.E	Pierreville	Pierreville	Mr. A. Emmett Sister M. Josephine	6	7	13	12	2	2	3	-	3	1	2	-	-
St. Frances R.C.	"	"	Sister St. Rene Sister Rose de la Croix	31	39	70	65	7	23	9	8	9	9	5	-	-
Pointe Bleue	Pointe Bleue	Pointe Bleue	Sister M. du Carmel Sister St. Adrien	46	43	89	77	22	50	-	9	5	3	-	-	-
Restigouche	Restigouche	Restigouche	Sister St. Leo Sister M. of St. Bridget Sister M. of St. Peter	77	51	128	104	43	16	20	10	13	11	15	-	-
Chesnail	St. Regis	St. Regis	Miss U. Billings	5	16	21	17	5	2	6	5	-	-	3	-	-
Chetlain	"	"	Miss G. Legarde	7	9	16	10	-	5	4	5	-	2	-	-	-
Cornwall Island E.	“	"	Mr. C. Chisholm	15	27	42	31	14	8	8	6	4	2	-	-	-
Cornwall Island W.	"	"	Miss E. Peters	13	16	29	22	4	8	-	5	-	5	5	2	-
St. Regis Island	"	"	Miss E. Fitzpatrick	6	12	18	12	10	2	-	4	-	-	2	-	-

St. Regis Village	"	"	Miss M. McDonald Miss H. C. McRae	37	30	67	51	36	5	8	7	4	4	2	-	1
Brennan's Lake	At Brennan's Lake	Timiskaming	Mr. L. McMahon, B.A	10	5	15	11	7	1	2	2	3	-	-	-	-
Hunter's Point	At Hunter's Point	"	Miss C. Nephin	4	8	12	8	3	-	4	3	1	-	-	1	-
Long Point	At Long Point	"	Mrs. J. D. McLaren	17	14	31	18	11	6	2	9	2	1	-	-	-
Timiskaming	Timiskaming	"	Sister John of the Eucharist	16	11	27	22	6	4	6	5	6	-	-	-	-
[1]Waswanipi	At Waswanipi	"	Mr. S. R. Iserhoff	27	38	65	33	65	-	-	-	-	-	-	-	-
[1]Manouan	At Manouan	Outside Treaty	Miss U. Bordeleau Miss 0. Richard	33	21	54	43	42	11	1	-	-	-	-	-	-
[1]Obedjiwan	At Obedjiwan	"	Miss L. Dion Miss J. Lafrance	25	21	46	35	24	6	16	-	-	-	-	-	-
[1]Weymontaching	At Weymontaching	"	Miss M. Alie Miss T. Boisvenue	15	19	34	20	19	8	7	-	-	-	-	-	-
Total, Quebec	-	-	-	805	791	1,596	1,181	671	227	216	199	124	74	58	24	3

[1] Seasonal school only

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937—Cont.

School	Reserve	Agency	Teacher	Number on Roll Average			Average Attend-ance	Grades								
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
ONTARIO																
Cape Croker	Cape Croker	Cape Croker	Miss S. J. Burke	20	22	42	34	6	7	12	4	5	5	3	-	-
Port Elgin	"	"	Mrs. S. M. Bell	11	16	27	16	-	13	3	7	-	3	2	-	-
Sidney Bay	"	"	Miss G. Edington	8	10	18	11	4	3	4	3	2	1	-	1	-
Back Settlement	Caradoc	Caradoc	Miss H. M. Howe	22	12	34	25	8	5	6	1	4	4	5	1	-
Bear Creek	"	"	Miss M. Stiltz	11	7	18	9	4	4	1	3	3	-	2	1	-
Muncey	"	"	Miss B. Comfrot	9	6	15	8	5	3	-	2	3	-	2	-	-
Oneida No. 2	Oneida	"	Mr. V. H. Morris	23	18	41	23	22	5	4	2	4	2	1	1	-
Oneida No.3	"	"	Mr. L.A. Braylord	20	26	4	24	20	13	5	6	-	1	1	-	-
River Settlement	Caradoc	"	Miss P. Sabin	20	8	28	17	13	2	2	5	3	2	1	-	-
Christian Island R.C	Christian Island	Christian Island	Miss M. M. O'Toole	15	14	29	23	5	5	4	4	4	4	1	2	-
Christian Island U.C	"	"	Mr. H. S. Rawlings Miss I. Bell	21	23	44	28	19	5	6	-	6	3	5	-	-
Manitou Rapids	Manitou Rapids	Fort Frances	Miss P. Pratt	13	8	21	8	3	4	7	3	1	2	1	-	-
[2] Seine River	Wild Potato	"	Mr. J. Leeder	9	10	19	12	19	-	-	-	-	-	-	-	-
Gull Bay	Gull Bay	Fort William	Miss D. Ross	13	9	22	13	9	4	6	2	-	-	1	-	-
Lake Helen	At Lake Helen	"	Mr. G. W. Vesey	10	12	22	15	15	1	3	3	-	-	-	-	-
[3]Martin Falls	Long Lake	"	Miss O. Wright	9	14	23	15	16	-	3	-	2	1	-	1	-
McIntyre Bay	Grand Bay	"	Mr. N. Van Hatten	6	10	16	10	2	8	3	-	-	3	-	-	-
Mission Bay	Fort William	"	Miss C. Troy	9	11	20	14	9	-	3	4	2	1	1	-	-
Mobert	Mobart	"	Mr. J. H. Douglas	13	22	35	22	13	8	6	1	7	-	-	-	-
			Mrs. M. H.													

Pie	Pie	"	Reed	12	24	36	18	29	3	2	2	-	-	-	-	-
Whitesand	Whitesand	"	Miss A. McGuire	13	7	20	16	10	3	3	2	2	-	-	-	-
Batchawana	Batchawana Bay	Sault Ste. Marie	Miss E. M. Robicheau	12	15	27	21	6	2	2	-	8	7	-	2	-
Garden River C.E	Garden River	"	MissA. Davies	7	12	19	15	9	-	2	3	1	-	3	1	-
Garden River R.C	Garden River	"	Miss L. Gattie Miss M. Hickey	37	40	77	56	25	14	-	14	6	11	6	1	-
Goulais Bay	Goulais Bay	"	Miss M. I. Cazaly	12	16	28	22	14	4	5	4	1	-	-	-	-
Georgina Island	Georgina Island	Georgina Island	Mr. R. A. Gibson	13	7	20	14	8	7	-	3	2	-	-	-	-
Golden Lake	Golden Lake	Golden Lake	Miss J. Currier	19	16	35	20	12	4	8	8	3	-	-	-	-
Sheshegwaning R.C	Sheshegwaning	Gore Bay	Miss V. LaVictoire	8	11	19	13	9	4	-	2	3	-	1	-	-
West Bay	West Bay	"	Miss M. Wrinn	27	18	45	27	24	6	6	4	3	2	-	-	-
Albany River	At Albany River	James Bay	Rev. H. A. Joselyn	24	16	40	10	27	12	1	-	-	-	-	-	-
[1] Cat Lake	At Cat Lake	"	Mr. L. A. Martin	9	21	30	21	30	-	-	-	-	-	-	-	-
[1] English River	At English River	"	Mr. N. Clarke	14	16	30	20	17	6	5	1	1	-	-	-	-
Fort Hope	At Fort Hope	"	Rev. D. Macdonald	11	9	20	5	18	2	-	-	-	-	-	-	-
Moose Fort	At Moose Fort	"	Rev. L. A. Sampson	27	36	63	23	51	6	1	1	2	-	2	-	-
[1] Trout Lake	At Trout Lake	"	Mr. E. Sigston	55	56	111	58	111	-	-	-	-	-	-	-	-
Whitefish Bay	Whitefish Bay	Kenora	Mr. A. Lafleche	12	13	25	21	12	5	-	7	1	-	-	-	-
Birch Island	Whitefish River	Manitowaning	Miss E. Fortin	8	16	24	19	3	7	4	4	3	2	1	-	-
Buzwah	Buzwah	"	Miss C. Wakegijig	18	13	31	17	22	2	4	-	2	1	-	-	-
Kaboni	Kaboni	"	Mrs. S. A. Prudhomme	12	14	26	17	18	2	2	-	4	-	-	-	-
Sheguiandah C.E	Sheguiandah	"	Miss M. Ballantyne	5	7	12	5	6	1	3	-	1	1	-	-	-
Sheguiandah R.C	Sheguiandah	"	Miss E. C. Lapointe	6	4	10	6	2	3	2	-	-	-	3	-	-
			Miss B.													

Sucker Creek	Sucker Creek	"	Willis	5	11	16	12	7	2	2	2	2	1	-	-	-
Whitefish Lake	Whitefish Lake	"	Miss M. Kinoshameg	5	9	14	9	3	1	3	3	3	1	-	-	-
Wikwemikong	Wikwemikong	"	Miss C. O'Driscoll Miss R. Trudeau	42	42	84	55	30	12	-	13	15	6	6	2	-
Moraiantown	Moravian	Moravian	Roy J. A. Ward	15	30	45	28	11	12	4	5	6	-	3	4	-

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937—Cont.

School	Reserve	Agency	Teacher	Number on Roll Average			Average Attend-ance	Grades								
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
ONTARIO																
Gibson	Watha	Parry Sound	Mrs. C. O. Sommer	8	15	23	16	6	1	5	1	-	5	2	3	-
Lower French River	Lower French River	"	Mr. A. B. Carruthers	7	12	19	9	13	3	1	1	-	-	-	1	-
Maganetawan	Maganetawan	"	Miss G. B. O'Meara	7	3	10	8	2	2	-	1	2	2	-	1	-
Moose Deer Point	At Moose Deer Point	"	Miss E. Donald	7	5	12	10	3	1	2	2	4	-	-	-	-
Ryerson	Parry Island	"	Miss A. McArthur	18	19	37	23	5	11	7	1	4	-	7	2	1
Shawanaga	Shawanaga	"	Mrs. E. English	12	10	22	14	4	5	4	8	1	-	-	-	-
Rama	Rama	Rama	Miss G. Swerdieger Miss R. L. McNeice	30	31	61	42	9	6	6	3	4	16	7	6	4
Alnwick	Alnwick	Rice Lake	Mr. J. Loukes	25	22	47	29	15	7	9	5	5	3	3	-	-
Mud Lake	Mud Lake	"	Mr. W. G. Rome Miss B. V. Long	27	36	63	48	10	10	4	11	8	8	5	4	3
Kettle Point	Kettle Point	Sarnia	Mr. G. Dill	12	16	28	22	14	6	-	3	4	-	1	-	-
St. Clair	St. Clair	"	Mr. W. E. Windover	6	13	19	15	5	2	9	2	1	-	-	-	-
Stoney Point	Stoney Point	"	Miss M. E. Anderson	4	5	9	5	3	1	1	1	2	1	-	-	-
French Bay	Saugeen	Saugeen	Miss E. M. McCulloch	7	7	14	12	1	2	1	1	4	2	-	-	-
Saugeen	"	"	Mr. W. M. Knechtel	13	7	20	15	5	7	4	2	1	-	1	-	-
Scotch Settlement	"	"	Mr. M. J. McIver	13	14	27	21	10	5	9	3	-	-	-	-	-
New Credit	New Credit	Six Nations	Mr. J. C. Hill	25	23	48	37	8	2	6	6	6	3	10	4	3
Six Nations No. 1	Six Nations	"	Miss J. L. Jamieson	25	26	51	35	13	5	-	10	8	4	7	4	-
Six Nations	"	"	Miss V. Davis	41	29	70	45	8	8	24	30	-	-	-	-	-

No.2			Miss N. Jamieson													
Six Nations No.3	"	"	Miss M. Anderson	34	21	55	38	11	6	11	5	10	8	2	2	-
Six Nations No.4	"	"	Miss M. Hill	16	13	29	23	6	7	-	-	7	2	5	2	-
Six Nations No.5	"	"	Miss A. Hill	24	12	36	26	8	9	3	-	10	1	3	2	-
Six Nations No. 6	"	"	Miss B. Monture	26	21	47	29	15	9	6	2	4	5	3	3	-
Six Nations No. 7	"	"	Miss H. Miller	32	28	60	38	23	13	3	5	2	7	3	4	-
Six Nations No. 8	"	"	Mr. O. Smith	27	18	45	32	12	3	5	2	6	8	3	6	-
Six Nations No.9	"	"	Miss. E. General	25	32	57	39	15	8	7	6	6	4	7	4	-
Six Nations No. 10	"	"	Miss S. Jamieson	30	26	56	34	18	10	-	8	11	6	-	3	-
Six Nations No. 11	"	"	Mr. J. L. Garlow Mr. H. English	25	45	70	40	25	11	4	4	9	7	4	6	-
Dokis	Dokis	SturgeonFalls	Miss L. Addey	17	19	36	23	22	6	7	1	-	-	-	-	-
Garden Village	Nipissing	"	Miss E. Cox	21	22	43	26	29	8	-	-	4	2	-	-	-
[1] Timagami	At Timagami	"	Rev. L. C. Wittig	14	21	35	24	10	1	6	11	7	-	-	-	-
Mississsaugi River	Mississauga	Thessalon	Miss M. MacNulty	14	19	33	24	17	5	3	-	5	-	1	2	-
Sagamook	Spanish River	"	Miss H. Kelly	16	15	31	27	21	6	4	-	-	-	-	-	-
Serpent River	Kenahutch	"	Miss A. Bush	14	10	24	15	6	6	2	5	5	-	-	-	-
Spanish River Protestant	Spanish River	"	Miss H. Crooks	4	8	12	8	6	1	-	4	1	-	-	-	-
Tyendinaga Central	Tyendinaga	Tyendinaga	Miss L. M. Bell	12	15	27	16	7	2	5	4	3	2	2	2	-
Tyendinaga Eastern	"	"	Miss N. H. Stoddart	18	17	35	22	6	10	4	6	2	3	3	1	-
Tyendinaga Mission	"	"	Miss L. Brant	14	23	37	20	11	6	1	10	3	4	1	2	-
Tyendinaga Western	"	"	Mr. L. Claus	11	11	22	15	5	1	7	-	3	3	3	-	1
Walpole	Walpole	Walpole	Mr. J. W. Daley													

Island No. 1	Island	Island	Mrs. J. W. Daley	39	30	69	54	34	11	-	6	7	4	2	5	-
Walpole Island No.2	"	"	Mrs. E. E. George	18	15	33	24	13	5	11	-	1	-	3	-	-
Total, Ontario	-	-	-	1,428	1,471	2,899	1,879	1,161	437	316	301	275	175	137	86	11
MANITOBA																
Berens River R.C	Berens River	Clandeboye	Sister M. Philippe de Neri	17	15	32	21	12	4	9	-	7	-	-	-	-
Berens River U.C	"	"	Mr. C. D. Street	30	24	54	24	18	17	8	-	4	4	-	2	-
Black River	Black River	"	Mr. G. Slater	10	12	22	10	6	5	3	5	3	-	-	-	-
Bloodvein River	Bloodvein	"	Rev. F. Leach, O.M.I	13	12	25	15	9	5	7	4	-	-	-	-	-
Brokenhead	Brokenhead	"	Mr. G. E. Sage	16	11	27	13	12	6	3	4	2	-	-	-	-
Fort Alexander Upper	Fort Alexander	"	Mrs. C. R. Harbord	14	20	34	13	24	3	2	2	1	1	1	-	-

[1] Seasonal school only.

[2] New school opened Jan. 13, 1937.

[3] New school opened Mar. 9, 1936.

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937—Cont.

School	Reserve	Agency	Teacher	Number on Roll Average			Average Attend-ance	Grades								
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
MANITOBA—Concluded																
Grand Rapids	Grand Rapids	Clandeboye	Rev. G. M. Armstrong, B.A	17	12	29	16	10	6	3	4	4	2	-	-	-
Hollowwater River	Hollowwater River	"	Mr. R. C. Marsh	15	11	26	13	12	4	8	1	-	-	-	-	-
Little Grand Rapids R.C	Little Grand Rapids	"	Mr. B. Guimond	16	12	28	19	17	8	3	-	-	-	-	-	-
Little Grand Rapids U.C	"	"	Mr. L. L. Schuetze	26	13	39	19	22	9	7	1	-	-	-	-	-
Pekangekum	Pekangekum	"	Mr. H. Schuetze	13	13	26	13	22	4	-	-	-	-	-	-	-
Poplar River	Poplar River	"	Mrs. D. M Baird	8	13	21	11	5	8	7	1	-	-	-	-	-
Fisher River	Fisher River	Fisher River	Mr. W. G. Tong Miss M. Stevens	33	32	65	33	35	7	-	10	5	6	1	1	-
Jackhead	Jackhead	"	Mrs. C. R. McKenzie	12	9	21	11	7	3	9	2	-	-	-	-	-
Peguis Centre	Peguis	"	Miss A. L. Clarke	13	18	31	14	10	6	3	14	4	3	-	-	-
Peguis North	"	"	Miss A. Eaton	14	8	22	13	13	3	-	2	1	3	-	-	-
Peguis South	"	"	Miss A. C. E. Field	23	25	48	24	17	12	3	5	5	6	-	-	-
Oak River Sioux	Oak River	Griswold	Miss W. H. Stapleton	6	11	17	8	16	1	-	-	-	-	-	-	-
Ebb and Flow Lake	Ebb and Flow	Manitowapah	Mr. A. G. Taggart	13	8	21	11	12	5	2	-	2	-	-	-	-
Fairford	Fairford	"	Miss I. G. Fairservice Miss N. Skaftfeld	18	33	51	36	32	8	-	8	3	-	-	-	-
Lake Manitoba	Lake Manitoba	"	Sister M. Margarita Sister Cecilia	15	10	25	16	12	5	-	4	3	1	-	-	-
Lake St Martin	Lake St Martin	"	Mr. S. Waller	19	19	38	15	24	3	6	4	1	-	-	-	-

Little Saskatchewan	Little Saskatchewan	"	Mr. A. Wheadon	14	14	28	10	17	7	3	1	-	-	-	-	-
Shoal River	Shoal River	"	Rev. C. E. Cooke Mrs. C. B. Cooke	26	20	46	25	4	11	3	1	-	-	-	-	-
Waterhen River	Waterhen	"	Sister P. Fuller	11	3	14	11	6	1	2	2	3	-	-	-	-
Churchill	At Fort Churchill	Norway House	Rev. L. F. Rowe	21	16	37	33	26	11	-	-	-	-	-	-	-
Cross Lake R. C.	Cross Lake	"	Sister St. Luc	18	18	36	13	15	17	4	-	-	-	-	-	-
Cross Lake U.C	Cross Lake	"	Miss C. Shoup	13	18	31	15	24	6	1	-	-	-	-	-	-
[1]God's Lake R.C.	God's Lake	"	Bro. J. Cordeau	12	15	27	10	18	9	-	-	-	-	-	-	-
[1]God's Lake U.C	"	"	Mr. R. S. Hiltz	12	15	27	15	12	15	-	-	-	-	-	-	-
Island Lake R.C	Island Lake	"	Mr. A. Gauthier	47	32	79	31	28	20	17	10	4	-	-	-	-
Island Lake U.C	"	"	Mr. W. Mutch	46	37	83	22	80	2	-	1	-	-	-	-	-
Jack River R.C.	Norway House	"	Sister Morin	11	8	19	7	14	3	1	1	-	-	-	-	-
Oxford House	At Oxford House	"	Mrs. A. M. Scoates	14	23	37	20	30	2	-	5	-	-	-	-	-
Rossville	Norway House	"	Miss E. Smith-Windsor	7	9	16	6	10	2	3	-	1	-	-	-	-
York Factory	At York Factory	"	Mr. F. E. Goldring	17	16	33	9	31	1	1	-	-	-	-	-	-
Big Eddy	The Pas	The Pas	Miss E. McKay	13	9	22	15	10	5	4	2	1	-	-	-	-
Ohemawawin	Chemawawin	"	Mr. H. Priestley-Barrett	18	10	26	18	12	5	2	4	3	-	-	-	-
Nelson House R.C	Nelson House	"	Mr. B. Lauze	14	10	24	17	15	2	2	4	1	-	-	-	-
Nelson House U.C	"	"	Mr. E. Monias	14	11	25	17	23	-	1	1	-	-	-	-	-
The Pas	The Pas	"	Miss A. Wright	13	9	22	15	9	3	4	2	1	3	-	-	-
Pine Bluff	Pine Bluff	"	Mr. P. Sicotte	5	6	11	9	3	2	1	2	2	1	-	-	-
RedEarth	RedEarth	"	Rev. J. L.Lowe	17	11	28	26	10	7	4	4	2	-	1	-	-

Shoal Lake	Shoal Lake	"	Mr. C. E. Wilde	9	7	16	13	5	-	2	-	9	-	-	-	-
Split Lake	Split Lake	"	Rev. G. C. Cowley	16	22	38	-	-	-	-	-	-	-	-	-	-
Swan Lake	Swan Lake	Portage Ia Prairie	Rev. J. E. Cooper	10	8	18	13	10	1	4	2	-	1	-	-	-
Total, Manitoba	-	-	-	757	688	1,445	755	834	254	142	100	73	32	6	3	1

[1] Seasonal school only.

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937—Cont.

School	Reserve	Agency	Teacher	Number on Roll Average			Average Attend-ance	Grades								
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
SASATCHEWAN																
Little Fines	Little Pines	Battleford	Miss A. L. Cunningham Miss M. Armitage	23	14	37	30	13	1	4	5	5	3	-	6	-
RedPheasant	Red Pheasant	"	Mr. H. Reynolds	13	12	25	16	13	5	-	5	-	-	2	-	-
Thunderchild	Thunderchild	"	Miss K. Beanland	9	12	21	11	14	3	-	-	4	-	-	-	-
Ahtahkakoops	Ahtahkakoops	Canton	Mr. B. B. Goodman	20	17	37	19	18	8	7	4	-	-	-	-	-
Big River	Big River	"	Miss C. Merrett	12	11	23	15	1	67	-	-	-	-	-	-	-
Little Red River	Little Red River	"	Mr. F. C. Dey	13	9	22	14	14	1	3	3	1	-	-	-	-
Mistawasis	Mistawasis	"	Rev. W. W. Moore	11	11	22	12	20	1	1	-	-	-		-	-
Montreal Lake	Montreal Lake	"	Mr. B. T. Plunkett	10	18	28	12	26	2	-	-	-	-	-	-	-
Sturgeon Lake	Wm. Twatt’s	"	Mr. T. E. MacDonald	12	10	22	13	15	3	1	3	-	-	-	-	-
White Bear’s	WWte Bear’s	Crooked Lakes	Miss M. McGregor	11	20	31	27	17	3	4	5	-	2	-	-	-
Fort-a-la-Come South	James Smith	Duck Lake	Mrs. E. M. Siddons	10	4	14	9	6	5	-	2	1	-	-	-	-
James Smith	"	"	Mrs. A. M. McFarlane	4	11	15	7	9	2	1	2	1	-	-	-	-
John Smith	John Smith	"	Rev. G. J. Waite	8	13	21	16	6	3	1	6	5	-	-	-	-
White Cap Sioux	Moose Woods	Moose Woods	Mrs. B. C. Carlin	3	11	14	11	5	1	2	2	4	-	-	-	-
Big Island Lake	Bighead	Onion Lake	Mr. J. H. Lirette	12	12	24	13	10	9	5	-	-	-	-	-	-
Frog Lake	Frog Lake	"	Mr. A. E. Peterson	10	4	14	7	9	3	1	1	-	-	-	-	-
Long Lake	Keehewin’s	"	Mr. C. Hebert	11	10	21	14	12	4	4	-	-	-	-	-	-
Ministikwan	Ministikwan	"	Mr. J. Chamberlain	7	9	16	3	14	1	-	1	-	-	-	-	-
			Miss R.													

Cote's	Cote's	Pelly	Jamieson Mrs. R. F. Roy	15	14	29	18	11	7	4	5	-	2	-	-	-
Key's	Key's	"	Mr. W. J. D. Kerley	11	6	17	9	4	4	4	2	2	1	-	-	-
Assiniboine	Assinboine:	Qu'Appelle	Miss F. M. Hodgson	17	9	26	20	10	4	4	3	3	2	-	-	-
Day Star's	Day Star's	Touchwood	Rev. F. B. Torpey	5	9	14	1	36	-	4	4	-	-	-	-	-
Fishing Lake	Fishing Lake	"	Rev. A. J. Lawes	15	15	30	15	13	10	2	5	-	-	-	-	-
Stanley	Stanley	Treaty No. 10	Mr. A. Spence	11	18	29	13	29	-	-	-	-	-	-	-	-
Total, Saskatchewan	-	-	-	273	279	552	337	311	87	52	58	26	10	2	6	-
ALBERTA																
Sarcee	Sarcee	Sarcee	Rev. F. M. R. Gibney	15	14	29	19	8	8	-	-	3	6	-	4	-
Morley	Morley	Stony	Miss J. Telfer	1	5	6	5	4	-	-	2	-	-	-	-	-
Total, Alberta	-	-	-	16	19	35	24	12	8	-	2	3	6	-	4	-
NORTHEST TERRITORIES																
Fort Smith	At Fort Smith	Athabaska	Sister 0. Lavoie	3	1	4	2	1	1	2	-	-	-	-	-	-
[1]Fort McPherson	At Fort McPherson	Fort Simpson	Rev. T. Greenwood	4	11	15	6	13	2	-	-	-	-	-	-	-
Fort Simpson	At Fort Simpson	"	Sister M. A. Garnache	3	5	8	7	3	3	1	1	-	-	-	-	-
[1]St. David's Mission	At St. David's Mission	"	Rev. H. G. Cook	7	9	16	11	15	1	-	-	-	-	-	-	-
Total, Northwest Territories	-	-	-	17	26	43	26	32	7	3	1	-	-	-	-	-
BRITISH COLUMBIA																
Fort Babine	Fort Babine	Babine	Mr. J. J. Moroney	23	16	39	18	11	13	10	5	-	-	-	-	-
Glen Vowell	Sikedakh	"	Mr. A. F. Parkinson	8	13	21	18	11	4	-	3	3	-	-	-	-
Hazelton	Hazelton	"	Mr. N. Stewart	20	37	57	33	26	3	7	10	5	5	1	-	-
Kispiox	Kispiox	"	Rev. J. T. Burchill	16	23	39	24	27	5	7	-	-	-	-	-	-
Kitsegukla	Kitsegulda	"	Rev. B. Black	18	15	33	17	17	4	5	-	5	2	-	-	-
Kitwanga	Kitwanga	"	Rev. B. Shearman	13	20	33	18	12	6	9	2	1	2	1	-	-

[1] Seasonal school only.

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937—Cont.

School	Reserve	Agency	Teacher	Number on Roll Average			Average Attend-ance	Grades								
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
BRITISH COLUMBIA—Concluded																
Rocher Déboulé	Hagwilget	Babine	Mrs. J. Macdonald	7	10	17	10	9	3	-	4	-	1	-	-	-
Beila Bella	Belle Belle	Belle Coola	Miss F. L. Perry	31	32	63	37	38	18	4	-	3	-	-	-	-
Bella Coola	Belle Coola	"	Miss H. E. Young	28	18	46	24	33	6	2	4	1	-	-	-	-
Kitimat	Kitimat	"	Miss R. Nelson	28	35	63	40	27	13	12	8	2	1	-	-	-
Klemtu	Klemtu	"	Mr. J. B. Glover	9	6	15	10	15	-	-	-	-	-	-	-	-
Cowichan	Cowichan	Cowichan	Sister M. Alphonse	13	20	33	15	23	3	4	1	2	-	-	-	-
Koksilah	Koksilah	"	Miss E. H.Creighton	11	17	28	14	13	5	6	-	2	2	-	-	-
Nanaimo	Nanaimo	"	Miss E. S. Klippert	24	17	41	26	16	4	5	5	3	3	3	2	-
Songhees	Somenos	"	Miss M. T. Hughes	3	11	14	8	4	2	4	-	2	-	-	2	-
Tsartlip	Tsartlip	"	Miss G. M. Lovick	10	13	23	13	14	3	-	3	-	3	-	-	-
[1]Moberly Lake	Moberly Lake	Fort St. John	Mr. L. M. Gething	12	6	18	12	17	1	-	-	-	-	-	-	-
Alert Bay	Nimpkish	Kwawkewlth	Mr. W. P. Wickett	26	27	53	29	38	6	7	-	2	-	-	-	-
Campbell River	Campbell River	"	Miss H. Earl	12	13	25	22	15	4	6	-	-	-	-	-	-
Cape Mudge	Cape Mudge	"	Rev. T. C. Colwell	19	13	32	17	9	6	3	8	-	5	1	-	-
Kingcome Inlet	At Kingcome Inlet	"	Miss P. M. Arrowsmith	19	21	40	16	25	8	4	1	1	1	-	-	-
Mamalillikulla	Mamalillikulla	"	Miss H. Bowden	7	11	18	8	14	2	-	2	-	-	-	-	-
Quatsino	Quatsino	"	Mr. E. A. Hill-Tout	9	7	16	9	10	2	4	-	-	-	-	-	-
Smith's lnlet	Kwashela	"	Miss H. H. Pennington	6	4	10	4	2	1	4	1	2	-	-	-	-
Boothroyd	Boothroyd	Lytton	Miss L. Blachford	6	11	17	12	4	6	6	1	-	-	-	-	-
Seabird Island	Seabird Island	"	Mr. F. G.	9	13	22	12	10	2	3	3	-	2	1	1	-

			M. Grist													
Seton Lake	Shalalth	"	Miss C. MacLennan	12	8	20	15	1	5	8	2	4	-	-	-	-
Chehalis	Chehalis	New Westminster	Mr. J. W. Burns	10	13	23	12	13	6	1	2	1	-	-	-	-
Katzie	Katzie	"	Miss H. Winter	5	4	10	8	4	2	-	3	-	1	-	-	-
Skwah	Skwah	"	Mr. C. O. Daly	5	13	18	10	9	3	4	-	-	2	-	-	-
Shulus	Nicola Mameet	Nicola	Mr. D. C. Westaway	12	13	25	9	17	2	5	1	-	-	-	-	-
Inkameep	Osoyoos	Okanagan	Mr. A. Walsh	7	6	13	10	5	2	1	1	1	-	2	1	-
Okanagan	Okanagan	"	Miss M. Hepworth	13	17	30	13	11	1	5	2	8	3	-	-	-
Penticton	Penticton	"	Miss M. E. Weydert	11	11	22	14	8	5	1	1	1	3	-	3	-
Massett	Massett	Queen Charlotte	Miss P. Moon Miss E. Gibson	40	45	85	44	56	13	10	4	1	1	-	-	-
Skidegate	Skidegate	"	Miss V. F. Weaver Miss C. A. Vanderveen	24	21	45	28	16	7	8	5	7	2	-	-	-
Gitladamicks	Kitladmax	Skeena	Rev. S. Kinley	16	19	35	11	25	7	-	3	-	-	-	-	-
Gwinoha	Gwinoha	"	Miss H. A. Jater	7	7	14	5	6	2	2	4	-	-	-	-	-
Hartley Bay	HartleyBay	"	Mr. J. A. Findlay	17	13	30	21	5	7	6	4	5	-	2	1	-
Kincolith	Kincolith	"	Miss E. H. Aylwin	19	33	52	25	36	7	7	-	1	-	1	-	-
Kitkatla	Kitkatla	"	Rev. G. H. Goodreid	28	19	47	20	27	7	6	5	1	1	-	-	-
Kitsalas	Kitsalas	"	Mr. H. Kelly	10	12	22	13	9	1	5	2	3	2	-	-	-
Lakalsap	Lakalsap	"	Mrs. N. C. Hayhurst Mr. J. Hayhuret	16	23	39	19	24	2	3	4	4	1	1	-	-
Metlaketla	Metlaketla	"	Mr. T. A. Bryant	13	16	29	16	9	9	6	3	-	-	2	-	-
Port Essington	Port Essington	"	Mrs. H. Pogson	18	16	34	17	17	1	6	4	-	-	1	1	-
			Miss L. E. Kinley													

Port Simpson	Port Simpson	"	Miss R. J. Horton	50	28	78	25	43	10	11	7	5	1	1	-	-
[1]Klappen	Iskut Lake	Stikine	Rev. L. Bosse, O.M.I	5	7	12	10	12	-	-	-	-	-	-	-	-
[1]McDames	"	"	Mr. H. G. Fitzpatrick	10	7	17	11	13	4	-	-	-	-	-	-	-
[1]Tehitan	Tehitan	"	Mr.W. P. Thoman	10	11	21	13	8	7	5	1	-	-	-	-	-
[1]Fort Grahame	Fort Grahame	Stuart Lake	Mr. P. J. Downey	14	11	25	17	6	8	3	-	8	-	-	-	-

[1] Seasonal school only.

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937—Cont.

School	Reserve	Agency	Teacher	Number on Roll Average			Average Attend- ance	Grades								
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
BRITISH COLUMBIA—Concluded																
[1]FortMcLeod	Fort McLeod	Stuart Lake	Mr. G. N. Cormack	11	7	18	14	18	-	-	-	-	-	-	-	-
Homalco	Aupe	Vancouver	Mr. W. H. Sowrey	17	15	32	12	24	5	3	-	-	-	-	-	-
Sliammon	Sliammon	"	Miss M. Boeur	9	15	24	11	11	1	1	8	3	-	-	-	-
Squamish	Squamish	"	Sister Mary Amy	11	17	28	19	18	3	1	2	2	-	2	-	-
Ucluelet	Itedse	West Coast	Mr. C. Von Storch	17	7	24	9	10	6	-	8	-	-	-	-	-
Total British Columbia	-	-	-	825	863	1,688	917	901	263	220	137	89	48	19	11	-
Yukon																
[1]Champagne Landing	At Champagne Landing	Yukon	Mr. W. R. Stringer	10	13	23	10	19	4	-	-	-	-	-	-	-
[1]Little Salmon	At Little Salmon	"	Miss M. A. Herron	2	10	12	5	10	1	1	-	-	-	-	-	-
Moosehide	At Moosehide	"	Rev. A. Anderson	6	8	14	8	6	5	1	2	-	-	-	-	-
[1]Old Crow Village	At Old Crow Village	"	Miss M. McCabe	16	13	29	16	29	-	-	-	-	-	-	-	-
Selkirk	At Selkirk	"	Rev. C. W. Ward	10	9	19	8	13	6	-	-	-	-	-	-	-
[1]Teslin Lake	At Teslin Lake	"	Mr. C. J. Loat, B.A	21	9	30	16	11	8	3	8	-	-	-	-	-
Total Yukon	-	-	-	65	62	127	63	88	24	5	10	-	-	-	-	-
[1] Seasonal school only.																

Statement of Combined White and Indian Day Schools in the Dominion

School	Reserve	Agency	Number on Roll Average			Average Attend- ance	Grades								
			Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
Hiawatha	Near Keene	Rice Lake	11	3	14	12	3	4	-	1	3	-	-	1	2
Honey Harbour	Near Midland	Parry Sound	29	21	50	34	20	7	6	9	3	2	1	2	-

Mattawa	At Mattawa	Sturgeon Falls	32	30	62	43	16	7	7	7	6	4	11	4	-
Michipicoten Harbour	At Michipicoten Harbour	Sault Ste. Marie	7	7	14	8	2	2	-	7	1	1	-	1	-
Whitefish River	At Whitefish Fails	Manitowaning	9	6	15	10	3	5	4	1	2	-	-	-	-
Total, Ontario	-	-	88	67	155	107	44	25	17	25	15	7	12	8	2
MANITOBA															
Jack River C.E	Norway House	Norway House	8	1	22	11	14	3	3	1	-	1	-	-	-
Moose Lake	At Moose Lake	The Pas	6	7	13	6	8	3	1	-	1	-	-	-	-
Patapun	At Patapun	Clandeboye	12	2	14	8	7	-	3	-	3	1	-	-	-
Total, Manitoba	-	-	26	23	49	25	29	6	7	1	4	2	-	-	-
SASKATCHEWAN															
Round Plain	Near Prince Albert	Carlton	4	6	10	6	7	-	-	-	-	1	-	1	1
BRITISH COLUMBIA															
Telegraph Creek	At Telegraph Creek	Stikine	6	10	16	8	12	3	-	-	1	-	-	-	-
Seasonal school only.															

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937

School	Post Office Address	Agency	Principal	Denomination	Number on Roll Average			Average Attend-ance	Grades								
					Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
NOVA SCOTIA																	
Shubenacadie	Shubenacadie	Hants	Rev. J. P. Mackey	Roman Catholic	83	82	165	155	49	22	20	24	34	7	9	-	-
QUEBEC																	
Fort George	Moosonee	James Bay	Rev B. S. Green	Church of England	23	32	55	54	25	12	7	-	11	-	-	-	-
ONTARIO																	
Albany Mission	Fort Albany	James Bay	Rev. A. R. Biodeau, O.M.I..	Roman Catholic	43	40	83	77	22	19	20	13	9	-	-	-	-
Cecilia Jeffrey	Kenora	Kenora	Mr B W Byers	Presbyterian	84	79	163	146	60	9	12	14	31	13	19	-	-
Chapleau	Chaplean	Chapleau	Canon A. J. Vale	Church of England	53	51	104	101	4	07	15	5	10	12	9	11	5
Fort Frances	Fort Frances	Fort Frances	Rev. V. de Varenne, O.M.I.	Roman Catholic	54	40	94	88	37	13	12	12	12	6	2	-	-
Fort William	Fort William	Fort William	Sister M. Rita	Roman Catholic	42	48	90	80	29	8	10	23	11	7	2	-	-
Kenora	Kenora	Keaora	Rev.J. E. Baillargeon, O.M.I.	Roman Catbolic	40	58	98	90	30	21	14	14	9	-	-	-	-
McIntosh	McIntosh	“	Rev. C. Perreault, O.M.I.	Roman Catholic	55	51	106	97	50	19	11	8	10	6	2	-	-
Mohawk	Brantford	Six Nations	Rev H W. Seen, B.A.	Church of England	75	81	156	153	21	5	23	26	18	17	22	18	6
Moose Fort	Moose Fort, via Moosonee	James Bay	Rev. G. Thompson	Church of England	19	23	42	40	14	8	7	5	6	2	-	-	-
Mount Elgin	Muncey	"	Rev. O. B.Strapp	United Church	73	83	156	153	30	12	15	24	18	2	124	10	2
Shingwauk	Sault Ste. Marie	Sault Ste. Marie	Rev. C. F. Hives	Church of England	55	82	137	131	26	12	13	27	8	21	14	13	3
Sioux Lookout	Sioux Lookout	Kenora	Rev. J. F. J. Marshall	Church of England	60	71	131	106	29	26	22	27	10	13	4	-	-
Spanish	Spanish	"	Rev. P. Mery, S. J.	Roman Catholic	123	128	251	239	67	26	36	21	40	31	16	14	-
Total, Ontario	-	-	-	-	77	835	1,611	1,501	455	185	210	219	192	149	114	66	21
MANITOBA																	

Birtle	Birtle	Birtle	Rev. E. H. Lockhart	Presbyterian	50	65	121	109	34	25	31	15	15	-	-	1	-
Brandon	Brandon		Rev. J. A. Doyle, D.D.	United Church	76	103	179	168	31	23	27	25	21	18	14	13	7
Cross Lake	Cross Lake	Norway House	Rev. H. Boissin, O.M.I.	Roman Catholic	12	20	32	30	8	9	8	7	-	-	-	-	-
Elkhorn	Elkhorn	"	Rev. A. E. Minchin	Church of England	78	76	154	142	61	21	10	20	17	13	8	3	1
Fort Alexander	Fort Alexander	Clandeboye	Rev. J. Brachet, O.M.I.	Roman Catholic	50	66	116	104	39	24	28	12	13	-	-	-	-
Norway House	Norway House	Norway House	Rev. R. T. Chapin, BA	United Church	53	58	111	98	53	16	17	9	2	10	2	2	-
Pine Creek	Camperville	Portage la Prairie	Rev. P. Bousquet, O.M.I.	Roman Catholic	54	58	112	108	39	22	9	11	10	18	3	-	-
Portage la Prairie	Portage la Prairie	"	Rev. J. Jones	United Church	49	50	99	94	32	17	4	15	12	19	-	-	-
Sandy Bay	Marius	"	Rev. O. Chagnon, O.M.I.	Roman Catholic	42	41	83	76	5	26	20	10	9	5	3	5	-
Total, Manitoba	-	-	-	-	470	537	1,007	929	302	183	154	124	99	83	30	24	8

[1] New school opened August 26, 1936

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937—Cont.

School	Post Office Address	Agency	Principal	Denomination	Number on Roll Average			Average Attend-ance	Grades								
					Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
MANITOBA—Concluded																	
Beauval	Beauval	-	Rev. V. Bleau, O.M.I.	Roman Catholic	54	55	109	101	34	32	23	14	4	2	-	-	-
Cowessess	Marieval	Crooked Lake	Rev. P. Chatelain, O.M.I.	Roman Catholic	40	53	93	85	25	18	9	20	6	9	4	2	-
Duck Lake	Duck Lake	Duck Lake	Rev. H. Delmas, O.M.I.	Roman Catholic	76	89	165	158	51	20	34	21	20	19	-	-	-
File Hills	Balcarres	File Hills	Mr. F. Rhodes	United Church	43	58	101	95	18	8	13	20	13	13	8	4	4
Gordon’s	Punnichy	Touchwood	Mr. R. W. Frayling	Church of England	57	69	126	118	53	12	14	28	13	5	1	-	-
Guy	Sturgeon Landing	"	Rev. N. Doyon, O.M.I.	Roman Catholic	55	56	111	103	65	17	16	13	-	-	-	-	-
Lac La Rouge	Lac La Ronge	"	Rev. G. W. Fisher	Church of England	50	68	118	112	34	14	11	14	31	3	3	6	2
Muscowequan	Lestock	Touchwood	Rev. G. Jeannotte, O.M.I.	Roman Catholic	45	62	107	90	41	2	15	18	17	7	6	1	-
Onion Lake C.E	Lloydminster	Onion Lake	Rev. H. Ellis	Church of England	63	53	116	104	44	13	10	12	13	5	13	3	3
Onion Lake R.C	Lloydminster	"	Rev. E. Pascal, O.M.I	Roman Catholic	77	76	153	122	72	25	9	16	10	14	7	-	-
Qu’Appelle	Lebret	"	Rev. M. de Bretagne, O.M.I	Roman Catholic	132	144	276	239	74	21	27	37	42	35	23	13	4
Round Lake	Stockholm	Crooked Lake	Rev. R. J. Ross	United Church	39	45	84	75	15	13	13	20	4	10	5	3	1
St. Philips	St. Philips	Pelly	Rev. A. Paradis, O.M.I.	Roman Catholic	33	43	76	69	31	2	30	15	8	-	-	-	-
Thunderchild	Delimas	Battleford	Rev. J. Angin, O.M.I.	Roman Catholic	73	66	139	126	67	22	11	15	6	11	5	1	1
Total, Saskatchewan	-	-	-	-	837	937	1,774	1,597	624	219	225	263	187	133	75	33	15
ALBERTA																	
			Rev. J. L.														

Blood	Cardston	Blood	Levern, O.M.I	Roman Catholic	81	81	162	155	45	21	38	19	19	14	-	6	-
Blue Quills	St. Paul	Saddle Lake	Rev. L. Balter, O.M.I	Roman Catholic	76	71	147	122	39	27	25	20	17	4	12	3	-
Crowfoot	Cluny	Blackfoot	Rev. J. Riou, O.M.I	Reman Catholic	38	58	96	85	39	17	4	10	10	8	3	5	-
Edmonton	Edmonton	"	Rev. J. F. Woodsworth	United Church	73	86	159	140	39	29	41	12	8	12	8	6	4
Ermineskins	Hobbema	Hobbema	Rev. P. P. Moulin, O.M.I	Roman Catholic	72	85	157	140	89	8	25	20	5	4	5	1	-
Grouard	Grouard	Lesser Slave Lake	Rev. C. Falher, O.M.I	Roman Catholic	48	58	106	98	18	16	13	24	4	9	10	9	3
Holy Angela	Fort Chipewyan	Athabaska	Sister Kristoff	Roman Catholic	13	53	46	37	16	11	7	8	1	1	1	1	-
Joussard	Joussard	Lesser Slave Lake	Rev. P. Serrand, O.M.I	Roman Catholic	56	79	135	126	62	15	14	19	1	19	2	3	-
Morley	Morley	Stony	Rev. E. J. Staley	United Church	38	39	77	71	31	5	4	20	8	5	2	2	-
Old Sun’s	Gleichen	Blackfoot	Rev. J. W. House	Church of England	53	46	99	90	41	7	11	16	10	9	2	3	-
St. Albert	St. Albert	"	Sister V. M. Corriveau	Roman Catholic	89	81	170	165	80	20	19	5	9	14	21	2	-
St. Cyprian	Broeket	Peigan	Rev. W. Barlow	Church of England	24	23	47	44	27	7	-	3	10	-	-	-	-
St. Paul’s	Cardston	Blood	Canon S. Middleton	Church of England	5	75	134	125	28	19	13	20	16	8	15	4	11
Sacred Heart	Brocket	Peigan	Rev. E. Ruaux, O.M.I	Roman Catholic	3	26	57	55	9	10	7	9	11	5	3	-	3
Sturgeon Lake	Calais	Lesser Slave Lake	Rev. L. Girard, O.M.I	Roman Catholic	39	46	85	79	27	7	13	6	7	11	10	4	-
Vermilion	Fort Vermilion	"	Rev. J. Habay, O.M.I	Roman Catholic	36	46	82	66	24	12	17	9	9	6	4	1	-
Wabasca C.E	Wabasca	"	Rev. K. L. Sandercock	Church of England	16	22	38	35	19	4	9	6	-	-	-	-	-
Wabasca R.C	Desmarais	"	Rev. L. Beuglet, O.M.I	Roman Catholic	55	65	120	102	45	13	17	14	8	15	4	1	-
Whitefish Lake	"	"	Rev. C. D. White	Church of England	18	16	34	27	17	-	8	-	4	5	-	-	-
Total, Alberta	-	-	-	-	915	1,036	1,951	1,762	698	248	285	240	167	139	102	51	21

NORTHWEST TERRITORIES																	
Aklavik C.E	Aklavik	Fort Good Hope	Rev. H. S. Shepherd	Church of Englnd	17	10	27	26	15	3	6	3	-	-	-	-	-
Aklavik R.C	Aklavik	"	Sister J. Dussault	Roman Catholic	11	17	28	21	15	2	5	1	3	2	-	-	-
Fort Resolution	Fort Resolution	Fort Resolution	Sister M. L. Champoux	Roman Catholic	16	31	47	40	25	11	6	4	1	-	-	-	-
Hay River	Hay River	"	Rev. W. B. Singleton	Church of England	9	8	17	16	1	5	4	7	-	-	-	-	-
Providence Mission	Fort Providence	"	Sister Mack	Roman Catholic	29	31	60	53	32	6	9	8	3	1	1	-	-
Total, Northwest Territories	-	-	-	-	82	97	179	156	88	27	30	23	7	3	1	-	-

[1] New school opened August 26, 1936

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1937—Conc.

School	Post Office Address	Agency	Principal	Denomination	Number on Roll Average			Average Attend-ance	Grades								
					Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
BRITISH COLUMBIA																	
Ahousaht	Ahousaht	West Coast	Mr. A. E. Caldwell	United Church	30	29	59	47	17	9	8	7	7	-	11	-	-
[2] Alberni	Alberni	"	Rev. F. E. Pitts, B.A	United Church	74	57	131	114	42	24	20	10	10	7	12	3	3
Alert Bay	Alert Bay	Kwawkewlth	Mr. F. E. Anfield	Church of England	113	99	212	203	68	38	41	23	16	17	9	-	-
Cariboo	150 Mile House	Williams Lake	Rev. G. Forbes, O.M.I.	Roman Catholic	58	68	123	119	47	17	14	7	14	11	10	3	-
Christie	Kakawis	West Coast	Rev. B. McLaughlin, O.S.B.	Roman Catholic	59	51	110	103	28	9	12	9	15	16	18	3	-
Coqualeetza	Sardis	New Westminster	Rev. R. C. Scott	United Church	140	110	250	200	65	45	33	23	27	28	13	7	9
Kamloops	Kamloops	Kamloops	Rev. T. M. Kennedy, O.M.I.	Roman Catholic	167	187	354	284	130	50	36	56	33	36	13	-	-
Kitimat	Kitimat Mission	Bella Coola	Mrs. E. H. Durnin	United Church	14	28	42	36	15	9	9	3	5	1	-	-	-
Kootenay	Cranbrook	Kootenay	Rev. M. Murphy, O.M.I.	Roman Catholic	46	44	90	86	29	16	13	19	13	-	-	-	-
Kuper Island	Kuper Island	Cowichan	Rev. J. Guerts, S.M.M.	Roman Catholic	48	56	104	95	36	30	17	13	4	3	-	1	-
Lejac	Lejac	Stuart Lake	Rev. W. Byrne-Grant, O.M.I.	Roman Catholic	88	102	190	168	85	24	24	25	11	4	10	3	4
Port Simpson	Port Simpson	Skeena	Miss L. M. Deacon	United Church	-	30	30	29	2	4	8	7	2	2	2	3	-
St. George's	Lytton	Lytton	Rev. A. R. Lett	Church of England	87	98	185	168	69	27	14	31	18	12	3	5	6
St. Mary's Mission	Mission City	NewWestminster	Rev. F. O'Grady, O.M.I.	Roman Catholic	83	109	192	169	75	30	28	22	14	15	7	-	-
Secbelt	Sechelt	Vancouver	Rev. T. J. Fahlmann, O.M.I.	Roman Catholic	55	39	94	80	21	14	18	13	11	8	1	8	-
Squamish	North Vancouver	"	Sister Mary Amy	Roman Catholic	33	31	64	61	24	10	5	9	6	6	3	1	-

Total, British Columbia		-	-	-	1,092	1,138	2,230	1,962	754	356	300	277	206	166	115	37	22
YUKON																	
Carcross	Carcross	Yukon	Rev. H. C. M. Grant	Church of England	23	24	47	43	15	12	9	4	7	-	-	-	-
St. Paul's Hostel	Dawson	"	Rev. L. G. Chappell	Church of England	12	9	21	17	4	4	5	-	1	2	4	1	-
Total, Yukon		-	-	-	35	33	68	60	19	16	14	4	8	2	4	1	-

[1] New school opened August 26, 1936.

[2] School destroyed by fire, Feb. 21, 1937.

Statement Showing the Enrollment by Province in Different Classes of Schools for the Fiscal Year Ended March 31, 1937

Province	Total Number of Schools	Denomination				Number on Roll Average			Average Attend-ance	Percentage Attend-ance	Grades								
		Church of England	Presbyterian	Roman Catholic	United Church	Boys	Girls	Total			I	II	III	IV	V	VI	VII	VIII	IX
Nova Scotia	1	-	-	1	-	83	82	165	155	93.93	49	22	20	24	34	7	9	-	-
Quebec	1	1	-	-	-	23	32	55	54	98.18	25	12	7	-	11	-	-	-	-
Ontario	13	5	1	6	1	776	835	1,611	1,501	93.17	455	185	210	219	192	149	114	66	21
Manitoba	9	1	1	4	3	470	537	1,007	929	92.25	302	183	154	124	99	83	30	24	8
Saskatchewan	14	3	-	9	2	837	937	1,774	1,597	90.02	624	219	225	263	187	133	75	33	15
Alberta	19	5	-	12	2	915	1,036	1,851	1,762	90.31	698	248	285	240	167	139	102	51	21
Northwest Territories	5	2	-	3	-	82	97	179	155	87.15	88	27	30	23	7	3	1	-	-
British Columbia	16	2	-	9	5	1,092	1,138	2,230	1,962	87.98	754	356	300	277	206	166	112	37	22
Yukon	2	2	-	-	-	35	33	68	60	88.23	19	16	14	4	8	2	4	1	-
Total, residential schools	80	21	2	44	13	4,313	4,727	9,040	8,176	90.44	3,014	1,268	1,245	1,174	911	682	447	212	87

Province	Total Number of Schools	Number on Roll Average			Average Attend- ance	Percentage Attend- ance	Grades								
		Boys	Girls	Total			I	II	III	IV	V	VI	VII	VIII	IX
Prince Edward Island	1	7	12	19	14	73.68	9	1	3	2	3	-	1	-	-
Nova Scotia	10	143	142	285	186	65.26	124	55	25	39	24	7	6	5	-
New Brunswick	11	157	181	338	262	77.51	99	55	46	39	35	31	26	7	-
Quebec	31	805	791	1,596	1,181	73.99	671	227	216	199	124	74	58	24	3
Ontario	85	1,428	1,471	2,899	1,879	64.81	1,161	437	316	301	275	175	137	86	11
Manitoba	46	757	688	1,445	755	52.24	834	254	142	100	73	32	6	3	1
Saskatchewan	24	273	279	552	337	61.05	311	87	52	58	26	10	2	6	-
Alberta	2	16	19	35	24	68.57	12	8	2	3	6	-	4	-	-
Northwest Territories	4	17	26	43	26	60.45	32	7	3	1	-	-	-	-	-
British Columbia	55	825	863	1,688	917	54.32	901	263	220	137	89	48	19	11	-
Yukon	6	65	62	127	63	49.60	88	24	5	10	-	-	-	-	-
Total, day schools	275	4,493	4,534	9,027	5,644	62.52	4,242	1,418	1,028	888	652	383	255	146	15
COMBINED WHITE AND INDIAN SCHOOLS															
Ontario	5	88	67	155	107	69.83	44	25	17	25	15	7	12	8	2
Manitoba	3	26	23	49	25	51.02	29	6	7	1	4	2	-	-	-
Saskatchewan	1	4	6	10	6	60.00	7	-	-	-	-	1	-	1	1
British Columbia	1	6	10	16	8	50.00	12	3	-	-	1	-	-	-	-

Total, combined white andIndian day schools	10	124	106	230	146	63.47	92	34	24	26	20	10	12	9	3

Summary of School Statement

Province	Class of School			Total Number of Schools	Number ou Roll Average			Average Attend-ance	Percentage Attend-ance	Grades								
	Day	Resi-dential	Com-bined		Boys	Girls	Total			I	II	III	IV	V	VI	VII	VIII	IX
Prince Edward Island	1	-	-	1	7	12	19	14	73.63	9	1	3	2	3	-	1	-	-
Nova Scotia	10	1	-	11	226	224	450	341	75.77	173	77	45	63	58	14	15	5	-
New Brunswick	11	-	-	11	157	181	338	262	77.51	99	55	46	39	35	31	26	7	-
Quebec	31	1	-	32	828	823	1,651	1,235	74.80	696	239	223	199	135	74	58	24	3
Ontario	85	13	5	103	2,292	2,373	4,665	3,487	74.75	1,660	647	543	545	482	331	263	160	34
Manitoba	46	9	3	58	1,253	1,248	2,501	1,709	68.33	1,165	443	303	225	176	117	36	27	9
Saskatchewan	24	14	1	39	1,114	1,222	2,336	1,940	83.05	942	306	277	321	213	144	77	40	16
Alberta	2	19	-	21	931	1,055	1,986	1,786	89.92	710	256	285	242	170	145	102	55	21
Northwest Territories	4	5	-	9	99	123	222	182	81.98	120	34	33	24	7	3	1	-	-
British Columbia	55	16	1	72	1,923	2,011	3,934	2,887	73.38	1,667	622	520	414	296	214	131	48	22
Yukon	6	2	-	8	100	95	195	123	63.08	107	40	19	14	8	2	4	1	-
Total	275	80	10	365	8,930	9,367	18,297	13,966	76.33	7,348	2,720	2,297	2,088	1,583	1,075	714	367	105

Expenditure—Votes 166 and 378—By Primary Allotments and Provinces, 1936-37

Province	Administration	Training	Medical	Welfare	British Columbia Special	Irrigation Roads and Surveys	Total
-	$	$	$	$	$	$	$
Prince Edward Island	1,357 50	1,882 52	5,074 47	6,231 76	-	-	14,546 25
Nova Scotia	4,934 42	40,943 66	35,941 00	76,024 84	-	2,253 34	160,097 26
New Brunswick	5,674 85	17,429 26	24,116 76	62,184 42	-	264 15	109,689 44
Quebec	24,267 48	69,482 97	77,227 80	202,228 89	-	8,295 48	381,502 62
Ontario	81,731 71	370,401 35	208,602 03	158,955 76	-	5,818 46	825,509 31
Manitoba	61,213 61	218,296 20	110,864 01	93,020 81	-	1,433 88	484,828 51
Saskatchewan	122,315 06	330,810 77	131,529 12	82,297 64	-	193 06	667,145 65
Alberta	92,566 70	316,615 95	114,262 30	133,970 50	-	-	657,415 45
British Columbia	131,795 64	396,481 15	208,168 34	123,124 50	99,504 09	4,156 87	963,230 59
Yukon	1,168 47	19,639 91	12,207 07	8,703 74	-	-	41,719 19
Northwest Territories	24,756 63	38,994 06	43,819 31	26,444 04	-	-	134,014 04
General	34,896 45	12,501 96	10,350 94	-	-	607 74	58,357 09
-	586,678 52	1,820,977 80	984,334 17	983,537 84	99,504 09	23,022 98	4,498,055 40

Annuities Paid and Interest on Indian Trust Funds 1936-37	
ALBERTA	
Athabaska	$ 7,685 00
Blackfoot	121,086 74
Blood	7,763 94
Edmonton	23,009 16
Hobbema	15,553 75
Lesser Slave Lake	15,025 00
Peigati	6,278 71
Saddle Lake	7,236 13
Sarcee	2,395 92

Stony	4,906 15
-	$ 210,938 50
BRITISH COLUMBIA	
Babine	$ 584 77
Bella Coola	301 03
Cowichan	5,499 06
Fort St John	1,812 51
Kootenay	659 77
Kwawkewlth	3,337 23
Lytton	4,001 17
New Westminster	15,217 24
Nicola	92 55
Okanagan	1,069 10
Queen Charlotte	281 40
Skeena River	2,748 53
Stikine	83
Stuart Lake	1,506 97
Vancouver	10,009 58
West Coast	1,333 83
Williams Lake	113 50
-	$ 49,477 95
MANITOBA	
Birtle	$ 3,447 01
Clandeboye	18,098 14
Fisher River	9,721 13
Fort Churchill	1,090 00
Griswold	393 63
Manitowapah	11,241 92
Norway House	15,972 42
The Pas	24,265 02
Portage la Prairie	8,139 52
York Factory	2,250 00
-	$94,619 69

DEPARTMENT OF MINES AND RESOURCES

NEW BRUNSWICK	
Northern Division	$ 967 78
Northeastern Division	1,187 71
Southwestern Division	83 11
-	$ 2,238 60
NOVA SCOTIA	
Micmacs of Nova Scotia	$ 1,669 94
NORTHWEST TERRITORIES	
Fort Good Hope	$ 4,285 00
Fort Resolution	8,720 00
Fort Simpson	6,085 00
-	$ 19,090 00
ONTARIO	
Alnwick	$ 9,656 03
Cape Croker	21,893 20
Caradoc	3,463 39
Chapleau	2,835 65
Christian Island	14,851 33
Kenora District (Patricia Portion)	16,516 00
Fort Frances	13,860 86
Georgina Island	3,512 91
Golden Lake	15 51
Gore Bay	10,096 22
James Bay	18 90
Kenora	26,295 60
Manitowaning	25,504 96
Moravian	8,830 99
New Credit	4,707 85
Parry Sound	17,298 80
Port Arthur	16,626 09
Rama	7,987 42
Rice Lake	8,380 66
Sarnia	17,466 52
Saugeen	15,795 29
Sault Ste Marie	12,901 17
Savanne	6,625 00
Scugog	1,268 73
Six Nations	42,418 45

Sturgeon Falls	60,488 78
Thessalon	7,046 25
Tyendinaga	5,155 99
Walpole Island	3,087 44
-	$ 381,605 99
QUEBEC	
Bécancour	330 02
Bersimis	6,140 15
Cacouna	480 78
Caughnawaga	816 54
Lorette	723 58
Maniwaki	4,053 94
Manowan	2,117 33
Oka	455 19
Pierreville	387 07
Pointe Bleue	607 85
Restigouche	240 23
St Regis	2,958 83
Timiskaming	2,380 11
-	$ 21,697 62
SASKATCHEWAN	
Battleford	$ 19,491 59
Carlton	22,938 88
Crooked Lakes	27,990 56
Duck Lake	9,501 02
File Hills	8,317 40

Annuities Paid and Interest on Indian Trust Funds 1936-37—Concluded

SASKATCHEWAN—Concluded	
Onion Lake	$ 6,064 87
Pelly	12,204 32
Qu'Appelle	26,030 31
Touchwood	19,281 24
Wood Mountain	3 07
-	$ 146,823 26

INDIAN TRUST FUND Showing Transactions in Connection with the Fund during the Fiscal Year ending March 31, 1937		
Service	Debit	Credit
Balance, March 31, 1936	-	$ 13,877,868 60
Collections on land sales, timber, and stone dues, rents, fines, fees, etc	-	480,005 63
Interest for year ending March 31, 1937	-	704,791 63
Credit transfers during year	-	20,390 43
Expenditure during year	$ 1,073,784 80	-
Transfers by warrant, etc.	11,627 36	-
Balance, March 31, 1937	13,997,644 13	-
-	$15,083,056 29	$15,083,056 29